RISK MANAGEMENT OF THE NATIONAL DEBT

EVALUATION OF THE 2003-2007 POLICY

&

2008-2011 POLICY

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Dutch State Treasury Agency

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CONTENTS

Executive summary

The Dutch government applies a risk framework in financing the deficit and refinancing the existing national debt. The risk framework is a set of policy rules aimed at financing the national debt at the lowest possible cost, with an acceptable risk to the budget. The risk framework is evaluated at regular intervals. Roughly speaking, such an evaluation (together with the formulation of new policy) takes place once every four years. This time the evaluation and the development of the new policy have been postponed for a year in order to give the current Minister the opportunity to take decisions on this point. The new risk framework will cover the period 2008-2011. This report combines both the evaluation and the new policy.

Scope of debt management; cost minimisation at an acceptable risk to the budget

The debt financing strategy applied by the Netherlands (and most other countries) is to finance the national debt as efficiently as possible at an acceptable risk to the budget. In principle, other debt policy approaches are also possible. For example, literature often speaks of the possibility of using debt financing for budget stabilisation purposes or as an instrument for controlling risks in the national balance sheet (ALM). The various approaches to debt management are described in Section I. Another recurrent theme is the scope of debt management. Specifically, the question is whether the debt policy is rightly restricted to the costs and risks to the budget or whether the social effects of debt financing should also be considered in the policy. The report confirms that the debt manager is primarily responsible for minimising the interest costs in the budget and restricting fluctuations in those costs (see also Section II.2.1). Budget stabilisation through smart debt financing is not viable, since this will require far-reaching insight into the effects that destabilise the balance. Although some governments considered the stock approach of Asset and Liability Management (ALM), the idea of ALM as a risk management strategy was abandoned because of its complexity. Although including the social effects of debt financing is attractive in conceptual terms, this turns out to be difficult to manage as an objective in practice. It is impossible or difficult to measure the social effects. Internalising the social effects makes the debt manager's assignment less concrete, which means that the debt policy results will not be measurable either. However, the government may still decide to use debt management for purposes other than cost minimisation. As the costs and benefits to the budget of an alternative strategy may be considered in the decision whether to adopt the strategy, it is the debt manager's responsibility to provide insight into these costs and benefits.

Debt policy entailed by budgetary policy

The debt management strategy should be consistent with the budgetary policy. The latter is geared to prevent the 3% deficit limit from being exceeded. Furthermore, the current cabinet aims to achieve a structural surplus of 1% of GDP by 2011 in order to ensure sustainable public finances. Finally, interest costs are left out of the expenditure frameworks in order to counteract pro-cyclical policy. The limit set for the deficit implies that fluctuations in interest costs should not reach levels that jeopardise a sound budgetary position. In addition, limiting the average debt financing costs will help achieve a budget surplus. Leaving the interest costs out of the frameworks does not alter these insights. The reasons for this are set out in Section II.2.2. Low costs and an acceptable risk remain relevant factors. When deciding what is acceptable, it should be borne in mind that the risk framework also has to be effective in the most improbable (economic) situations.

Risk framework 2003-2007: architecture

The current risk framework was established in 2002 and initially applied up to and including 2006. In order for the new framework to be in line with the new cabinet, it was decided to extend the current framework to 2007.

The point of departure of the risk framework is to minimise the costs at an acceptable risk to the budget. The central control variable is an annual basis amount-at-risk of 9% of GDP. This basis amount-at-risk determines which part of the debt is susceptible each year to changes in the market rate of interest. It consists of the debt to be refinanced plus the swaps. Windfalls or setbacks in the budget balance are purposely not included in the basis amount-at-risk (i.e. they are not used as control variables). The degree of risk considered acceptable within the framework is relative and changes in accordance with the GDP. In this way, risk develops in tandem with the capacity to bear risk. The decision at the time to apply basis amount-at-risk of 9% was consistent with the annual refinancing by other European countries showing some similarity to the Netherlands and was comparable with the turnover ratio of the portfolio.

The financing policy has been formulated as a supplement to the risk framework, which alone proved insufficient to adequately limit risk. The financing rules demand that more than one type of bond should be issued each year, that a liquid size should be attained for each bond and that the volume on the money market should be sufficient to absorb unexpected fluctuations in the borrowing requirement. The rules also assign a limited role to interest rate swaps. Swaps are an excellent instrument to bring the repayment profile resulting from the issuance of bonds and bills in line with the risk profile of 9% of GDP per annum.

Risk framework 2003-2007: evaluation

The operation of the current risk framework can be demonstrated with the aid of a model analysis. In this analysis, the average expected costs of the debt policy are set off against the expected risk (expressed as Cost-at-Risk, or CaR). Costs and risk are expressed over a cumulative period of five years. The analysis shows the impact of risk management on the interaction between costs and risk. In summary, the following conclusions can be drawn.

Adequate risk control

The risk framework, together with the financing rules, worked well as a risk safety net. Apart from ensuring adequate risk control, they also prevented the costs from becoming excessive. Although the policy permits more than one specific portfolio, the differences between these portfolios in terms of costs and risk do not exceed €500 million over a five-year period, with 50 billion of interest cost this is approximately 1%.

Workability not perfect

Each year, a basis risk of 9% of GDP has to be achieved in order to maximise efficiency within the specified risk framework. Exceeding 9% is too risky, while coming under the target is too expensive. Achieving this target appears to be difficult in practice because unforeseen changes in the cash balance (budget balance) affect the size of the basis risk. Unforeseen windfalls reduce the basis risk, which means that the term has to be reduced in order to still achieve 9% of GDP. Setbacks, on the other hand, necessitate an extension of the term. If windfalls or setbacks only manifest themselves later in the year, adjustments are sometimes no longer possible. In that case, the target of 9% of GDP is not attained.

Following the business cycle not desirable

Reducing and extending is only justified if this is done in response to a trend. For example, it is advisable to reduce the term gradually if the debt declines in line with the trend, and to extend the term if the debt increases in line with the trend. The current policy follows the business cycle and is therefore more volatile than is desirable.

Room for improved efficiency

Although the current strategy works efficiently within the specified frameworks, it is not on the efficient frontier. Therefore, a limited efficiency gain can be realised. The model applied for the risk profile analysis shows that an efficient strategy, unlike the current risk profile, is characterised by an evenly spread risk profile over a particular number of years and then drops back to zero. In

principle, any desirable risk profile can be achieved with the aid of interest rate swaps. This means that the efficiency gain can be realised without affecting the issuance policy.

New framework provides improvement in efficiency and workability

The new framework will use a benchmark (reference point), which will be selected in such a way as to aim for a portfolio with a centralised risk profile. Where the use of a *benchmark* increases the workability of the framework, *choosing the centralised portfolio as a benchmark* will increase efficiency. The benchmark will be chosen in such a way, that it can be realised with the use of swaps; the issuance policy will not be changed.

A benchmark is an objective standard for measuring the debt manager's performance. The choice of a benchmark is a choice in favour of a specific portfolio. For efficiency reasons, this choice is limited to centralised portfolio. The choice of a benchmark also means that a decision is made as to the interest rate at which the debt is financed. Once a portfolio has been determined, the costs and the risk of the benchmark portfolio will have been defined in unequivocal terms. The benchmark prescribes exactly what the debt manager should do in theory, i.e. gradually issue in the same term.

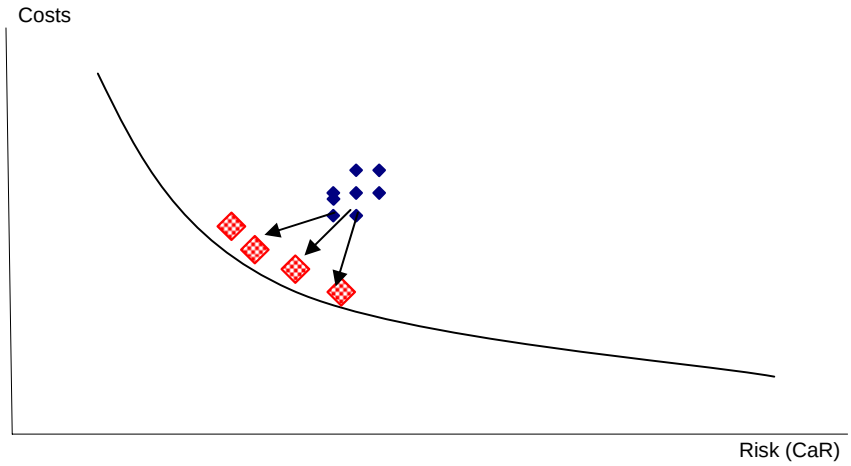
In practice, the benchmark can only be reproduced by financing in *exactly* the same manner at *exactly* the same yield. This does not mean that the debt manager will apply exactly the same strategy in practice. The actual financing strategy will involve a combination of continued issuance policy and the use of instruments such as swaps.

If chosen and organised properly, the benchmark will be an *adequate risk safety net*. This will also make control more unequivocal, as the debt manager approximates the risk and costs of one unambiguous portfolio. A benchmark is *transparent*. This transparency is appreciated by the market and facilitates the (political) management of the debt manager. In terms of *efficiency*, it may be assumed that a gain can be realised if the aim is a centralised portfolio. The model shows that, over a five-year horizon and with a rising interest-rate curve, portfolios with a centralised risk profile are more efficient in a state of equilibrium than portfolios with a jagged profile. In addition, efficiency is further improved in that the benchmark stimulates the 'smart' use of financing instruments.

Some of that efficiency will have to be surrendered in favour of improved workability of the national debt risk framework. At the moment, *workability* is impeded by unforeseen balance fluctuations. The new policy will by-pass this disruption by making changes in the budget balance

part of the target variable. The inclusion of the balance in the benchmark does not affect its unequivocalness.

Pursuit of a benchmark portfolio



Performance in relation to the benchmark will be discussed in the budget and the annual report. Although performance may focus on the *costs* of debt financing, a factor of particular importance is the degree to which the *risk profile* of the benchmark is approximated. Where the costs are concerned, the costs of the portfolio are simply set off against the costs of the benchmark. The debt manager's performance will be constant as long as his result does not change in relation to the benchmark. Just like any other portfolio, the benchmark involves expected interest costs and a risk that these costs will be higher. A performance equalling the benchmark therefore does not mean that the interest costs will accordingly be low. If the debt manager should eventually perform slightly better than the benchmark, the *expected* costs will be lower than the costs of the benchmark. The risk profile of the actual portfolio is subsequently compared with that of the benchmark. It is fairly easy to assess periodically the extent to which the risk profile approximates the envisaged profile.

Selection of the benchmark portfolio (including other features) in practice

Except for several practical preconditions the benchmark should fulfil, the selection of the benchmark portfolio is based mainly on what is desirable. A question of particular importance in this respect is what form of debt financing is most compatible with the budgetary policy as a whole. The cabinet aims to achieve good budget results, as arranged in the coalition agreement in the run-up to the surplus in 2011. It should also ensure that the risks remain sufficiently controllable so as not to jeopardise a sound budgetary policy. Every attainable portfolio has a certain level of costs and risk, which is subject to change in accordance with the assumed

scenario for the development in the budget balance. As the risk framework is meant specifically as a safety net (still effective in the worst case scenario), express account should be taken of the risk of balance deterioration and its impact on interest costs. Another key point is the extent to which, as part of the current budgetary policy, the aim should be to reduce, extend or maintain at a constant level the average term of the debt portfolio. Finally, a relevant factor for the benchmark portfolio is the interaction between costs and risk. After all, a well-informed choice in favour of a specific benchmark portfolio means that careful consideration was given to the insurance premium the government is prepared to pay for every euro in lower risk.

Based on the above, it has been decided to use a benchmark portfolio characterised by continuous issuances in a 7-year bond. This will be the central control variable of the debt management policy during the period 2008-2011. The choice for this benchmark is in agreement with the current budgetary policy. The debt quote is expected to decline as a result of the current budgetary policy. In the present framework that targets a basis amount-at-risk of 9% of GDP, the average term of the debt portfolio would be gradually reduced. The choice for a 7-year benchmark portfolio also reduces the average term of the debt portfolio (based on the expected trend of debt). In choosing a 7-year benchmark, the current policy is continued, albeit at average lower expected costs and risk.

Unlike the framework aiming at a risk of 9% of GDP, the benchmark portfolio does not respond to the business cycle. This was a deliberate decision because fluctuations in the business cycle and the balance were one of the reasons why the risk framework was less workable than originally intended. This does not mean that the current control variable could not be adjusted to changes in the economic or budgetary situation. However, we advise that the national debt only be adjusted (much like the course of an oil tanker) in the event of trend-related changes in the economy. Such trends only manifest themselves in due course. As part of the periodic evaluation of the risk framework, therefore, consideration will always be given to the question whether any breaks in the trend require an adjustment of the benchmark.

I. Theoretical and practical approaches to risk management

I.1 Summary

The Dutch government's risk management follows the recommendations of the IMF and the World Bank. In line with this, the debt policy aims to finance debt as efficiently as possible with due observance of an acceptable risk. This section discusses how the policy pursued in the Netherlands relates to the theory of risk management. In addition, it explains how other government debt managers have implemented their risk management policy. Based on the findings, an initial conclusion is drawn as regards the usefulness of the various approaches for the Dutch government's risk framework.

Risk management plays a key role in administering the national debt. The central factor is the market risk, which relates to changes in the economic/macroeconomic climate that affect interest rates. Literature distinguishes three approaches to risk management. Each of these approaches has its own definition of the terms *costs* and *risk*, as well as its own interpretation of the purpose of debt management.

The idea behind the *budget stabilisation approach* (1) is that the debt manager, through smart financing of the national debt, contributes to the stabilisation of the budget balance. In that case, the financing should be managed in such a way that the interest costs in the budget always move in a direction opposite to that of the primary balance. The *Asset Liability Management* approach (2) aims to match the risk features of the assets and liabilities on the national balance sheet, so that economic shocks have an equal effect on both sides of the balance sheet. Finally, the *cost-minimisation* approach (3) aims to minimise the costs of debt financing, given a particular risk level. The term 'costs' specifically refers to the interest costs in the budget. The risk is defined as the possible fluctuation in these costs.

In practice, debt managers do not apply every approach to an equal extent. It has appeared, for example, that in practice the budget stabilisation approach is not used as a risk management guideline. The main reason for this is that it is difficult for a country to investigate how various macroeconomic variables will affect the debt costs and the balance. In addition, if a country does not know what shocks to expect, it is impossible to determine the correct hedge for the budget balance in advance. Although some countries rationalise policy measures by referring to the budget stabilisation approach, their main objective is usually cost minimisation.

The ALM approach is not particularly popular either in practice. This is due to the complexity of compiling a national balance sheet. Hedging balance sheet risks through matching is often very expensive. To date, no government has been able to compile a comprehensive balance sheet of all its assets and liabilities. The countries most active in the analysis and use of ALM are New Zealand and France. Although these countries take a number of results from the analyses into account in the overall structure of the debt policy, they do not base their risk management on the ALM approach.

Cost minimisation appears to be by far the most popular risk management approach. All European countries use this method. While this may be due to the limitations of the other approaches, most governments tend to focus on the costs of debt financing and their impact on public finances. In other words, financial management revolves around sound public finances and the reduction of the national debt. Control of the interest costs plays an important part in this. Countries implement the cost-minimisation approach (given a particular budget risk) in different ways. The risk considered acceptable is obviously country-specific. Furthermore, different control variables are used in managing costs and risk.

The conclusion may be drawn that the budget stabilisation approach and the ALM approach are difficult to apply in practice. It is not possible to adopt these approaches as a guideline for the risk policy in the Netherlands. Thus, the emphasis for debt management is on cost minimisation, provided the risk to the budget is acceptable.

I.2 Details

The remainder of this section addresses the theoretical and practical approaches to debt management in further detail. Section I.2.1 addresses the role of the risk management of the national debt according to the literature. Section I.2.2 describes the risk management approaches and examines to what extent these approaches are applied by debt managers.

I.2.1 Risk and risk management for debt managers

For a debt manager, risk management and debt management are closely related. According to Wheeler, the purpose of debt management is ‘to ensure that the government’s borrowing needs are met efficiently and that the stock of government debt and the incremental debt flows […] are managed in a manner consistent with the government’s cost and *risk* preferences’.[1] This

[1] Wheeler, G. (2004), p. 4.

formulation assigns a central role to the policy aimed at risk identification and control within the debt management process.

What is meant by the term 'risk'? Risk is a corollary of uncertainty and relates to the consequences of that uncertainty. The risk consists of two components: the chance of a particular outcome occurring and the extent of the effect entailed by this outcome. In practice, calculating the chance and extent of an outcome plays a central part in choosing a debt strategy.

According to the *Guidelines for Public Debt Management* (IMF/World Bank, 2001), the public debt manager is confronted with six types of risk: market risk, refinancing risk, liquidity risk, credit risk, settlement risk and operating risk (see Annex 1). Of these, only market risk is relevant to the reassessment of the risk framework. For the purpose of analysis, the definition of 'market risk' comprises all risks relating to changes in the economic/macroeconomic climate. In addition to fluctuations in interest rates and exchange rates, this definition covers all macroeconomic shocks, such as a sudden drop in domestic consumption. This definition is most consistent with the various risk management approaches recognised in the literature.

I.2.2 Theoretical concepts and practical applications of risk management

In the literature, three theoretical approaches to market risk are distinguished. Two of these are *debt flow* approaches, while the third is based on *stocks (balance sheet items)*. First, the budget stabilisation approach aims to stabilise the budget balance. Second, the *stock* approach is *Asset and Liability Management* (ALM), which aims to harmonise the risk features of the assets and liabilities on the national balance sheet. The third approach is cost minimisation, which aims to minimise the costs at an acceptable risk to the budget.

I.2.2.1 The budget stabilisation approach

Tax smoothing and the budget stabilisation approach

The budget stabilisation approach is related to the argument of *tax smoothing*. The basic principle behind tax smoothing is that changes in the tax rate have a distorting effect on the economy. Regular fluctuations in the rate cause uncertainty, as a result of which decisions by individuals regarding their labour supply, saving behaviour and willingness to invest are less than optimal. This is harmful to the allocative efficiency of economic transactions. Therefore the government would have to aim to even out the tax burden over time. Accordingly, Barro (1979) recommended that, if there is a sharp rise in government expenditure during a recession, this should not be compensated with tax increases, but rather be absorbed by a temporary deterioration of the

budget balance. This means that a national debt is accumulated over the period concerned, which can be reduced again during good times. The principle of tax smoothing is a form of automatic economic stabilisation that causes fluctuations in the balance. These fluctuations are unpleasant if they are likely to result in significant fluctuations in the budget balance and/or if a government should adhere to a maximum deficit. By means of smart debt financing, the balance fluctuations may be restricted. For example, fluctuations in the interest costs might counterbalance fluctuations in the primary balance.

In principle, the objective of budget stabilisation may be achieved by maximising the correlation between the interest costs and the primary budget balance.[2] In order for budget stabilisation to be effective all the time, the coherence between fluctuations in the interest costs on the one hand and the primary balance on the other should be virtually perfect. Only in that case will there be a good chance that fluctuations in the interest costs will counteract fluctuations in the primary balance *in every period*.[3]

In order to determine which debt structure may result in budget stabilisation, the interrelationship between macroeconomic variables on the one hand and the debt costs and the primary balance on the other has to be understood. A shock with a negative effect on growth will negatively influence income and push up government expenditure. In that case, the objective of a budget stabilisation approach would be to reduce the interest costs at the same time. Say, for example, that the economy is hit by a negative *demand* shock, resulting in a fall in domestic consumption and consequently economic growth. The rate of inflation and government income will go down, while government expenditure will increase. In this case, the debt costs might fall if inflation-indexed (or GDP-indexed) debt were included in the portfolio and/or if the share of short-term debt were to increase in this situation (assuming that short-term interest rates follow the falling rate of inflation[4]). Issues of index-linked bonds and/or short-term debt stabilise the budget balance and constitute a hedge/natural hedge. Conversely, in the event of a negative *supply* shock, such as a rise in oil prices or a drop in productivity growth, a debt structure with inflation-indexed bonds will be ineffective.[5] The negative shock causes a decline in economic growth and thereby in government income.[6] In addition to this deterioration of the primary balance, there will be higher interest costs, rising in accordance with the rate of inflation. In that

[2] Blommestein, H. (ed.) (2005), pp. 43-44.
[3] A correlation of, for example, 0.5 means that fluctuations in the balance and the interest costs will cancel each other out half of the time, but will reinforce each other during the other half. Even if the correlation is slightly higher, there is still a relatively large chance that the movements have an adverse effect during a particular period.
[4] Whether this will happen depends on the extent to which the shock hits the entire interest rate region (e.g. the euro zone). A country-specific shock will have little effect on short-term interest rates.
[5] Wheeler (2004), pp. 80-81.
[6] This effect on government income does not, for that matter, automatically apply to the Netherlands, since the income from the Dutch gas reserves is positively dependent on oil prices.

case, a portfolio of nominal long-term debt, offering protection against interest rate increases caused by inflation, will be desirable.

In the 1990s, interest in the budget stabilisation approach was fed by the budget requirements attached to accession to the Economic and Monetary Union (EMU). Under these requirements, the budget deficit should not exceed 3% of GDP. Since the business cycle may cause substantial balance fluctuations, governments usually aim to minimise the deterioration in the budget balance during bad times. Obviously, debt financing directed at budget stabilisation may – in theory – be a useful tool in this connection.

The budget stabilisation approach in practice

To what extent has the budget stabilisation approach penetrated the debt management practice? The risk management profiles of various debt managers justify the conclusion that none of them apply the budget stabilisation approach as a guideline. Literature offers various explanations for this.

Alesina, Roubini and Cohen argue that debt managers ignore the budget stabilisation approach because budgetary policy is not driven by *tax smoothing* motives. They claim that governments put up with the welfare losses caused by tax rate fluctuations.[7] However, this argumentation does not apply to the motive of budget stabilisation, all the more because the policy of countries belonging to the EMU is geared to staying within the 3% limit. De Haan and Wolswijk (2005) attribute the lack of practical application of the budget stabilisation approach to the fact that countries find it difficult to investigate how the various macroeconomic variables affect the debt costs and the balance. Furthermore, it is not known what shocks (demand or supply shocks) a country may expect. As a result, it is practically impossible to determine the right hedge for the budget balance in advance. An example of this pertinent to the situation in the Netherlands will be given below.

Although no debt manager applies the budget stabilisation approach as a risk management guideline, arguments drawn from this approach are used for risk management purposes. This is done to justify isolated policy actions that cannot be rationalised entirely on the basis of the existing risk framework. In these cases, the budget stabilisation approach is put forward as an ad hoc argument. This applies, for instance, with regard to the decision of whether to issue index-linked bonds.

[7] Alesina, A., N. Roubini, G.D. Cohen (1997), p. 229.

In France, for example, where risk policy is based on cost minimisation, the French debt manager concluded that index-linked bonds, although not optimal from a cost-minimisation perspective, might contribute to the stabilisation of the budget balance.[8] The United Kingdom has also indicated that index-linked bonds have a favourable effect on the stabilisation of the budget balance. It is not clear whether this played a part in the decision to issue such bonds.[9] In the Netherlands, where policy also aims at minimising costs, a working group of the Ministry of Finance, the Dutch central bank (DNB) and the Netherlands Bureau for Economic Policy Analysis (CPB) looked into the advantages and disadvantages of issuing index-linked bonds. At the end of 2005, the working group published a report containing its analysis and main findings with regard to index-linked bonds[10], the summary of which is attached as Annex 2. The study involved an analysis of whether the use of index-linked bonds could lead to budget stabilisation. The working group concluded that it was difficult to establish how macroeconomic variables affect the debt costs and the primary balance. Although an analysis over a 20-year period revealed a marginal positive correlation between the rate of inflation and the budget balance, it appeared that this relationship was not robust. The findings for the Netherlands over this period showed that in half of the cases the rate of inflation and the balance moved in the same direction (which means that there was budget stabilisation) and that they moved in opposite directions during the other half (destabilisation). Accordingly, index-linked bonds would not automatically absorb the balance fluctuations entailed by inflation. At the same time, the report demonstrated that in the Dutch situation a portfolio with index-linked bonds would be inferior to the existing portfolio where the cost-risk ratio was concerned. This, together with the fact that the Dutch government (owing to a limited borrowing requirement and the liquidity needed in other bonds) could only issue a limited quantity, had the effect that no index-linked bonds were issued.

Conclusion

In summary, the conclusion may be drawn that the budget stabilisation approach, although described in fairly great detail from a theoretical perspective, is not applied in practice as a risk management guideline. Nevertheless, some countries rationalise policy measures with the aid of arguments related to the budget stabilisation approach.

[8] Renne, J.P. and N. Sagnes (2006), pp. 6-7.
[9] IMF/The World Bank (2003), p. 336.
[10] Working Group on the Budget in Real Terms (2005).

I.2.2.2 The ALM approach

ALM in the business sector

In the 1970s, a risk management approach known as *Asset and Liability Management* (ALM) was introduced in the business sector. The purpose of ALM is to harmonise the assets and liabilities on the balance sheet in such a way that both sides of the balance sheet are equally affected by shocks. In this way, the balance sheet as a whole would be shockproof. The balance sheet of a pension fund, for example, consists on the assets side of an investment portfolio, with a particular market value at any given moment, and on the liabilities side of obligations, equalling the net discounted value of the pensions payable in the future. In a theoretically perfect situation, a shock – such as a fall in interest rates – causing an increase in the value of the obligations would have to bring about a proportional increase in the value of the investments.

Such a perfect match between value development on both sides of the balance sheet exists largely in theory, however. In practice, mismatches continue to exist, either because they are too expensive to tackle or because they are not recognised owing to the difficulty of valuing the balance sheet items. There are various types of mismatch. For example, different terms for asset and liability items make the balance sheet sensitive to interest rate fluctuations. Parallel to this, differences in the currency composition of asset and liability items make the balance sheet sensitive to exchange rate fluctuations. The ALM approach tries to chart the various components of the balance sheet, as well as their sensitivity to shocks in various macroeconomic scenarios.

ALM and the debt manager

The practical application of ALM means that the debt manager should gear the risk features of the debt (part of the liabilities side of the national balance sheet) to the risk features of the other liabilities and to those of the possessions (the assets side of the national balance sheet).[11] Such harmonisation reduces the influence of interest rate and exchange rate fluctuations on the national balance sheet (the net worth).[12] From this perspective, risk management involves limiting the extent to which the net worth may be affected by fluctuations in macroeconomic variables.

Since the 1990s, various debt managers have pondered the question of whether and how the ALM approach can be embedded in the risk management policies of governments. In doing so, they came across several problems. The government cannot just apply a theory from *corporate finance* to the debt policy because a company differs from a state on several key points. In a company, for example, there is often a direct relationship between assets and liabilities

[11] Horman, G. (2002), p. 3.
[12] Wolswijk, G. and J. de Haan (2005), pp. 6-7.

(e.g. shares are issued to finance an expansion), while this is usually not the case for governments. The main problem, however, is that it is extremely complicated to identify all the assets of a government and value them correctly. What, for instance, would be the value of Vermeer's painting 'The Milkmaid' on the balance sheet? And what to do with the pension commitments and other *contingent liabilities*?

Taking these problems into account, Blommestein (2005) distinguishes three ways in which governments could implement an ALM approach. The first approach aims to harmonise the risk features of the various *financial* assets and liabilities on the national balance sheet. The second approach is an extension to the *financial and physical* assets and liabilities on the national balance sheet. Buildings, roads and other types of physical infrastructure are therefore also taken into consideration, which gives the necessary complications. The third variant aims to set off the net discounted value of the future primary budget balances against the debt. This exercise provides insight into solvency: the government can only repay the debt if it generates sufficient net income in the future. Although the latter approach is a stock approach in conceptual terms, it obviously consists in part of (future) flow variables. The three variants are discussed in more detail below.

Financial assets and liabilities

The first ALM approach only takes account of the *financial* assets and liabilities on the national balance sheet. Although governments do apply this approach, this application is usually restricted to limited parts of the debt portfolio. Often this only involves the management of foreign currency debt. The market risk of foreign currency bonds can be minimised with ALM by matching the term structure and the currency composition of these debts with the foreign currency reserves of the government or the central bank. In this case, the ALM method is used at 'sub-portfolio' level. Obviously, such an approach is no guarantee that the balance as a whole will be shockproof.

Financial and physical assets and liabilities

Until now, two debt managers have tried to match the risk features of the financial *and* physical assets and liabilities on their national balance sheet: New Zealand and – to a lesser extent – France.

New Zealand tried to quantify the interest rate sensitivity of the three main actual asset categories: motorways, shares in the public electricity companies and public ownership of lands and buildings.[13] To make the issue manageable, the other government assets were disregarded.

[13] Horman, G. (2002), p. 6.

Nevertheless, it appeared impossible to obtain a detailed picture of the national balance sheet.[14] The global picture emerging from the calculations gave rise to three conclusions. First of all, it was established that the effective term of the assets was fairly long, which meant that the term of the debt portfolio had to be long as well. Secondly, it appeared that the market value of some assets was only sensitive to changes in the real (as opposed to the nominal) interest rate. Such assets were therefore inflation-indexed, which conclusion led to the issuance of index-linked bonds. Thirdly, it became clear that the assets were not sensitive to exchange rate fluctuations. This implied that there was no point in maintaining foreign currency debt. New Zealand concluded that the insights from the ALM study had to be regarded as a supplement to – rather than a replacement of – other forms of risk management. The compilation of a balance sheet entailed too many problems to base the risk policy on ALM. Cost minimisation remains the mainstay of risk management in New Zealand.

The second country that tried to apply ALM in practice was France.[15] The main point of the French ALM approach was to assess the extent to which the assets side of the balance sheet was inflation-indexed. If there were inflation-indexed assets, this would have been an argument in favour of including index-linked bonds in the debt portfolio. Compiling a national balance sheet is mainly an academic exercise for the French debt manager. In essence, the French policy remains focused on cost minimisation.

Debt position and net discounted value of all government income

The third ALM variant aims to relate the net discounted value of the future primary budget balances to the debt position. In this case, therefore, the features of the debt are analysed together with the features of all (future) government income and expenditure. The approach can be used in order to check whether the debt structure is in agreement with the net income flows of the government that are available for hedging the debt position (solvency). Obviously, this analysis will only yield meaningful results if an adequate estimate can be made of the net discounted value of the future primary balances. In practice, it appears to be extremely difficult to make such an estimate. Complicating factors include exogenous developments affecting government income (such as economic shocks, demographic turnover, etc.), the choice of an adequate discount rate and the effects of existing policy on future income and expenditure.[16]

[14] Firstly, the poor quality of the data gathered resulted in marked standard deviations in the estimates of interest rate sensitivity. Secondly, it remained unclear how the assets responded to inflation.
[15] The information on France's experiences with ALM was obtained in particular from interviews with officers of *Agence France Tresor* (French Treasury Agency).
[16] Please note that the complexity is not caused by assumptions on *future* policy. In this sense, the analysis is independent of policy.

Conclusion

None of the debt managers compile a comprehensive balance sheet of all government assets and liabilities. The conclusion may also be drawn that countries do not apply any variant of the ALM approach as a guideline for the risk management of the national debt. The countries most active in the analysis and use of ALM are New Zealand and France. However, these countries, too, only make limited use of the ALM analysis for risk management purposes.

I.2.2.3 Cost minimisation

The purpose of the cost minimisation approach is to minimise the expected interest costs for the budget at an acceptable risk level. The risk consists of unforeseen fluctuations in the market rate of interest, which may increase or reduce the expected interest costs. What is an acceptable risk level depends on a government's risk preference.

Different ways of minimising interest costs

There are various ways in which a debt manager can minimise interest costs. For example, it is possible to reduce the average term of the debt. Assuming a rising interest-rate curve (interest rate increases with the term), the interest costs will decline (on average). However, reducing the term also increases the risk.[17] Firstly, the short-term interest rate is more volatile than the long-term interest rate, so that the chance of the eventual interest costs deviating from the average expected interest costs is greater than for longer-term debt.[18] Secondly, shorter-term debt has to be refinanced earlier and more often. Both observations together mean that, by borrowing in the short term, a debt manager is exposed to *greater* risk *more often*.

There are also other ways in which a debt manager can minimise debt costs. A number of these do not necessarily entail extra risk. First of all, greater transparency regarding the issuance policy may reduce the costs of debt financing. Increased predictability of the debt policy may decrease uncertainty among market players about the issuance policy and thus reduce the risk premium in the interest rate. Examples include timely publication/revision of issuance calendars or disclosure of the risk management policy. A second option is to increase the liquidity of the trade in government bonds.[19] This may reduce the liquidity premium demanded by investors. Sufficient liquidity in the market may be achieved, for example, by linking the volumes of individual bonds to a minimum level. Thirdly, the debt costs may be reduced by issuing bonds that are structurally in great demand. If investors are prepared to pay a premium in this respect, this will translate to

[17] Bolder, D.J. (2003), p. 4.
[18] Hahm demonstrates this for the interest rate movements in the US. See Hahm, J.H. (2002), pp. 7-8.
[19] The various ways of minimising costs can also be found in Leong, D. (1999), pp. 15-16.

lower costs. Literature refers to such bonds as *preferred habitats*. Normally, this strategy will also affect the risk of debt financing. Issuing index-linked bonds or ultra-long-term bonds (if there is an interest for such bonds in the market) are examples of this.

Debt managers and cost minimisation

Compared with the other two risk management approaches, researchers have paid relatively little attention to the cost-minimisation approach.[20] Nevertheless, this is the most commonly used approach among debt managers, including all European countries. For example, the objective of risk management in the Netherlands is 'to borrow funds [...] at the lowest possible cost within an acceptable risk.'[21] Another example is Sweden, which has the objective 'to minimize the cost of borrowing [...] within the existing risk limits.'[22] The popularity of the cost-minimisation approach among debt managers is also reflected in the definition of the objective of debt management in the *Guidelines for Public Debt Management* of the IMF/the World Bank. This definition reads 'the main objective is to ensure that the government's financing needs [...] are met at the lowest possible cost [...] consistent with a prudent degree of risk.'[23] Therefore the *Guidelines* mention cost minimisation at an acceptable risk as the primary objective of debt management.

The popularity of the cost-minimisation approach can be explained partly by the aforementioned limitations of the other two approaches. In addition, the cost-minimisation approach is relatively simple. Furthermore, minimising interest costs is in line with the idea that healthy public finances entail a low national debt. During the 1970s and the 1980s, many countries had a large national debt. This not only resulted in higher risk premiums but also increased the vulnerability of countries to the sentiment on the financial markets. Moreover, the high debt ratios were a great strain on public finances. The awareness of this growing problem was institutionalised in the Treaty of Maastricht, which stipulated that countries had to reduce their debt burden to no more than 60% of GDP. For many countries, interest costs constitute one of the largest cost items within the budget. A reduction in debt costs helps to improve the budget balance and contributes to keeping the national debt manageable and thereby to reducing risk premiums. Finally, cost minimisation is in keeping with the trend of aiming to increase the efficiency of government expenditure.

CaR, average term and requirements for bonds to be issued

How is cost minimisation as an objective of risk management put into practice? Many countries use a *cost-at-risk* (CaR) analysis in determining the optimum debt structure. The costs and risks

[20] Wolswijk, G. and J. de Haan (2005), p. 8.
[21] Working Group on the Budget in Real Terms (2005), p. 19.
[22] Wheeler, G. (2004), p. 15.

of a large number of issuance strategies are charted using stochastic calculations. The expected risk is expressed as CaR: the *maximum* additional interest costs that are expected to arise in the worst-case interest rate scenario.[24] The expected costs of each portfolio are determined by taking the average of all possible interest rate scenarios. By comparing the expected costs and the CaR for a large number of portfolios, it will be possible to identify the portfolio for each risk level (CaR) that has the lowest expected costs. All portfolios that meet this requirement can be expressed graphically in an efficient frontier (see also Section III). The eventual choice of a portfolio on that frontier depends on the risk preference.

Owing to market-related preconditions or sub-objectives, the actual portfolio always differs from the optimum portfolio from an efficiency perspective. For example, countries prefer to issuance more than one type of bond for reasons of diversification. The specific choice of bonds depends particularly on market conditions. Subsequently, the diversification is limited in order to guarantee the liquidity of the bonds (and thereby an attractive price).

After a government has determined an optimum portfolio, the extent to which the government realises this portfolio should be assessed. To this end, the debt manager uses standards. The standard most often used is the average term of the debt portfolio. Depending on the aim pursued, the risk for the government may increase or decrease. For example, if the aim is to reduce the average term (in order to approximate the optimum portfolio more closely) while the debt remains constant, the financing term will become shorter every year and the risk of debt financing will increase. Conversely, a higher average term will reduce the risk. The percentage of the debt that should be refinanced within one year also provides information about the average term of the portfolio. A compilation of the control variables used by other countries is attached as Annex 3.

Interest rate swaps

Issuing bonds in a limited number of specific terms does not always produce the desired result in terms of risk management. In other words, the issuance policy may have the effect that the average term of the portfolio is not in agreement with the desired term from a risk perspective. Therefore many countries use interest rate swaps as part of their debt policy. By means of swaps, the issuance policy can be separated from the risk policy and the objectives of both policy forms can be achieved.[25] In the Netherlands, swaps are part of debt financing as well. A party entering

[23] IMF/The World Bank *(*2001), p. 6.
[24] There is a probability of 97.5% that the referred to interest rate scenario is indeed the worst-case scenario. The chance that in 97.5% of all cases the interest costs will not exceed the specified level is based on a normal distribution of interest rate development. The 97.5% interval covers that entire distribution, up to twice the standard deviation in excess of the average level in that distribution.
[25] Wolswijk, G. and J. de Haan (2005), p. 12.

into an interest rate swap will receive the long-term interest rate and pay the short-term interest rate or vice versa. Thanks to interest rate swaps, a debt manager may, for example, issue a ten-year benchmark bond and still pay a shorter-term interest rate. Entering into swaps involves a *credit risk*: the risk that the other party in a swap fails to fulfil its obligations. This risk is managed by hedging the swap position with collateral.

Conclusion

Cost minimisation is the most commonly used risk management method. This is due to the flaws attached to the other risk management approaches and to the fact that cost minimisation is in agreement with the aim to reduce the national debt and keep taxes low. In considering the costs and risk, the optimum debt portfolio is determined by means of a cost-at-risk analysis. This makes it possible to find the portfolio with the lowest expected costs for each risk level. The government's risk preference is decisive in the eventual choice of a portfolio. In order to monitor risk management, the debt manager uses standards. In most cases, this involves the average term and annual refinancing volume. Interest rate swaps are often used as debt management instruments.

II. Scope of debt management and alignment to budgetary policy

II.1 Summary

In the strategy of cost minimisation at an acceptable risk, 'cost' is understood to mean the expected interest costs in the budget. The risk involves the sensitivity of those interest costs to fluctuations in the market rate of interest. Two themes are relevant here. The first of these is the delineation of debt management to its effects on the budget, while the embedding of debt management in the budgetary policy is another important factor.

Debt management is restricted to the effects of debt financing on the budget. The fact that the scope of debt management does not extend beyond the budget is not self-evident and is a recurrent topic of discussion. These discussions focus particularly on the extent to which the social costs and benefits (*externalities*) of debt financing should be included in debt management. For instance, failure to meet a specific market demand will lead to market failure. In the event of market failure, prosperity may be boosted if the government provides this supply. An example of this is the discussion referred to earlier about the issuance of index-linked bonds by the Dutch government. A second externality arises from the public-good nature of public debt. Viewed against the principle of the public good, full repayment of the national debt is not automatically the

preferable option. It may be useful to uphold a national debt market if society has a need for this (e.g. in order to provide a benchmark for risk-free interest rates).

The extent of responsibility is an essential point in debt management. In the many discussions held on this subject in the run-up to this report, it was established that – *as a rule* – the scope of debt management is restricted to the costs and benefits in the budget. An extension of the debt manager's role to the internalisation of possible *externalities* may be problematic. The social costs and benefits of debt financing are often difficult to substantiate. Which policy increases welfare? To what extent does it achieve this? In addition, why is government policy superior to the market mechanism? In addition, the aforementioned extension means that the debt manager's objective would no longer be accurately described (and measurable). However, the government may still decide to use the debt policy for purposes other than cost minimisation. In that case, it will be the debt manager's responsibility to implement the chosen policy and to assess the costs and benefits of this policy for the budget.

The second theme is the embedding of debt management in the budgetary policy, which is geared to prevent the 3% deficit limit from being exceeded. Often, however, the aim is to achieve a balanced budget or a small surplus. In order to ensure sustainable public finances, the present cabinet aims to achieve a structural surplus of 1% of GDP by 2011. In order to counteract pro-cyclical policy, the cabinet has also decided to leave the interest costs out of the expenditure frameworks. The limit set for the deficit implies that fluctuations in the interest costs should not reach levels that jeopardise a sound budgetary position. However, restricting the average debt financing costs will help achieve a budget surplus. Leaving the interest costs out of the frameworks does not alter these insights. Low costs and an acceptable risk remain relevant factors. When deciding what is acceptable, it should be borne in mind that the risk framework is also designed to be effective in the most improbable (economic) situations.

Finally, it is observed that debt management is viewed in a nominal setting. In concrete terms, this means that the costs and the risk of debt financing are expressed in nominal quantities, which is in agreement with the quantity used to express the rest of the budget. In the past, there have been arguments to analyse debt financing in real terms. This was the case for the analysis of the instrument of index-linked bonds. Although in this specific case the distinction between nominal and real resulted in different findings for risk management, the choice will – in general – largely be independent from a nominal or real approach.

II.2 Details

The above arguments will be explained in more detail below. Section II.2.1 will outline the considerations that play a part in determining the scope of debt management. Section II.2.2 will discuss the alignment of debt management to budgetary policy.

II.2.1 Cost minimisation and the scope of debt management

The definitions of the terms 'costs' and 'risk' arising from the objective of cost minimisation demarcate the debt manager's field of activity. As there is no unique delineation of the costs and risks of debt financing, the scope of debt management is a recurrent theme that also receives international attention. In particular, this often concerns the question whether the social costs and benefits of debt financing should also be part of debt management. These social effects are generally referred to by the term *externalities*. The discussion focuses on two types of *externalities*.

First, the debt policy might satisfy a specific market demand, for instance, for index-linked bonds or ultra-long-term bonds. In the debate on index-linked bonds held in recent years (*inter alia* in the Netherlands), supporters of the issuance of such bonds claim that this form of debt instrument would help the pension funds improve the match between their assets and liabilities. By issuing index-linked bonds, the government would resolve a market failure (the lack of supply of inflation-indexed instruments): a positive *externality*. According to the present scope of debt financing, it is only expedient for the debt manager to respond to a specific market demand if this were to yield the intended efficiency in terms of costs and risk to the budget. If the strategy were to be cost efficient, it would be a *no-regret* strategy. In the Netherlands, the issuance of index-linked bonds was considered from this angle. At the time of the study, there was no question of a cost-efficient strategy (see Annex 2).

A second example of an *externality* concerns the public-good nature of the public debt. In this case, the debate is about the advantages and disadvantages of full repayment of public debt. The discussion focuses on the question of whether it is necessary to uphold the infrastructure of the public debt market. Some experts argue that if the debt were reduced to zero, governments would have to continue maintaining smaller, but liquid public debt markets by investing budget surpluses in the Netherlands and abroad.[26] The reason they give for this is that the lack of a benchmark for risk-free interest rates will have a negative influence on the pricing of debt instruments issued by the private sector and disrupt the market development of business sector

[26] In the euro zone, upholding a market for treasury paper is not the responsibility of one particular country.

debt instruments. Others claim that certain categories of high-quality corporate debt might serve as a substitute for public debt. Thus, they deny the existence of a market failure and the government's role in this.[27]

An extension of the debt manager's role, for instance, in the internalisation of possible *externalities* may give rise to complications. The costs and benefits of debt financing to society are not easy to substantiate and difficult/impossible to measure. This makes it extremely difficult to determine to what extent a particular issuance strategy would affect welfare.

A role of the debt manager other than minimising interest costs at an acceptable risk also has some pragmatic drawbacks. An extension to the social effects of debt policy makes this policy less unequivocal and transparent. As the objectives are usually difficult/more difficult to define and quantify, their realisation can no longer be established. In addition, it cannot be said unequivocally what forms of policy should be pursued with regard to increasing welfare. Furthermore, the issuance of debt instrument is restricted by the amount of debt to be financed/refinanced. This means that choices have to be made. Such choices should always be conducive to efficient financing. The scope for also responding actively to the demand for a specific financial instrument is limited.

In the context of the present evaluation of the risk framework and the draft of a new framework, there have been extensive discussions specifically for the Netherlands about the scope of debt policy. Further to these discussions, it was decided that debt management would remain limited to the minimisation of interest costs in the budget at an acceptable risk.

Consequently, *in general*, the debt manager is primarily responsible for the efficient financing of the national debt. However, the government may still decide to use debt management for purposes other than cost minimisation. As the costs and benefits to the budget of such an alternative strategy may be considered in the decision of whether to adopt this strategy, it is the debt manager's responsibility to provide insight into these costs and benefits.

II.2.2 Alignment of debt management to the budgetary policy

The budgetary policy is the guiding principle in structuring debt management. The budgetary policy has various features. The first of these is budgetary discipline. The budgetary system aims to avoid the 3% deficit limit (laid down in the Treaty of Maastricht) from being exceeded at all

[27] However, some governments decide at times – again for reasons of cost minimisation – to uphold their debt market artificially. If there is a chance that surpluses may turn into deficits at any time, it is advisable to maintain the infrastructure of the market for government bonds. In this way, the future costs of borrowing may be restricted.

times. The discipline goes further than that, however. Where previous cabinets tried to achieve a structural equilibrium in the budget, this cabinet intends to realise a structural surplus of 1% of GDP by 2011. The pursuit of a surplus is necessary in order to keep sustainable public finances within reach despite the additional costs of an ageing society facing the government in the future. Starting with the budgetary year 2008, the interest costs will – finally – no longer be included in the expenditure frameworks in the budget. The main reason for this is that, under the frameworks, fluctuations in the interest costs may trigger pro-cyclical policy.

Preparation for the ageing-related costs

The cabinet has adopted the main recommendations from the twelfth report of the Study Group for Budgetary Policy.[28] The latter report focuses on an analysis of policy measures that would have to be taken in order to absorb the negative effects of ageing on public finances. The costs of ageing can be tackled in various ways. Apart from adjusting the ageing-related institutions (such as pension claims and healthcare) and increasing participation in the labour force, the government can save for later by cutting down expenditures and/or increasing taxes and social security contributions today. By using budget surpluses, the public debt can be reduced more quickly. Because the interest payments on the public debt will fall in that case ('interest release'), room will be created to finance rising expenditures associated with, for example, state pensions and healthcare.

Consequences for the risk framework of a debt declining in line with the trend

A declining debt affects the government's financing policy and the debt financing risk framework. Within the current risk framework – the pursuit of annual refinancing (a basis amount-at-risk) equalling 9% of GDP (see Section IV) – a smaller national debt means that each year a larger part of the outstanding debt should be refinanced. This implies that the average term of the bond portfolio becomes increasingly shorter. The financing of the national debt is moving towards the short end of the interest-rate curve.

Based on a rising interest-rate curve, such a reduction means on average lower costs and on average a higher risk for every euro of national debt. The increase in the risk is twofold. A larger part of the debt should be refinanced each year at the interest rate then applicable, while – in relative terms – short-term interest rates are also more volatile than long-term interest rates. In other words, a trend-related decline in interest costs in the budget is counterbalanced by greater volatility of those costs. The budget risk in relation to the item 'interest costs increases. Within the

[28] Twelfth report of the *Studiegroep Begrotingsruimte*, 'Ageing and Sustainability' [*Vergrijzing en houdbaarheid*], The Hague, 22 June 2006.

current risk framework, the view is taken that this additional risk is bearable (and desirable) in a situation where the budget position is robust (and leads to declining debt).

Consequences of leaving the interest costs out of the expenditure framework

To promote sound budgetary policy, the Study Group looked for ways to reduce the pro-cyclical policy often pursued in the past. In the current budgetary system, all costs fall within the specified expenditure frameworks, including costs sensitive to the business cycle, such as unemployment benefits, interest costs and public-sector wages.

During a boom period, the budget balance will improve and the interest costs on the public debt will fall.[29] Where expenditure windfalls occur in a boom situation, this may lead to pro-cyclical policy if the resulting budgetary space is used for additional expenditures elsewhere. In order to reduce the lure of pro-cyclical policy, the interest costs have been left out of the expenditure frameworks.[30]

There are several sides to leaving the interest costs out of the frameworks. On the one hand, an increase in the interest costs will no longer be labelled as a budgetary setback that would have to be compensated elsewhere within the budget. The fact that setbacks in interest costs no longer trigger a 'perverse' response of the other costs under the specified expenditure frameworks may be a reason for relaxing the current restriction set to the interest-rate risk for the budget. On the other hand, interest costs are included in the EMU balance and are relevant to the 3% deficit limit under the Treaty of Maastricht. As long as the interest costs fall within the expenditure frameworks, fluctuations in the interest costs will be compensated somewhat in the other expenditure categories. This is no longer the case now that the interest costs have been left out of the frameworks. If the government deficit is close to 3% of GDP or the deficit approaches the signal value of 2% of GDP, even small fluctuations in interest costs may be too great. In such a situation, the budget risk taken should most certainly be restricted ('safety net'). With regard to this last conclusion, some experts argue that fluctuations in the interest costs on account of the interest rate will (partly) be compensated by opposite movements on the income side. This may be so, for example, if rising interest rates always coincide with economic recovery and/or an immediate reduction of the pension contributions. In that case, a windfall in tax income will

[29] It is presumed that the volume effect on the interest costs will dominate the price effect (rising interest rates during boom). Although this assumption seems realistic, the price effect is not irrelevant. Interest rates in the Netherlands are particularly dependent on developments abroad. As the business cycle in the Netherlands is more in step with those abroad, price effects become more important. The eventual effect of the business cycle on the interest costs depends on the sensitivity of the deficit to cyclical movements (budget elasticity), the extent to which interest rates respond to the business cycle and the extent to which the debt is refinanced. In theory, interest costs can be both pro-cyclical and anti-cyclical.

[30] Where an interest windfall is caused by a lower interest rate, this would be an additional argument against using this windfall for an increase in expenditure. After all, as the discounted value of pension commitments will be higher, a lower interest rate means an increase in the financial ageing problem in the long term.

counterbalance a setback in interest costs.[31] However, it has not been demonstrated whether such compensatory effects actually occur.

In summary, fluctuations in interest costs should not be such as to jeopardise budgetary discipline. Low debt financing costs, however, are a favourable factor in the pursuit of a surplus. Even when interest costs fall outside the frameworks, an efficient interaction of costs and risk continues to be important. In addition, the national debt risk framework is intended primarily to keep the risks of debt financing within acceptable limits. It is advisable not to assume in advance that the debt financing risk will be mitigated.

III The risk management framework for 2003-2007: architecture and evaluation

III.1 Summary

The current risk framework was established in 2002 and initially applied up to and including 2006. In the run-up to the formulation of a new risk framework, the decision was taken to extend the current framework to 2007, so that the new cabinet could decide about the new framework.

The point of departure of the risk framework is to minimise the costs at an acceptable risk to the budget. The central control variable is an annual basis amount-at-risk of 9% of GDP. The basis risk determines which part of the debt is susceptible each year to changes in the market rate of interest. This part consists of the amount of the existing debt that should be refinanced, together with the net swap portfolio. Because of the link to GDP, the extent of risk considered acceptable has become a relative concept. This link is designed to enable the risk assumed to develop in tandem with the budget's capacity to bear that risk. The Minister's choice, taken in 2002, in favour of an annual basis risk of 9% was driven by the fact that other European countries showing some similarity to the Netherlands did not refinance more than 9% of their GDP each year. Furthermore, this level was in keeping with the historical portfolio of the time.

In itself, the risk framework is insufficient to achieve an unequivocal manner of debt financing as well as an adequate limitation of the risk. Furthermore, the Dutch government considers it important to issue liquid bonds for specific terms. Therefore the financing policy was formulated as a supplement to the risk framework. The financing rules demand that each year a bond with a minimum size of €10 billion be issued in both the ten-year and three-year segment and that a money market be maintained with sufficient volume to absorb unexpected fluctuations in the

[31] Tax income might be disappointing if the rise in interest rates (in combination with mounting housing prices during a

borrowing requirement. Finally, swaps may be used to a limited extent for risk management purposes. Swaps are an excellent instrument to bring the repayment profile resulting from the issuance of bonds in line with the risk profile of 9% of GDP per annum. The risk profile (rather than the repayment profile) determines the interest rate sensitivity of the debt.

So much for the architecture of the current risk framework. But how does the risk framework operate? The operation of the framework can be demonstrated with the aid of a model analysis. In this analysis, the average expected costs for a large number of portfolios are set off against the expected risk (expressed as Cost-at-Risk, or CaR). The CaR describes (with 97.5% certainty) the maximum additional interest costs that may arise given the worst-case interest rate scenario. Costs and risk are expressed over a cumulative period of five years. The model analysis is extremely useful for charting the effect of risk management on the interaction of costs and risk. It also makes clear what will happen if parameters (such as the debt size) change. The analysis gave rise to the following conclusions.

Adequate risk control

The delineation of the costs and the risk of debt financing have been sufficiently strict. This has led to adequate risk control, while no excessive costs were incurred. Therefore, the risk framework, together with the financing rules, worked well as a safety net.

Workability not perfect

In order to be as efficient as possible within the specified risk framework, a basis risk of 9% of GDP has to be achieved each year. Exceeding 9% is too risky, while coming under the target would be too expensive. Achieving this basis amount-at-risk turns out to be difficult in practice. This is because unforeseen changes in the cash balance (budget balance) affect the size of the basis risk. Unforeseen windfalls reduce the basis risk, which means that the term has to be reduced immediately in order to still achieve the 9% target. Setbacks, on the other hand, necessitate an immediate extension of the term. In practice, it appears that if windfalls or setbacks manifest themselves later in the year, adjustments are not always possible and a basis risk of 9% of GDP is not attained.

Following the business cycle not desirable

Reducing and extending is only justified if this is done in response to a trend. For example, it is advisable gradually to reduce the term if the debt declines in line with the trend, and to extend the term if the debt increases in line with the trend. The current policy follows the business cycle and is therefore more volatile than is desirable.

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boom) causes the amount of deductible mortgage interest to increase.

Room for improved efficiency

Although the current strategy works efficiently within the specified frameworks, it is not on the efficient frontier. A limited efficiency gain can be realised. An efficient strategy is characterised by a risk profile that is evenly spread over a particular term segment and then drops back to zero. The current strategy is characterised by an irregular risk profile. In principle, any desirable risk profile can be achieved with the aid of interest rate swaps. This means that the efficiency gain can be realised without affecting the issuance policy. The difference between the current and the envisaged risk profile determines how many swaps will be needed. Even if an extensive swap portfolio is required for that purpose, this will not constitute an impediment (neither for the DSTA nor for the market).

III.2 Details

The remainder of this section addresses the architecture and theoretical operation of the framework (Section III.2.1). Furthermore, Section III.2.2 will contain an analysis of the operation of this framework in practice.

III.2.1 Risk framework 2003-2007

The framework for 2003-2007 aims to increase the predictability and manageability of the nominal interest costs in the budget. The interest costs are budgeted annually on the basis of estimates of the interest rate (CPB), the refinancing volume and the budget balance. The risk is that the interest rate and/or the budget balance may differ from the estimate, causing unforeseen fluctuations in interest costs. The interest costs consist of i) outstanding debt multiplied by the average coupon rate plus ii) the debt to be refinanced at the current interest rate plus iii) the budget deficit at the current interest rate[32] minus iv) the expiring debt at the average coupon rate on that debt. As stated earlier, the *risk* consists of the unforeseen fluctuations in those interest costs. The cause of such fluctuations is twofold. On the one hand, fluctuations in interest costs may result from refinancing existing debt. On the other hand, the interest costs also depend on the budget balance. The former type is known as *basis* risk, the latter type as the *incidental* risk.

The *basis amount-at-risk* consists of the refinancing volume (fraction of the outstanding debts that is refinanced annually) plus the net swap portfolio, since swaps are also sensitive to interest rate changes (Annex 4). Subsequently, interest rate volatility determines the extent to which interest costs, given the basis amount-at-risk, may change. The effect on interest costs equals the basis

amount-at-risk, multiplied by the difference between a) the average coupon rate on the expiring part and b) the new financing interest rates. The *incidental* risk depends on setbacks in the budget balance. These have to be financed entirely at the current interest rate.

The following example demonstrates the possible size of the basis risk versus incidental risk. Let us assume that the basis amount-at-risk in any year is €50 billion at an average coupon rate of 4%. If this amount has to be refinanced at an average of 5%, the additional costs will be €0.5 billion (0.1% of GDP). If we subsequently assume that the budget deficit is €5 billion larger than expected (1% of GDP), the financing of this setback at an average interest rate of 5% will result in additional interest costs of €0.25 billion (0.05% of GDP).

Basis amount-at-risk as a target variable

The risk framework is geared to the basis risk (refinancing).[33] In principle, the incidental risk (volatility in the budget balance) is not used as a guiding principle. As explained below (Section III.2.2), however, this risk does affect the basis amount-at-risk in future years. Pursuing constant attainability of the basis amount-at-risk in future years means an indirect limitation of the total interest-rate risk in any future year.

The basis amount-at-risk, as a control variable, is linked to GDP and amounts to 9% per annum.[34] With this amount as the point of departure, the setbacks in interest costs are subsequently determined by the extent of fluctuation in the market rate of interest.

Table III.1 Structure of the basis amount-at-risk (example 2005)

A	Capital market bonds repayable in 2005	24.8
B	Money market volume at the end of 2004 (refinanced in 2005)	17.4
C	Net swap portfolio	-0.1
D	GDP 2005 (estimate December 2004)	474.5
E	**Basis amount-at-risk 2005, ex ante, as a percentage of GDP ((A+B+C)/D*100)**	**8.9**

Besides being the *maximum* amount the government annually wants to expose to interest rate changes, the basis amount-at-risk is also the *minimum* amount the government annually wants to refinance. Lower annual refinancing would mean that, on average, less short-term financing takes place than is possible within the preconditions of an acceptable risk. Given the central

[32] A surplus will obviously reduce the national debt and therefore interest costs.
[33] For a detailed explanation of the risk framework for 2003-2007, see the DSTA's Annual Policy Outlook 2003, page 24 *et seq.* (www.dsta.nl).
[34] The risk amount of 9% of GDP is an ex-ante target. At the start of the year, the amount of refinancing to be included in the numerator can be established exactly. However, the GDP (the numerator) is an estimate. A GDP that differs from the estimate may have the ex-post effect that the GDP percentage will be different as well.

assumption of a generally rising interest-rate curve, this would be too expensive (see Section III.2.2 for the details).

Choice of GDP link and 9% risk amount

The central idea behind the link to the GDP is that the interest costs are kept constant over time in *relative* terms. This helps to ensure that the risk assumed remains proportional to the budget's capacity to bear this risk. The reasoning behind choosing *GDP* as the yardstick for the *budget's* risk-bearing capacity is that, broadly speaking, the income side of the budget would move along with the GDP. Utilising the extra space offered by a better budget position will yield a gain on the cost side.

In linking the risk to GDP, it was decided to apply a rate of 9%. When the current risk framework was established in 2002, the annual refinancing volume approximated 9% of GDP. Expressed as a percentage of GDP, the relevant (AAA) peers also did not exceed 9%. On balance, the choice of 9% was in line with the existing risk profile and guaranteed that the risk run by the Netherlands would not exceed that of other countries, such as France, for example.[35]

Risk framework and financing policy

In itself, the risk framework – with a basis amount-at-risk of 9% of GDP – says little about the actual scope of the risk. After all, the latter partly depends on the extent to which the market rate of interest changes over a particular period and in a particular term segment. The basis amount-at-risk can be achieved using several financing strategies, whereby the costs and risk vary in accordance with the strategy chosen. For this reason, the risk framework has been supplemented by a set of financing rules. These rules are as follows:

1. In the capital market, bonds are issued in at least two segments. Each year, issues are made in the ten-year segment because this is the benchmark segment. Furthermore, annual issues result in a curve up to the ten-year segment. Bonds are also issued in the three-year segment, so as to achieve diversification and portfolio term reduction desired at the time.[36] The decision of whether to issue in the 30-year segment is taken periodically, preferably at moments when the risk framework is evaluated.[37]
2. Once issued, bonds are increased (if possible within one year) to a volume that will guarantee the liquidity of the bond (€10 billion).[38]

[35] At the time, it was argued that a risk exceeding that of France might create a negative image.
[36] Where necessary, the five-year segment can also be utilised.
[37] Occasionally, decisions have been taken in favour of 30-year bonds without the framework being evaluated (e.g. in 2005).
[38] Expectations are that participation in the market with liquid benchmark bonds will also have a favourable effect on Dutch sovereign paper.

3. The money market volume should be sufficient (€15 to €20 billion at the end of year) in order to serve as a buffer for unforeseen changes in the borrowing requirement. During the year, the money market will also give the financing policy the necessary flexibility, which may bridge the gap in the capital market between the moment of repayment and the moment of issuance.
4. Swaps may be used to facilitate the connection between the financing policy and the basis amount-at-risk. However, the swap portfolio should remain limited and the use of swaps in any year should not complicate the realisation of the basis amount-at-risk in subsequent years.

The framework, *together* with these financing rules, will restrict the possible combinations of the costs and risks attached to debt financing. This will ensure that the objective of risk management is achieved and prevent the costs of debt financing from spiralling out of control.

III.2.2. Operation of the risk framework and financing rules in practice

From 2003, the Dutch government has given concrete substance to the interaction between costs and risk in the budget by using the basis amount-at-risk as a guideline. The interest-rate curve has been modelled as part of the risk framework. The central assumption is that *on average* the interest-rate curve moves in an upward direction. This means that on average short-term financing is cheaper than long-term financing.[39] The associated budgetary risks are the reverse. Annually, long-term financing yields a smaller amount of refinancing than short-term financing. By financing long-term (rather than short-term), we will restrict the basis amount-at-risk. Because the long-term interest rate is usually less volatile than the short-term rate, this scenario will also limit the chance of unforeseen changes in the interest costs (budgetary risk).

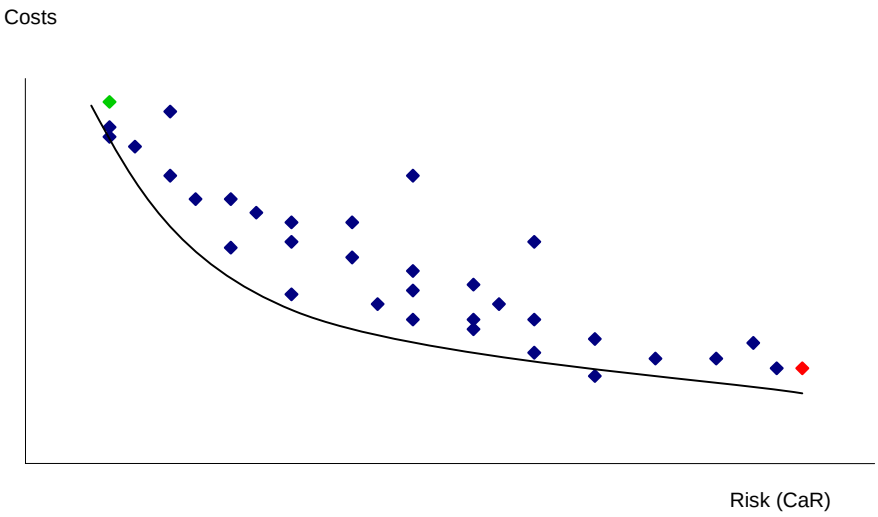
The interaction between costs and risk can be clarified in a cost-risk chart, in which the vertical axis represents the average costs of debt financing (interest costs) given a certain debt size and the horizontal axis (risk) the maximum additional costs arising over a fixed period (e.g. five years) in the worst-case interest rate scenario. Costs and risk vary in accordance with the composition and average term of the portfolio. The estimate of the maximum additional costs is based on an assumed statistical distribution among the interest rate scenarios. Given this distribution and the debt composition, a cost level can be specified as the maximum with 97.5% certainty.[40] The difference between the expected costs and the maximum costs possible is known as the *relative*

[39] Obviously, the additional costs of long-term financing will be limited if the curve, although rising, is reasonably flat.
[40] The confidence interval is one-sided, since only the risk of setbacks is relevant. The 97.5% limit corresponds to the average plus twice the standard deviation.

cost-at-risk (CaR for short).[41] Obviously, there is a 2.5% chance that the expected interest costs will be higher during the period concerned.

The cost-risk combination of every possible debt portfolio can be presented as a scatterplot. The dots reflecting the optimum combinations of costs and risk (the lowest possible costs given the risk, or the lowest possible risk given the costs) constitute the *efficient frontier*. It appears that only centralised portfolios characterised by an even repayment profile are efficient and are consequently on the frontier (Annex 5). The extremes in the graph can be seen as a centralised portfolio with a very long term (high costs, low risk) and one with a very short term (low costs, high risk).

Figure III.1. Cost-risk chart and efficient frontier



Operation of the risk framework in practice

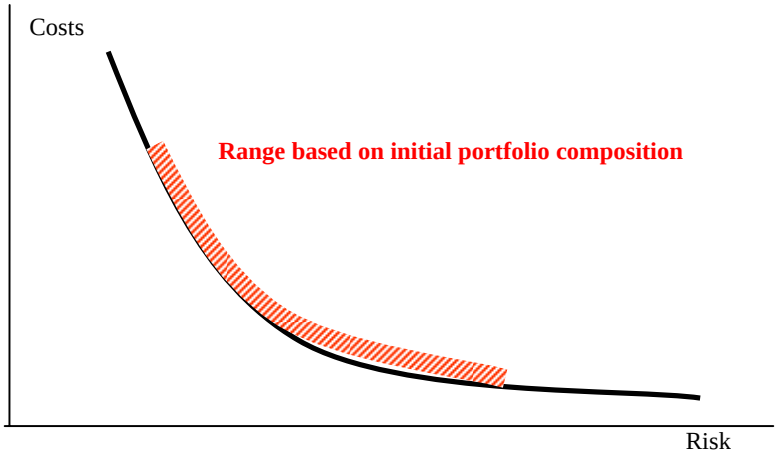
The operation of the current risk framework has been assessed by means of a model analysis. In this analysis, the average expected costs for various financing strategies are set off against the CaR. The CaR is caused by interest rate changes that have been modelled with the aid of uncorrelated shocks. The average expected costs and the CaR are expressed over a cumulative period of five years. The model analysis can offer insight into the implications for the interaction of costs and risk of the choice of a certain risk standard and of setting preconditions to debt financing. It also gives an outline of what will happen if parameters (such as debt size) change. The principal insights from the analysis are explained below.

[41] Instead of this difference, the *absolute* CaR just describes the maximum costs that may arise.

Delineation of the costs and risk of debt financing

To begin with, the model analysis is a theoretical concept. In this analysis, any initial portfolio composition and any financing strategy can be assumed. Without limitations to the initial or start portfolio, a whole spectrum of portfolios is conceivable. In reality, however, the start portfolio – owing to issuances in the past – has a specific composition. This composition affects the repayment profile in subsequent years. Accordingly, it is no longer possible to attain just any portfolio within a restricted period only by means of issuances. *Given* the start portfolio and the five-year horizon, only a part of the entire scatterplot and the efficient frontier is relevant (Figure III.2).[42]

Figure III.2. Start portfolio limits the spectrum of attainable portfolios



The risk framework restricts the spectrum even further. Not all portfolios that are attainable, given the start portfolio, satisfy a basis amount-at-risk of 9% of GDP per annum. Nevertheless, there are still many portfolios left (certainly if swaps are used) that comply with the control variable. It may be surprising that, despite the same basis amount-at-risk for all portfolios, there are still differences in risk between the portfolios. These differences are caused by the manner and degree in which the interest-rate curve moves. This movement depends on the nature and number of shocks to which the interest rate is exposed. Even if the 9% basis risk requirement is fulfilled, a portfolio with a relatively large number of short-term bonds will entail greater risk than a portfolio with many long-term bonds. This is (roughly) because a shock has the greatest impact on the short-term interest rate, which means that the short-term rate is more volatile than the long-term rate.

[42] If the start portfolio is in the middle of the spectrum, the most extreme portfolios (full 30-year or money market financing) cannot be attained within five years. However, a relatively short-term portfolio offers greater flexibility, whereas a relatively long-term portfolio limits that flexibility.

Figure III.3 firstly illustrates the cost-risk ratio for portfolios that are attainable, given the start portfolio. This is represented by the dark blue dots on the scatterplot. Subsequently, the restrictive impact of the risk framework is plotted (pink dots). An even smaller concentration remains after applying the condition of a basis amount-at-risk of 9% of GDP per annum.

Finally, there are the financing rules. These prevent the debt manager from creating 'extreme' portfolios (e.g. consisting exclusively of ultra-short-term or ultra-long-term bonds), most of which should then be swapped back in order to attain the risk amount of 9% of GDP. The financing rules ensure that a limited number of bonds are issued in the right quantity and ratio *and* that a limited number of swaps are sufficient. The clustering of the yellow dots in the middle is the result.

Figure III.3. Delineation of costs and risk by the risk framework and financing rules[43]

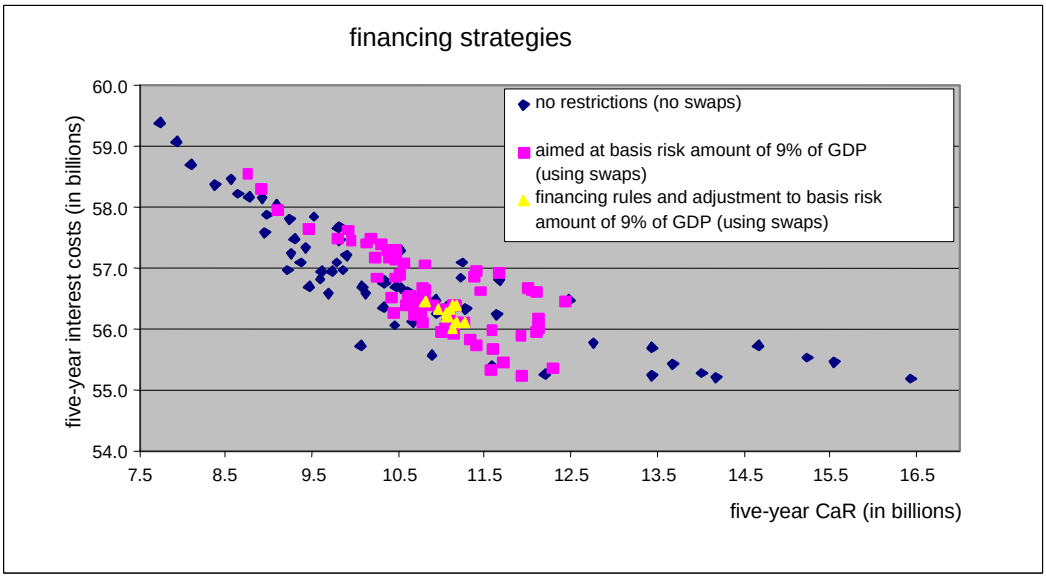
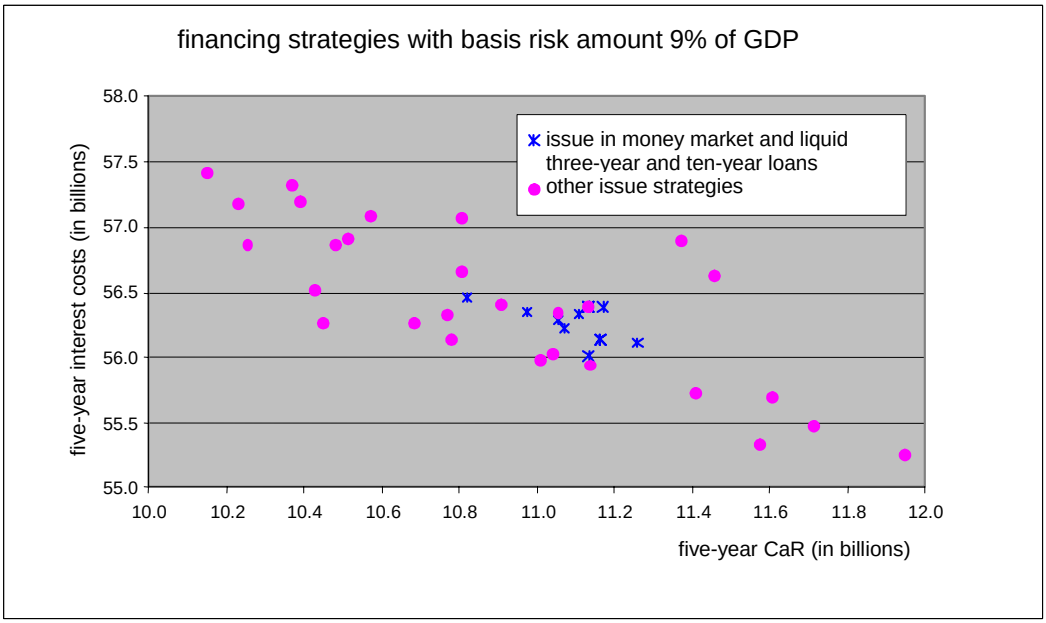


Figure III.4 zooms in on the scatterplot of the financing strategies that satisfy both the 9% basis risk criterion *and* the financing rules limitations.

[43] Each of the financing strategies is based on the composition of the debt portfolio and the interest rate expected in the market as at the end of 2001. With due regard for the actual balance and developments in GDP, the expected interest costs and the expected CaR have been calculated ex post for the 2002-2006 period.

Figure III.4. Enlargement of the 9% scatterplot and the clustering by financing rules



Given the start portfolio, the risk framework and the financing rules, the possible cost-risk combinations of debt financing are fairly limited. Figure III.4 demonstrates this. Viewed over the 2002-2006 period, the risk framework and financing policy *together* worked well as a safety net, preventing the costs and the risk of debt financing from assuming extreme forms.

Workability of the risk framework

The risk policy and the financing rules are easy to maintain as long as, from one year to another, only the repayment profile has to be adjusted via swaps to a basis amount-at-risk of 9% of GDP. However, the basis amount-at-risk of any year also takes account of the size of the money market portfolio as at the end of the previous year. Whereas repayments on the capital market have been fixed for a much longer period, the exact extent of the refinancing of money market bonds is only known on the last day of the year. After all, the money market serves as a buffer for cash balance fluctuations in the budget. Unexpected windfalls in the last period of the year (as in 2005 and 2006) result in smaller net money market financing. This reduces refinancing in the following year and thereby the basis amount-at-risk. Unexpected setbacks result in greater money market financing, thereby increasing the basis amount-at-risk in the following year. Although the risk framework does not directly use the risk of setbacks as a guideline and the aim was to leave this incidental risk out of the risk framework where possible, in practice this has a major effect on the attainability of the control variable.

As the year progresses, it becomes increasingly difficult to adjust the basis amount-at-risk to 9% of GDP if the developments in the balance give cause to do so. After all, a large part of the financing plan (the issuance of bonds) has already been implemented by then, so that the full effect will hit the money market. Nevertheless, the aim is to approximate the target as closely as possible. Depending on the problem (risk amount too high or too low), various instruments may be used. Examples include entering into payer or receiver swaps and cancelling or buying back capital market bonds or issuing additional capital market bonds. Despite the use of these instruments, it is sometimes too late to attain the envisaged basis amount-at-risk exactly. At the end of 2005, for example, it could be established that because of large windfalls in the cash balance – and a compulsory reduction of the net money market volume – the risk amount in 2006 would be only 8% of GDP.

One more comment about this issue. A changing money market in response to a changed cash balance simply makes it difficult to realise a predetermined size for the basis amount-at-risk. The link between the basis amount-at-risk and GDP makes this even more complicated. As explained earlier, the link makes it possible for the risk to develop in tandem with the capacity to bear this risk in the budget. If GDP grows more rapidly than the debt in absolute terms, the debt ratio will fall. A basis amount-at-risk of 9% of GDP will then correspond to a relatively larger part of the debt. This means that – all other things being equal – financing will involve a shorter term and therefore a greater risk. However, normally such a situation arises because the balance is (much) better than expected. Moreover, the effect of a favourable balance on the money market works in the opposite direction, causing the risk amount to decrease, which is an indication of longer-term (rather than shorter-term) financing.

The ability of the risk framework to move in tandem with the business cycle

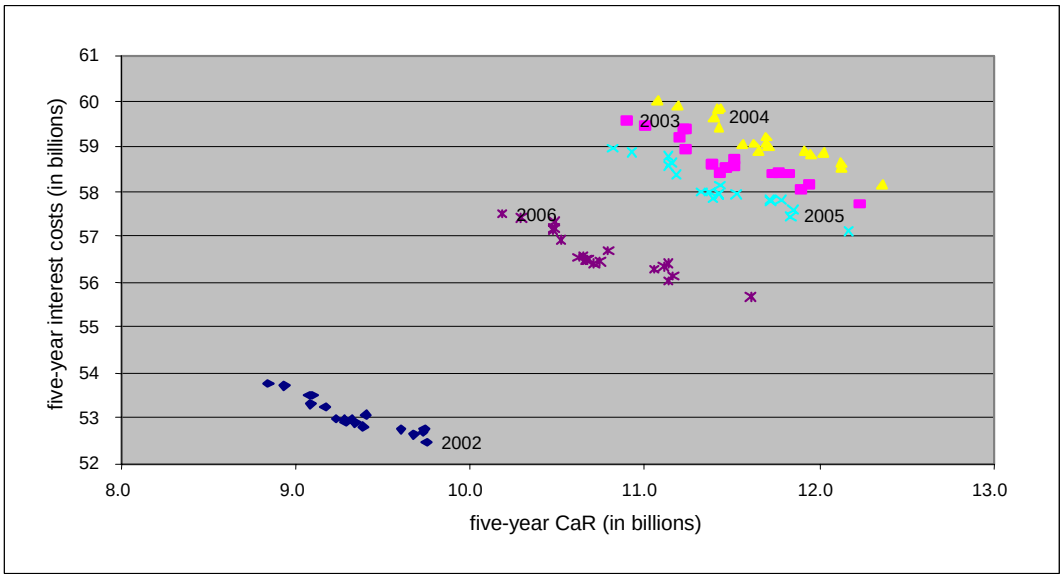
Realisation of the basis amount-at-risk, despite unforeseen fluctuations in the estimates of the cash balance and the GDP, has the effect that the financing policy has to be constantly adjusted. Windfalls will require a term reduction and setbacks a term extension. Furthermore, as the control variable is linked to GDP, this means in fact that the financing policy moves in tandem with the business cycle. When the economy improves and the cash balance is better than expected, terms are reduced. As soon as there is an economic downturn and setbacks arise, terms need to be extended. Following the business cycle results in just-in-time management and erratic policy (reduction, extension, reduction).

Based on the assumption that it is desirable to have risk move in tandem with the budget's capacity to bear that risk, it would be a logical step if, in response to a trend-related improvement in economic growth and therefore a trend-related decline in debt, to gradually finance debt in the

shorter term (i.e. more cheaply). Within the current risk framework, however, all changes (including cyclical ones) are regarded as a trend.[44] Viewed across a complete business cycle, therefore, the number of term extensions and term reductions is many times *greater* than would be necessary from a trend perspective. This leads to unnecessary changes in interest costs and thereby undesirable risk.

Figure III.5 illustrates how changes in GDP and the cash balance affect the financing strategy. The figure shows five different estimate scenarios (2002-2006) for GDP and the cash balance over a five-year period. For each scenario, various financing strategies have been extrapolated, all of which meet the basis amount-at-risk of 9% of GDP criterion. It should be noted that in each case an efficient frontier only applies to one specific debt size and GDP. Each of the scatterplots pertains to a different debt size and a different GDP. The imaginary efficient frontier for 2004 is furthest away from the origin because the debt size was greatest then and its financing, consequently, expensive.

Figure III.5.
Costs and risks of financing strategies in five scenarios for cash balance and GDP



Apart from the shift caused by the shift of the frontier, the fact that an adjustment of the estimate results in an immediate adjustment of the bond portfolio by means of swaps can be established for each scatterplot. As a result, the interaction between costs and risk for a comparable financing strategy differs for each scenario. Each estimate adjustment will effect a change in the interaction between costs and risk.

[44] Furthermore, there are developments in the cash balance that have nothing/little to do with economic reality.

Figure III.6. If the debt increases, the risk framework prescribes less risk (extension)

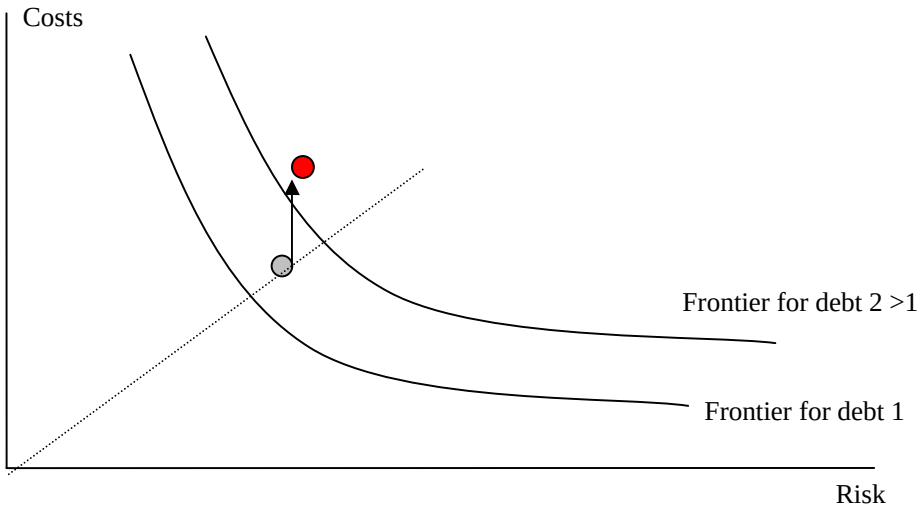


Figure III.6 illustrates in abstract terms what the risk framework implies if debt increases in size.[45] If debt as a percentage of GDP increases, the basis amount-at-risk as a percentage of debt will decrease. Instead of a proportional shift of the bond portfolio (along the straight line from the origin), the strategy moves to a portfolio with a relatively smaller risk, implying an extension.

The conclusion may be drawn that, in cases where an extension or reduction may be desirable from a trend perspective, frequent adjustments to the risk preference in response to the business cycle are neither necessary nor desirable.

Efficiency of the risk framework

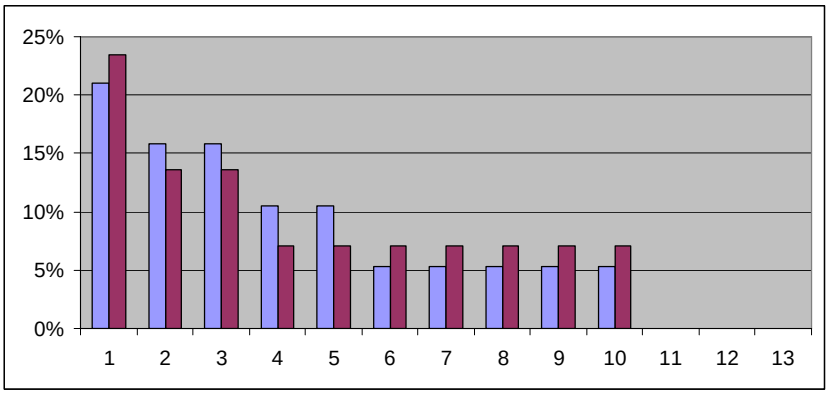
Efficient financing within the current risk framework means that money is borrowed as cheaply as possible, provided the risk is still *just* acceptable. In practice, this implies that the basis amount-at-risk of 9% of GDP should be achieved each year. After all, a smaller basis amount-at-risk will make financing more expensive than is necessary within the specified preconditions. In addition to the risk amount that should be attained, the aforementioned financing rules are applicable as well. While these rules help avoid excessive costs and risk (viewed over a five-year period), they also introduce a certain degree of inefficiency in the policy.

The repayment profile depends to a large extent on the historical composition of the portfolio and the financing rules (Figure III.7). The current rules and the portfolios resulting from them all

[45] Obviously, the chart is a highly simplified representation of reality and takes no account of changes in the GDP. The parallel shift is caused solely by rising debt (in absolute terms).

display an uneven repayment pattern over time. The model applied in this study shows that such a profile is sub-optimal.

Figure III.7. Annual repayments as a percentage of debt for two repayment profiles complying with the financing rules (10/5/3/money market and 10/3/money market)



The risk profile resulting from the repayment profile, after the use of swaps, does not have a regular pattern either. This is because the present risk framework takes into account that future issues will affect the realisation of 9% of GDP in due course. As a result, the basis amount-at-risk can only be prepared in full for the following year. The risk amount in later years will initially be lower. For portfolios whose repayment profile is close to 9% of GDP in the initial years, a limited number of swaps will be sufficient (if required) to realise the desired risk profile (9% of GDP).

As a result, within the current risk framework, neither the repayment profile nor the risk profile are evenly spread over time. An even risk profile is characterised by a constant risk amount in the first segments and a risk amount equalling zero in the subsequent period (Figure III.8). The model shows that, under normal market conditions, financing strategies with an even risk profile have maximum efficiency (Annex 5). In terms of efficiency, therefore, they are preferable to strategies that do not have an even risk profile.

An even repayment profile is maintained by continuously issuing a single bond. A repayment profile with a risk amount of 20% of the debt in each of the first five segments can be maintained via continued refinancing in five-year bonds (Figure III.8). In theory, a centralised portfolio is not an absolute necessity for achieving an even risk profile. In principle, any random *repayment profile* can be converted into an even *risk profile* by using interest swaps. In practice, this may be more difficult because the number and term of the required swaps may pose a restriction.

Figure III.8.

Even repayment profiles via continued issuance of five-year, seven-year or ten-year bonds

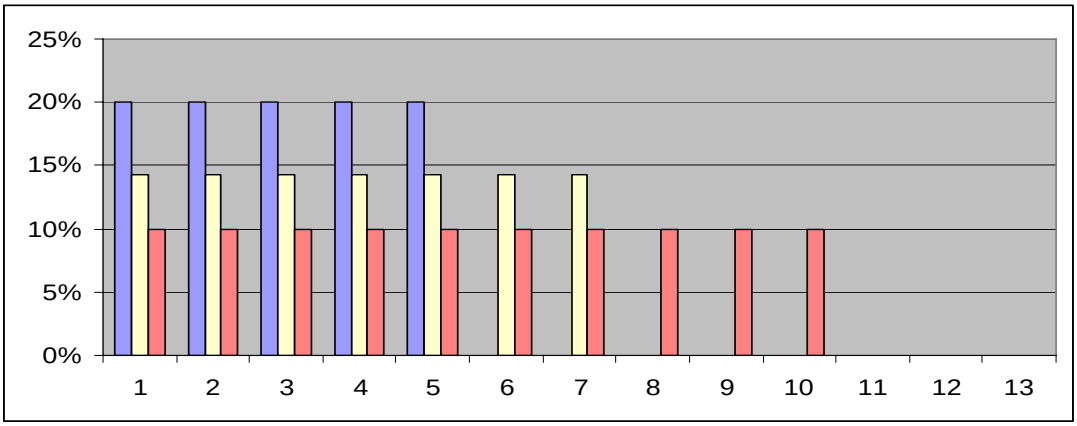
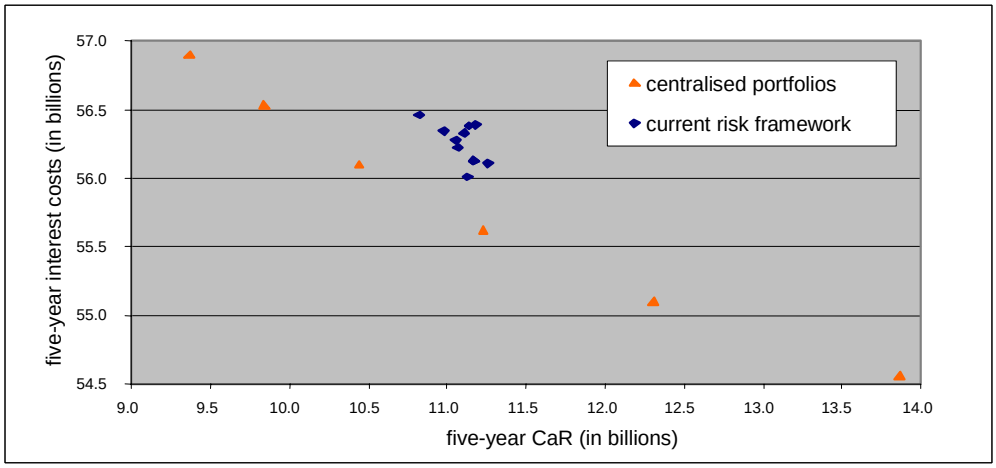


Figure III.9 shows how the cost-risk ratio of centralised portfolios with an even risk profile (modelled over the 2002-2006 period) compared to the risk profile associated with portfolios in which actual financing took place (selection from the dot clusters in Figure III.3). By definition, the portfolios in the current risk framework comprise several bonds. Furthermore, interest swaps are not used for preparing a risk amount for several successive years, so as to leave scope for future issuances. The inefficiency in the risk profiles of the current framework is incorporated into the chart.

Figure III.9.

Financing strategies in current risk framework compared to centralised portfolios (2002-2006)



A more even risk profile is possible given the flexibility in the choice of bonds and availability of interest swaps as an instrument. Compared to the current financing method, the model shows that financing can be slightly more efficient.

Conclusion

In summary, the conclusion may be drawn that the risk framework and the financing rules together have served as an adequate safety net for the risk of debt financing. However, the workability of the framework leaves much to be desired. Furthermore, it appears that fluctuations in the balance trigger responses in the debt financing that are neither necessary nor desirable. Finally, efficiency improvements can be effected.

IV. New risk framework

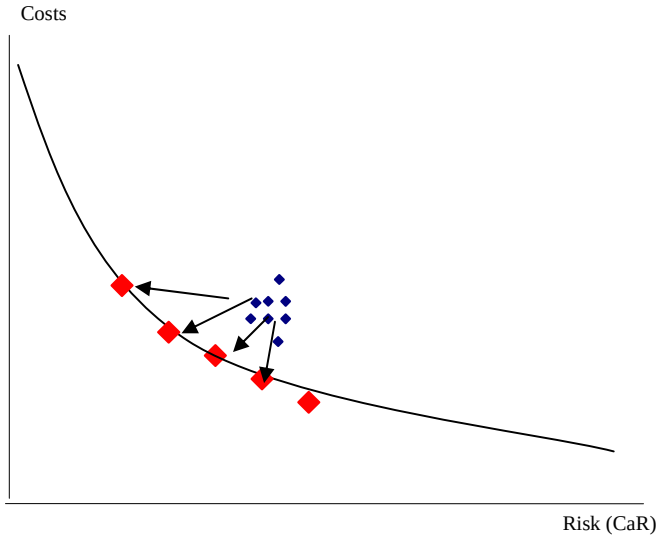
IV.1 Summary

The new framework will use a benchmark (reference point), which will be selected in such a way as to aim for a portfolio with a centralised risk profile. Where the use of a *benchmark* increases the workability of the framework, *choosing the centralised portfolio as a benchmark* will increase efficiency.

A benchmark is an objective standard for measuring the debt manager's performance. The choice of a benchmark is a choice in favour of a specific portfolio. For efficiency reasons, this choice is limited to centralised portfolios. The choice of a benchmark also means that a decision is made as to the interest rate (type of curve) at which the benchmark portfolio is financed. Once all the features have been determined, the costs and the risk of the benchmark portfolio will have been defined in unequivocal terms. The benchmark prescribes exactly what the debt manager would have to do in theory: i.e. gradually issue x-year bonds at the selected interest rate.

In practice, the benchmark can only be reproduced by financing in *exactly* the same manner at *exactly* the same yield. For this reason, it is important that the features of the benchmark are indeed reproducible in practice. This does not mean, however, that the debt manager will apply exactly the same strategy in practice as in the benchmark portfolio. The implementation of the actual financing strategy will be a combination of the issuance policy and the use of instruments such as swaps. Figure IV.1 shows various benchmark portfolios. After the benchmark portfolio is selected, the aim is to achieve one of these options.

Figure IV.1. Pursuit of a centralised benchmark portfolio is optimal in theory



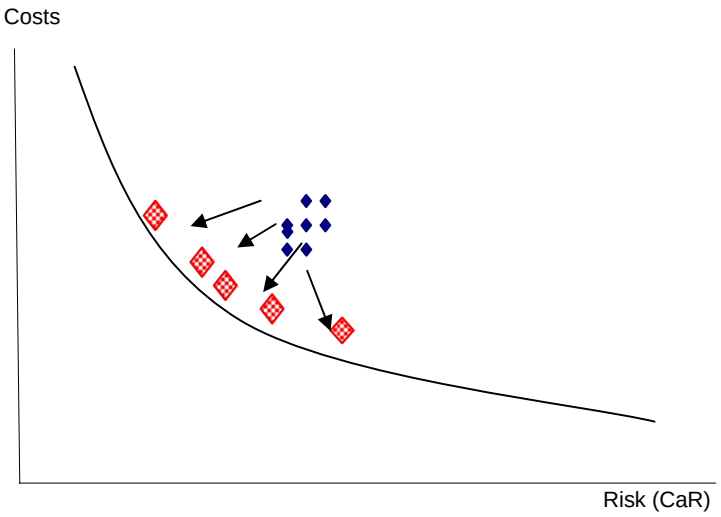
If the benchmark is chosen and organised properly, it will be an *adequate risk safety net* (much like the current risk framework). This will also make control more unequivocal, as the debt manager approximates the risk and costs of one point on the efficient frontier. The benchmark is unambiguous, even without supplementary financing rules.

A benchmark is *transparent*. This transparency is appreciated by the market and facilitates the (political) management of the debt manager.

In terms of *efficiency*, it may be assumed that a gain can be realised if the aim is a centralised portfolio. The model shows that, over a five-year horizon and with a rising interest-rate curve, portfolios with a centralised risk profile are more efficient in a state of equilibrium than portfolios with a jagged profile. Transparency also improves efficiency, as the benchmark stimulates the 'smart' use of financing instruments.

Some of that efficiency will have to be surrendered in favour of improved workability of the national debt risk framework. The *workability* of the current policy is impeded by unforeseen balance fluctuations. The new policy will by-pass this disruption by making changes in the budget balance part of the target variable. In this way, they cannot cause a discrepancy between target and reality. The inclusion of the balance in the benchmark does not affect its unequivocalness.

Figure IV.2. Pursuit of a centralised benchmark portfolio is optimal, but inclusion of changes in the budget balance causes small inefficiencies in relation to the theory



Performance in relation to the benchmark will be discussed in the budget and the annual report. Although performance may focus on the *costs* of debt financing, a factor of particular importance is the degree in which the *risk profile* of the benchmark is approximated.

Where the costs are concerned, the costs of the portfolio are simply set off against the costs of the benchmark.[46] The debt manager's performance will be constant as long as his result does not change in relation to the benchmark. Just like any other portfolio, the benchmark involves expected interest costs and a risk that these costs turn out to be higher. A performance equalling the benchmark therefore does not mean that the interest costs will accordingly be low. If the debt manager should eventually perform slightly better than the benchmark, the *expected* costs will be lower than the costs of the benchmark.

The risk profile of the actual portfolio is subsequently compared with that of the benchmark. It is fairly easy to assess periodically the extent to which the risk profile approximates the envisaged profile.

Selection of the benchmark portfolio in practice

Except for several practical preconditions the benchmark should fulfil, the selection of the benchmark portfolio is based mainly on what is desirable. A question of particular importance in

[46] These costs primarily concern the interest costs of debt financing according to the benchmark and according to practice. The market value of the debt portfolio is another relevant factor. This point is further explained in the section entitled 'Details'.

this respect is what form of debt financing is most compatible with the budgetary policy as a whole. According to these objectives, the cabinet aims to achieve good budget results, as arranged in the coalition agreement in the run-up to the surplus in 2011. The cabinet should also ensure that the risks remain sufficiently controllable so as not to jeopardise a sound budgetary policy. Every attainable portfolio has a certain level of costs and risk, which is subject to change in accordance with the assumed scenario for the development of the budget balance. As the risk framework is meant especially as a safety net (still effective in the worst case), express account should be taken of the risk of balance deterioration and its impact on interest costs. Another key point is to the extent to which, as part of the current budgetary policy, the aim should be to reduce, extend or maintain at a constant level the debt portfolio or to maintain at a constant level the average term. Finally, a relevant factor for the benchmark portfolio is the interaction between costs and risk. After all, a well-informed choice in favour of a specific benchmark portfolio means that careful consideration was given to the insurance premium the government is prepared to pay for every euro in lower risk.

Based on the above, it has been decided to use a benchmark portfolio characterised by continuous issuances in a 7-year bond. This will be the central control variable of the debt management policy during the period 2008-2011. The choice for this benchmark is in agreement with the current budgetary policy. The debt quote is expected to decline as a result of the current budgetary policy. In the present framework that targets a basis amount-at-risk of 9% of GDP, the average term of the debt portfolio would be gradually reduced. The choice for a 7-year benchmark portfolio also reduces the average term of the debt portfolio (based on the expected trend of debt). In choosing a 7-year benchmark, the current policy is continued, albeit at average lower expected costs and risk.

Unlike the framework aiming at a risk of 9% of GDP, the benchmark selected does not respond to the business cycle. This was a deliberate decision because fluctuations in the business cycle and the balance were responsible for the problems established with regard to workability. This does not mean that the current control variable could not be adjusted to changes in the economic or budgetary situation. However, we advise that the national debt only be adjusted (much like the course of an oil tanker) in the event of trend-related changes in the economy. Such trends only manifest themselves in due course. As part of the periodic evaluation of the risk framework, therefore, consideration will always be given to the question whether there are any breaks in the trend that require an adjustment of the choice of benchmark.

IV.2 Details

In formulating the new risk framework for 2008-2011, the aim is to achieve improvements compared to the current framework. Although the introduction of the framework for 2003-2007 meant a considerable improvement in risk management, a further advance can be made in terms of workability and efficiency. Consequently, these serve as two guiding principles for the new draft.

IV.2.1. The benchmark: design, advantages and performance measurement

The new framework will use a benchmark (reference point), which will be selected in such a way as to aim for a portfolio with a centralised risk profile. Where the use of a *benchmark* increases the workability of the framework (compared to a framework without a reference point), *choosing the centralised portfolio as a benchmark* will increase efficiency. This section explains what the benchmark is and how its organisation and use in practice will improve the efficiency and workability of the framework compared to the current framework.

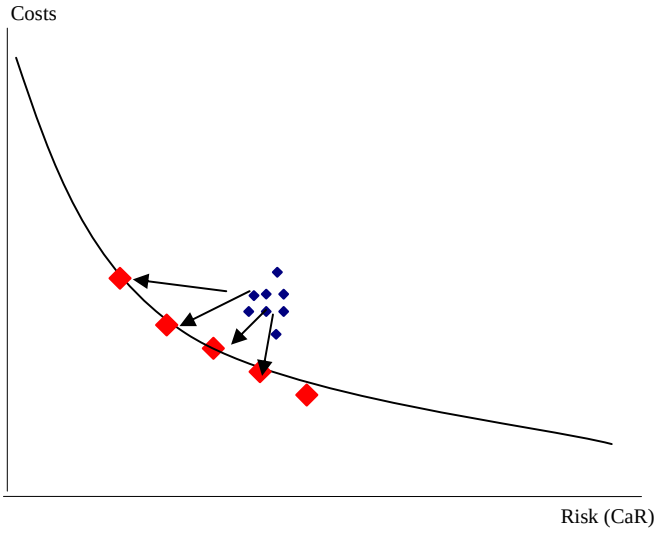
What is a benchmark?

A benchmark is an objective standard for measuring performance. The risk management benchmark discussed here has a number of characteristics.

1. The basis for the benchmark is a fictitious portfolio with a centralised risk profile (benchmark portfolio). This portfolio enjoys an efficient interaction of costs and risk.
2. The benchmark prescribes in unequivocal terms what the debt manager would have to do in theory.
3. In this connection, the yield at which refinancing is to take place is fixed.
4. The benchmark portfolio is composed in such a way as to be reproducible in practice.

Figure IV.3.

The benchmark is a centralised efficiency portfolio: a point on the efficient frontier



At a constant debt, a centralised risk profile can be maintained in the benchmark portfolio by always refinancing the repayment through the issuance of a single bond with the same term. Therefore the benchmark for the national debt prescribes exactly what the debt manager should do in theory, i.e. issue a small amount of the same bond every day. As a result, the benchmark is defined in unequivocal terms. As the yield at which the benchmark portfolio is recorded, the costs and risk of the benchmark are also defined in unequivocal terms. Due to the unequivocal definition, costs and risk can only be reproduced in practice by financing in *exactly* the same manner at *exactly* the same yield. A key point in this respect is that the features of the benchmark (such as the selected yield and the benchmark portfolio) are effectively *reproducible*. Only the five-year and ten-year benchmarks are portfolios that can be reproduced through the issuance of bonds. The use of, for example, swaps makes other points reproducible as well. Some other portfolios (which may be quite close) will be practically impossible to reproduce.

Why is a benchmark desirable?

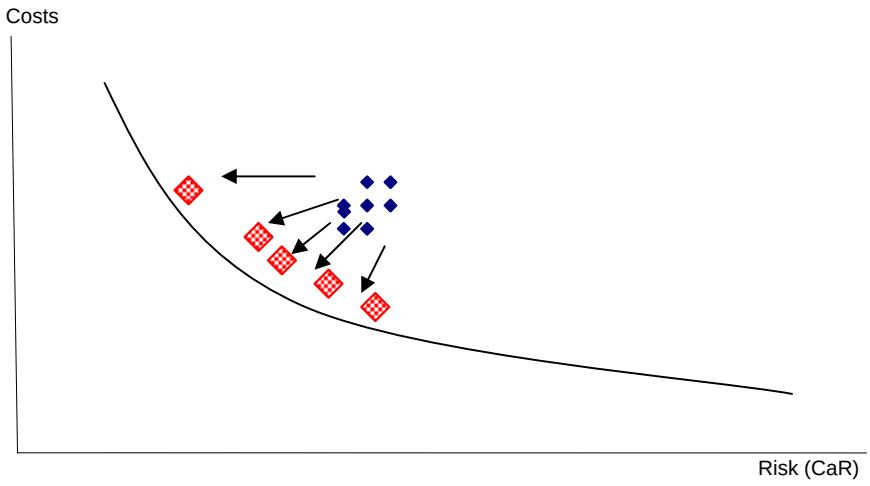
If chosen and organised properly, the benchmark will be an *adequate safety net* for the debt financing risk (much like the current risk framework). After all, the benchmark portfolio selected also determines the maximum risk to be run. As explained elsewhere, the benchmark defines the objective in extremely *precise terms*. Thus, the delineation largely realised in the risk framework for 2003-2007 is completed. The debt manager has to approximate the risk and costs of one point on the efficient frontier. By using the benchmark as the central control variable, the new risk framework – unlike the current framework – will not require supplementary financing rules to guarantee that unequivocalness.

A benchmark (which is an unequivocal reference point) is also compatible with the pursuit of *transparency*. In particular, greater transparency refers to the effect of financing policy and implementation decisions on costs and risk. This transparency is appreciated by the market (which favourably impacts the pricing of Dutch instruments) and facilitates the (political) management of the debt manager.

In terms of *efficiency*, it may be assumed ex ante that some gain can be achieved by choosing the benchmark in such a way as to aim for a portfolio with a centralised risk profile. As explained in Section III, the current risk framework results in irregular ('jagged') repayment and risk profiles. The model applied shows that, over a five-year horizon and with a rising interest-rate curve, portfolios with a centralised risk profile are more efficient ex ante in a state of equilibrium than portfolios with a jagged profile (Annex 5).

Please note that the advantages of a centralised portfolio have been modelled in a state of equilibrium. In practice, there will always be changes in the budget balance. These will cause temporary inefficiencies, which means that the theoretically efficient portfolio is unattainable in practice (Figure IV.4). This results in tension between efficiency and workability.

Figure IV.4.
Budget changes in the budget balance in theoretically efficient portfolios make them less efficient



The aforementioned transparency also improves efficiency in that the benchmark stimulates 'smart' use of financing instruments, which leads to better performance. This stimulus is due to the fact that for every financing policy decision (whether taken by the debt manager or the

government in a broader sense) it is immediately apparent whether this choice was efficient in that the benchmark is approximated (or even beaten in due course).

The *workability* of current policy is impeded primarily by unforeseen fluctuations in the balance, which demands a response. A failure to respond means that the target (9% of GDP) will not be achieved. The new policy introduces a method to by-pass this problem. In short, this method makes balance fluctuations part of the target variable, so that they can no longer cause a discrepancy between target and reality. As the balance fluctuations are a fact of life for the debt manager, it is appropriate to leave these fluctuations out of the debt manager's performance, which is measured against the benchmark. The inclusion of the balance in the benchmark does not affect its unequivocalness. Even after the balance has been included, it is still exactly clear what the debt manager would have to do in practice.

Just as the attainability of the benchmark is independent from changes in the budget balance, this independence also applies to other variables that should be regarded as given facts for the debt manager. In case of rising or falling interest rates, the result in relation to the benchmark will not change because the interest rate movements affect both the benchmark and reality. Thus, the benchmark is an improvement compared to both the current framework (the business cycle and changes in the budget balance have no effect) and the previous framework. In the period prior to the current framework, the control variable was based on duration. This was dependent on movements in the market rate of interest. In the face of rising interest rates while policy remained the same in other respects, the duration declined and the policy had to be adjusted, even though variables such as debt size and risk preference had not changed.

How is performance measured against the benchmark?

If the benchmark portfolio is adopted as the control variable, performance should also be assessed against that benchmark. In fact, this performance is twofold. The performance may concern the *costs*, but another key factor is the degree to which the benchmark's *risk profile* is approximated.

- *Performance in terms of costs*

The result relevant for the benchmark is known as 'total return', which is defined differently than that applied to the interest costs in the budget. The difference between the two definitions is rooted in the changes in the portfolio's value measured over the budget year. This is effectively the *unrealised* result, which is not expressed in the interest costs of that year (*realised* result). The use of the total return concept instead of the definition in the budget is necessary in order to prevent a situation where the debt manager keeps deferring unrealised losses so as to beat the

benchmark.[47] However, it is easy to establish a connection between the definitions, which will be done in the relevant reports on the benchmark.

A 'total return' result can be calculated both for the benchmark portfolio and for the actual portfolio. The difference between these two figures is the *result in relation to the benchmark*. This result can be split into a result realised on the recognisable definition of the interest costs and a result arising from changes in the market value.[48]

The debt manager's performance will be constant, provided there is no significant change in the result in relation to the benchmark. Obviously, the intention is to perform at least as well as the benchmark. In the latter case, the total return result of the actual portfolio will be *lower* than the total return result of the benchmark portfolio. The gain may manifest itself in the interest costs or in the debt's market value.

- *Performance in terms of risk*

Apart from comparing the results in terms of costs, it is also possible to compare the risk profile of the actual portfolio with that of the benchmark portfolio in order to obtain an indication of performance. It is fairly easy to assess periodically the extent to which the risk profile approximates the envisaged profile.

It should be borne in mind that the actual portfolio will initially differ from the chosen benchmark portfolio. Accordingly, there will be a period in which the irregular risk profile of the actual portfolio will develop into the centralised profile of the benchmark portfolio. The length of this period depends on the initial distance between the benchmark and the actual portfolio. During this period, it cannot be expected that the envisaged benchmark will be achieved or beaten. However, a path may be agreed for the transitional period against which the debt manager's performance can be measured.

IV.2.2. The benchmark in practice

As established earlier, the costs and risk of the benchmark portfolio can only be reproduced in practice by financing in *exactly* the same manner at *exactly* the same yield. This does not mean that the debt manager will apply exactly the same strategy in practice as in the benchmark portfolio. The actual financing strategy will involve a combination of instruments (money market,

[47] For performance measurement purposes, changes in the market value of the portfolio are most certainly relevant, since they affect the value of the debt.
[48] NB: The interest costs of the benchmark portfolio will differ from one year to another on account of fluctuations in the market rate of interest applied. In the event of unfavourable interest rate developments, this will be the materialisation of the risk. These fluctuations will similarly influence the interest costs of the actual portfolio.

bonds, swap, repurchase). The choice of instruments means that costs and risk have to be considered all the time. Each choice will initially result in a deviation from the benchmark. This is because a bond in segment x is not the same as a bond in segment y with a swap from y to x. The result is a deviation from the benchmark, which has consequences for the costs and/or the risk of debt financing.

The deviations arising in reproducing the benchmark are not unfavourable by definition. By making 'smart' use of instruments, it may even be possible to slightly outperform the benchmark. This constitutes the stimulus described above, which will only be effective if it is not easy to beat the benchmark. Once a benchmark has been chosen, the Minister may adjust the performance requirement in relation to that benchmark so as to create an adequate incentive for the debt manager.

If there is an unequivocal risk framework (such as a benchmark), preconditions for the products/instruments that may be used (the financing rules) will no longer be required. Obviously, preconditions may still be prompted by other considerations. Where the preconditions are compatible with what is considered desirable or attractive in the market, they often contribute indirectly to the realisation of lower costs (while ignoring these signals may increase costs). For example, it is important for liquidity purposes to issue bonds of a sufficient size. In addition, the annual issuance of a new euro bond in the ten-year segment will be required in order to create a full curve up to the ten-year segment, which the market regards as positive. From an international perspective, furthermore, a bond in the ten-year segment is viewed as an important bond, applied by nearly every debt manager.

The preconditions need not restrict the debt manager in the approximation of the benchmark. As long as other effective instruments can be used to a sufficient extent (such as swaps or issues in currencies other than the euro), the risk profile resulting from issues can always be adjusted to the risk profile of the benchmark portfolio. For this reason, there is no need to adjust the current issuance strategy in the new framework; this strategy will remain unchanged for the time being.

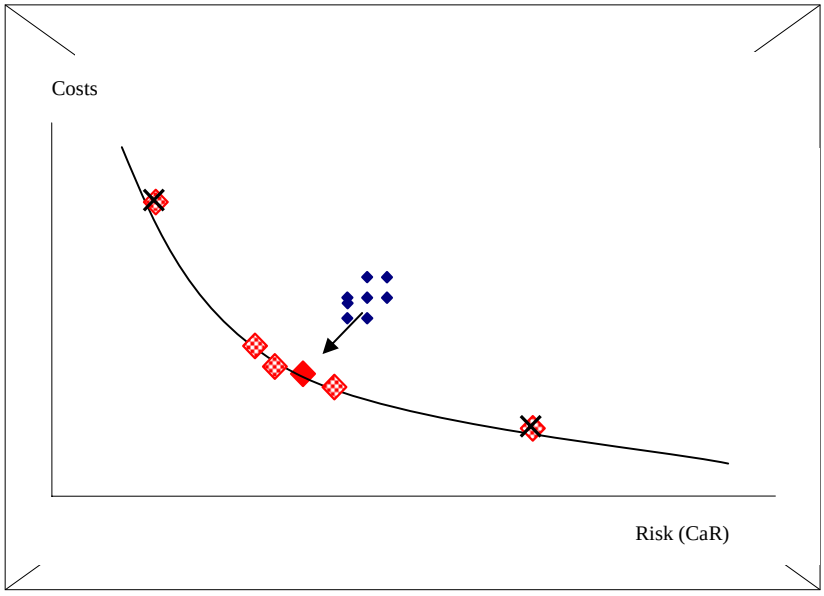
IV.2.3 The choice of a benchmark portfolio

It is clear that several benchmark portfolios are possible. This section will set out which benchmark portfolios are possible, the features of each of these portfolios and which features were decisive in choosing the portfolio concerned.

Possible benchmark portfolios

In theory, the Dutch State Treasury Agency might attain any other portfolio composition (and therefore benchmark) from the present portfolio by using financial instruments. In practice, however, it is advisable to pursue a workable combination of the desired issuance strategy and the use of instruments such as swaps. This means that not all benchmark portfolios are equally easy to attain.

Figure IV.5. The benchmark should be attainable from the current strategy



The debt portfolio (with a value of approximately €200 billion) is comparable to an oil tanker that only slowly changes direction. Because of choices made in the past, the current portfolio has a specific repayment profile. The market rewards transparency and continuity and appreciates a somewhat stable issuance policy. For this reason, it is advisable to continue that policy in the near future. By issuing bonds and using swaps, there is no difficulty in attaining portfolios with a centralised risk profile that more or less approximate the current portfolio in terms of costs and risk. Portfolios consisting exclusively or largely of long-term financing or short-term financing are too extreme and are not eligible.

Selection of the benchmark portfolio for 2008-2011

In making the final decision on the benchmark portfolio, a number of possible portfolios were compared. These portfolios differ in cost and risk level, but also in terms of cost-risk ratio. In particular, the selection process focused on the portfolio's desirability, given their cost and risk features and the embedding of these features in the budgetary policy. According to the objectives

of the budgetary policy, the cabinet aims to achieve good budget results and – obviously – ensure that the risks remain sufficiently controllable so as not to jeopardise the sound budgetary policy.

Based on the above, it has been decided to use a benchmark portfolio characterised by continuous issuances in a 7-year bond. This will be the central control variable of the debt management policy during the period 2008-2011. The choice for this benchmark is in agreement with the current budgetary policy. The debt quote is expected to decline as a result of the current budgetary policy. In the present framework that targets a basis amount-at-risk of 9% of GDP, the average term of the debt portfolio would be gradually reduced. The choice for a 7-year benchmark portfolio also reduces the average term of the debt portfolio (based on the expected trend of debt). In choosing a 7-year benchmark, the current policy is continued, albeit at average lower expected costs and risk.

Unlike the framework aiming at a risk of 9% of GDP, the benchmark portfolio now selected does not respond to the business cycle. This was a deliberate decision because fluctuations in the business cycle and the balance made the risk framework less workable than would have been possible in theory.

All this does not mean that the current control variable could not be adjusted to important changes in the economic or budgetary situation. However, we advise that the national debt only be adjusted (much like the course of an oil tanker) in the event of trend-related changes in the economy. Such trend movements only manifest themselves in due course. As part of the periodic evaluation of the risk management framework, therefore, consideration will always be given to the question whether breaks in the trend require an adjustment of the choice of benchmark.

Annexes

Annex 1. Risks inherent to debt management

- **Market risk:** The risks for the issuer in connection with the changes in market prices (such as interest rates and exchange rates).
- **Refinancing risk:** For countries with stable access to capital markets, this term refers to the risk that the debt has to be refinanced at a higher interest rate (a form of market risk). For countries with less stable access to capital markets, it is possible that debts cannot be refinanced, or can only be refinanced at prohibitively high costs and/or for very short terms. Where this has the effect that a country can no longer fulfil its obligations, we speak of a debt crisis.
- **Liquidity risk:** The risk that, owing to (unexpected) cash obligations, a large amount of money should be borrowed over a relatively short period of time with possible consequences for the level of interest rates and/or other bond conditions.
- **Credit risk:** The risk that arises if the other party fails to meet its obligations. This risk applies in particular to swap contracts and deposits in which the government is the lender. Credit risk also occurs in the period between the allotment of bonds and bills to the other parties and the moment when clearing and settlement take place.
- **Settlement risk:** The risk that arises if a transaction with another party cannot be settled without any blame on the side of that other party (e.g. due to a fault in the international payment system). The latter aspect distinguishes settlement risk from credit risk.
- **Operating risk:** This term refers to such risks as those that arise if mistakes are made when transactions are concluded or if the internal control systems (such as ICT) fail. This term also extends to reputation damage, legal risks, breaches of safety and (natural) disasters that affect a debt manager's activities.

Annex 2. Management summary from the report 'Index-Linked Bonds' (October 2005)

This report of the Working Group on the Budget in Real Terms addresses three questions as phrased in the instructions to this working group. These questions concern the significance of inflation linked bonds for the government budget (size and stability of interest costs and EMU balance) and the demand from pension funds for inflation linked bonds.

1.1. Key points

1. The interest rate on inflation linked bonds is expected to be lower than the interest on nominal bonds with an identical term to maturity.

2. Apart from their size, the variability of the interest costs in the budget is another relevant factor. Whether inflation linked bonds result in greater variability of the interest costs depends on whether the interest costs are measured in nominal or in real terms. For nominal interest costs, inflation linked bonds by definition entail a greater degree of variability than nominal bonds, while this is exactly the reverse where real interest costs are concerned. The present debt policy framework in which the EMU balance is the key parameter for budget policy, focuses on the nominal interest costs. From a long-term perspective, aiming at sustainability of government finances, an approach based on the real interest costs would be more appropriate.

3. Within the present debt policy framework, which focuses on the nominal interest costs and their short-term variability, inflation linked bonds are less attractive than issuing short-term bonds. This is because the ratio between size and variability of the nominal interest costs is more favourable for short-term bonds than for inflation linked bonds.

4. The relationship between shocks to the interest costs and other economic shocks is an important factor for the stability of the EMU balance. In general, shocks to the interest costs are relatively small in comparison with other shocks to the EMU balance, also where debt financing through inflation linked bonds is concerned. Calculations by the Netherlands Bureau for Economic Policy Analysis (CPB) show that inflation linked bonds yield a favourable relationship with other shocks, which gives them a stabilising influence on the EMU balance (hedge). In practice, short-term bonds may also yield a certain hedge. Because of the shorter term, however, this hedge will entail greater variability of the interest costs in the future. In both cases, the relationship (hedge) is certainly not perfect. For this reason, the absolute extent of the variability in the interest payments is important as well.

5. It is sometimes argued that the interest costs associated with the issue of inflation linked bonds are a better fit to the real expenditure framework used in Dutch budgetary policy than the interest costs associated with the use of nominal bonds. The argument runs as follows; because the expenditure framework is adjusted for inflation, all expenditure items that are part of this framework should also move one-on-one with inflation. Inflation linked bonds must thus be a perfect match since they move one-on-one with inflation. The argument confuses the inflation-sensitivity of the stock of debt with the inflation sensitivity of the (flow of) interest cost. Even in the case of nominal funding, the rise in interest costs as a result of a 1 percentage point increase in inflation would be much larger than the 1% price adjustment that would apply to the real expenditure framework. The use of inflation linked bonds would cause an even larger discrepancy between the inflation-sensitivity of the framework and that of the interest costs.

6. Issuance of inflation linked bonds may contribute to welfare in that it eliminates a form of market failure. For the pensions market, inflation linked bonds are a welcome instrument in order to cover inflation risks and increase the diversification possibilities. In this way, inflation linked bonds may contribute to the stability of the pensions sector, thereby contributing indirectly to stable government finances.

The overall assessment of inflation linked bonds depends on the weight attached to the various aspects. In conformity with the terms of reference, the working group is not expressing an opinion on this point.

1.2 Background

Inflation linked bonds cheaper?

The interest on inflation linked bonds is expected to be lower than the interest on nominal bonds with an identical term to maturity. The interest rate gap consists of two components, the inflation risk premium and a liquidity premium. The inflation risk premium is charged because creditors of nominal debts demand compensation for the uncertainty as to whether the bond is inflation proof. Although the expected inflation is incorporated in the nominal interest rate, the actual outcome is uncertain and depends on the inflation realised. Estimates of the size of the inflation risk premium vary and range from 0.1 to 1 percentage point. The CPB pension study applies a premium of ½ percentage point. Based on data collected by countries such as France and the UK, the Agency has calculated the maximum interest rate gap at 0.45 percentage point, which also includes the liquidity premium. The latter premium depends especially on the size of the market. Under the current market conditions, an index bond linked to the Dutch CPI obviously carries a slightly higher liquidity premium than a bond indexed to the euro CPI.

A lower interest rate does not necessarily mean that inflation linked bonds are “cheaper”, however. After all, the interest rate gap primarily constitutes compensation for the risk. Eventually, the valuation by the taxpayer will be the decisive factor. A more pragmatic approach usually looks at the size and significance of the interest costs for the EMU balance, as long as the latter is regarded as the key parameter for the budget policy.

Nominal or real definition of the interest costs

In addition to the price of debt, the variability of the interest costs is also a relevant factor. Whether inflation linked bonds contribute to stability in the budget depends on whether the interest costs are measured in real or in nominal terms, i.e. with or without the effect of inflation on the real value of the national debt. Traditionally, the government’s financial position is measured against the size of the EMU balance, with a nominal definition of the interest costs. In recent years, attention has also been paid to the sustainability of government finances in the long term. Hereby the financial position is measured against the real financial position of the government in relation to the expected future income and expenditure (see, for example, the work of the EPC Working Group on Ageing). In this context, the interest costs measured in real terms are a better reflection of the government’s position.

Present funding policy objective

The present funding policy objective is defined as *funding in order to refinance the current national debt and finance the deficit at the lowest possible cost subject to an acceptable degree of risk as regards the fluctuations in the budgeted interest costs*. This concerns the nominal interest costs. The working group has examined whether extending the State’s range of instruments by inflation linked bonds would make debt financing more efficient. This analysis shows that – within this objective – issuing inflation linked bonds would not be cost effective for the State. Combinations of treasury notes and nominal 10-year bonds would offer a more favourable ratio between nominal interest expenditure and the risks to the budget.

Inflation linked bonds and variability of the EMU balance

Inflation linked bonds are expected to constitute a certain hedge for inflation shocks. In this way, the variability of the EMU balance will be reduced. In general, a high rate of inflation goes hand in hand with a favourable position of the primary balance. As the interest payments on inflation linked bonds also bear a positive relation to the rate of inflation, these will have an absorbing effect on shocks to the EMU balance. This relationship (the covariance) is not perfect, however. For this reason, the absolute extent of the variability (the variance) in the interest payments is important as well. As long as the nominal interpretation of interest payments continues to play a part, restricting the share of inflation linked bonds within the total debt portfolio is obvious. In

principle, the variability of the EMU balance offers a better point of departure for capping than the current ceiling, which restricts the variability of the interest costs. Short-term bonds also offer a certain hedge, provided that the short-term interest rate follows the rate of inflation. However, the short term to maturity entails greater uncertainty about future interest payments.

Interest costs and the real expenditure framework

It is sometimes argued that the interest costs associated with the issue of inflation linked bonds would fit the real expenditure framework used in Dutch budgetary policy better than the issue of nominal bonds. The real expenditure framework is regularly adjusted for changes in the inflation rate. If inflation were to increase by 1 percentage point, all expenditures within the framework are allowed to increase in size by 1 percent as well. The argument that inflation linked bonds best fit this framework because they too are denominated in real terms, confuses the inflation-sensitivity of the stock of debt with the inflation-sensitivity of the interest costs. When funded entirely through inflation linked bonds, not only the flow of coupons but the entire stock of debt is inflation-sensitive. That the stock of debt responds one-to-one to changes in the inflation rate does not imply the same inflation-sensitivity for the flow variable; the interest costs in the budget. As the interest costs are much smaller than the stock of debt, an increase in the costs of 1% over the stock of debt implies a much larger percentage increase in the interest costs. As long as only nominal bonds are used, the inflation-sensitivity of the stock is limited to the share of debt that is refunded each year (and only to the extent that inflation feeds through to the interest rate). Even in this case, the interest costs would increase by substantially more than 1% if inflation rose by 1 percentage point, given that the share of debt that is refinanced each year is generally much larger than the interest costs. The use of inflation linked bonds would amplify the response of interest costs to inflation, leading to an even larger discrepancy between the adjustment of the framework and the rise in interest costs.

Inflation linked bonds and pensions sector

Issuance of inflation linked bonds may contribute to prosperity in that it eliminates a form of market failure, i.e. the absence of a market for inflation-proof securities. This is of particular importance in an ageing society with growing pension savings. Total equity of the Dutch pension funds already exceeds 125% of gross domestic product and will grow considerably in the future (see CPB pension study, 2004). This means that the proportion between contribution base and pension commitments will become increasingly distorted, so that the effect that shocks will have on the equity position will require increasingly large changes in contributions or claims. Greater volatility in contribution rates may cause disruptions in the labour market, while it will also affect government finances via the deferred taxation and the contributions to the General Pension Fund

for Public Employees (ABP). Uncertainty about the level of future pension benefits, moreover, will have a direct negative effect on prosperity.

The working group has examined the interest and potential motives of pension funds in taking out inflation linked bonds. The working group was given the impression that pension funds' interest has increased in recent years. In this connection, it should be pointed out that pension funds currently aim for matching to a limited extent only and use inflation linked bonds mainly as a diversification instrument. The incentives provided by the new Financial Reference Framework to aim for better matching are not particularly strong either. As a result, the demand for inflation linked bonds on the part of pension funds will be smaller than might be expected as part of a matching strategy. Nevertheless, a sufficient demand for inflation linked bonds is expected even in the current circumstances. The picture may improve considerably in the future if pension funds were to alter their course and focus on matching.

Annex 3. Cost minimisation at an acceptable risk: what control variables are used in other countries?

As stated earlier, the objective of debt management for most countries is to finance the national debt at the lowest possible cost, at an acceptable budgetary risk. In order to implement this objective, these countries use one or more control variables. Whereas the Netherlands currently applies the basis amount-at-risk as the control variable, other countries favour the (modified) duration, the weighted average (interest) term and the profile of repayments and/or interest-rate fixing. A small number of countries use a benchmark or reference portfolio in their risk management. The desired *level* of the control variable is usually determined with the aid of a CaR analysis. Below is an overview of the control variables applied by a number of other countries. The table summarises the methods used by the countries discussed.[49]

Belgium aims to limit refinancing risk and the risk of interest-rate fixing ('re-fixing risk').[50] The refinancing risk is minimised by pursuing the most even repayment pattern possible over time. In order to achieve this, refinancing has to meet two preconditions: no more than 22.5% of the debt may be refinanced within one year and no more than 60% within five years. Maximum percentages (25% and 65%, respectively) also apply to the amounts for which the interest rate should be re-determined. Apart from repayments, this also concerns interest rate swaps for which the fixed interest-rate period expires.

Canada aims to achieve a fixed 60% share (of total debt) of the debt for which the interest rate is fixed for a period longer than one year.[51] The target is to refinance no more than 40% of the debt within one year. Other standards monitored include the average term of the debt and the duration.

Denmark applies a duration target within a predetermined target range. The duration in respect of 2007 is three years with a six-month margin. Supplementary to this target, consideration is given to the extent of 'interest-rate fixing' (i.e. the share of the debt for which a new interest rate should be fixed within one year).[52]

Finland used the share of the variable-interest debt in the total debt as the guiding principle until 2005. From 2005, the risk management of the national debt is based on a benchmark portfolio

[49] The selection of countries is partly based on the extent to which information on risk management is publicly available.
[50] See, for example, the Annual Report 2005 of the Belgian Debt Agency, which is available via its website (www.debtagency.be).
[51] See the Debt Management Strategy 2007-2008 of the Canadian Ministry of Finance, which is available via its website (www.fin.gc.ca).
[52] See the Annual Report 2006 of the Danish central bank, Danish Government Borrowing and Debt, which is available via its website (www.nationalbanken.dk).

(a 'reference portfolio for debt management').[53] This portfolio pursues an interest-rate risk profile defined in terms of the average interest rate period of the debt ('the average period of re-pricing/re-fixing the debt'). The target is to realise a 'smooth fixing profile'. At the end of 2006, this period amounted to 2.8 years. There is no information about the exact portfolio pursued by the Finnish.

Portugal has construed a long-term benchmark portfolio that complies with predetermined targets for the (modified) duration (which fluctuates between 2.5 and 4 years) and the profile of repayments and of 'interest fixings'. The interest-rate risk is capped in both absolute and relative terms (as against the benchmark). The absolute limits for debt repayable within a period of 12, 24 and 36 months are 25%, 40% and 50% respectively. In relative terms, deviations from the relevant amounts of the benchmark portfolio may not exceed 10%, 15% and 20%, respectively.[54]

France aims to reduce the average term of the debt. Apart from this principal target variable, the French Treasury Agency has applied three supplementary (primarily internal) indicators since 2004. In addition to the spread on government bonds as against the euro average and other euro countries, these include the timing indicator and the allocation indicator. The former shows the actual debt costs compared to a situation involving constant issues of a part of the debt for selected terms. The allocation indicator compares the actual debt costs with the hypothetical debt costs if issues had been exactly in conformity with the calendar initially published.[55]

Sweden applies a target for the average term/interest rate period of the portfolio. The policy aims to reduce the average term from 5.0 years in 2006 to 4.4 years at the end of 2009. In addition, Sweden has guidelines for the share of different types of debt instrument in total debt within specific target ranges.[56] For nominal debt expressed in its own currency, the share pursued is 60%; for inflation-indexed debt, 25% and for debt expressed in foreign currency, 15%.

[53] See the Debt Management Annual Review 2006 of the Finnish Ministry of Finance, which is available via its website (www.statetreasury.fi).
[54] See the website of the Portuguese Treasury Agency (www.igcp.pt).
[55] See the website of the Agence France Trésor (www.aft.gouv.fr/).
[56] See the Central Government Debt Management – Proposed Guidelines 2007-2009, which document is available via its website (www.rgk.se).

Summary table

Country	Control variables / targets
Belgium	The extent of debt refinancing The extent of the debt for which the interest rate has to be re-determined ('interest-rate re-fixing')
Canada	Share of fixed-interest debt in total debt
Denmark	Duration target (within a target range) 'Interest-rate re-fixing'
Finland	Reference portfolio for debt management Average interest-rate period of the debt in years ('average period of re-fixing the debt')
Portugal	Benchmark portfolio Duration Repayment profile and 're-fixing' profile of the debt
France	Average term of the debt Spread in relation to euro zone Timing indicator Allocation indicator
Sweden	Average term of the portfolio Share of various types of debt instrument in the total debt

Source: websites of the relevant Treasury Agencies and/or Ministries of Finance.

Annex 4. Why and how are swaps included in the risk amount?

The risk framework annually prescribes a risk amount of 9% of GDP. In addition, the Dutch government considers it important to issue liquid treasury instruments for specific terms. Such issues result in a particular repayment pattern (and risk profile) over time. In all likelihood, this pattern will regularly cause the basis amount-at-risk to deviate from an amount of 9% of GDP per annum. Swaps may be used to bring the risk amount back in line (9%).

Let us assume that the total amount of repayments and money market bonds in any year is only 8% of GDP. Therefore the total amount sensitive to interest rate changes is in fact one percentage point too low. By arranging what are known as receiver swaps, the amount can be brought back to 9% of GDP. If the government enters into receiver swaps, it will receive the long-term interest rate and pay the short-term rate. As the short-term interest rate is re-determined every six months, the amount involved in the receiver swaps is sensitive to interest rate changes. This is why these swaps are included in the basis amount-at-risk. The reverse situation will occur if the repayment profile yields a refinancing amount of more than 9% of GDP. In that case, payer swaps should be arranged, which means that the long-term interest rate is paid and the short-term rate is received. Such payer swaps will reduce the basis amount-at-risk.

Annex 5. Why are centralised portfolios on the frontier while others are not?

A centralised portfolio is a portfolio in which – after an even risk profile has been prepared – the same bond is issued continuously. In this way, the risk profile remains constant over time. Such a portfolio corresponds to a point on the yield curve. Let us assume a portfolio in which a five-year bond is issued continually. The point on the yield curve at a five-year term is representative for this portfolio. A portfolio with an average term of five years may also be attained via a combination of other bonds that are selected in the right proportion to each other.

With regard to *centralised* portfolios with a five-year term, 20% of the debt should be refinanced every year. This means that 20% of the debt is exposed to interest rate changes.

If we were to consider a hypothetical situation in which the average term was maintained with, for example, a combination of one-year and ten-year bonds, this could be done by financing 56% of the debt with one-year bonds and 44% with ten-year bonds. This has the following effect on the average term (whereby X equals the share of the one-year debt in the total debt):

$5 = X \bullet 1+(1-X) \bullet 10$, whereby $X= 5/9 \approx 56\%$

This would mean, however, that each year (56+1/10•44 =) 60.4% of the bond would have to be refinanced. It is evident that refinancing this amount of the bond would involve the risk several times larger than the risk of the centralised portfolio. Consequently, in the combination of costs and risk, the centralised portfolio – situated on the frontier – will have maximum efficiency.

Annex 6. Research into the shape of the yield curve

Since World War II, the interest-rate curve has on average been steep and rising. Relatively stable and low long-term interest rates in an environment of monetary tightening have recently led to a flattening of the interest-rate curve. The movements of the short-term versus the long-term interest rates go against the conventional knowledge of the interest-rate curve and have been labelled a 'conundrum' by Alan Greenspan.[57]

The flattening of the interest-rate curve may be relevant to the risk management of debt. If this change in the interest-rate curve proves to be permanent, it will have implications for the traditional interaction between costs and risk. For this reason, a research was carried out into the possible causes of the flattening and the extent to which this flattening may be permanent.

Scientific literature identifies various factors that may influence the level and gradient of the interest-rate curve over time. These factors may be traced back to the interest rate components (i.e. inflation, inflation expectations, inflation risk premiums, actual interest rate and actual interest rate volatility).

First, increased credibility of the central banks caused inflation expectations to decline in line with the rate of inflation over time. This credibility has increased because of greater independence, greater efforts towards price stability and greater transparency. The lower rate of inflation and inflation expectations may also be attributed to the process of privatisation and deregulation in certain sectors. Furthermore, the increase in flows of global trade and the reduction of trade barriers (globalisation) have stimulated international competition, innovation and more efficient production processes. This caused a drop in production costs. As a result, inflation expectations seem to be anchored at a lower level. There is ample proof for the reduction in the volatility of inflation rates and thereby in the risk premium demanded by investors. As a result, the inflation risk premium has gradually declined.

The actual interest rate also seems to have fallen recently, as has actual volatility. This would seem to indicate that investors have more certainty about the actual return on their investments. The first explanation for a lower actual interest rate is what is known as the 'saving glut'. The worldwide savings of emerging markets and oil-producing countries exceed the investment ratio in these countries. Many of these 'additional savings' are invested in Western government bonds. Furthermore, new pension schemes seem to result in an increased demand for long-term fixed-interest securities, which reduces the long-term real interest rate. The lower real volatility may be attributable to better stock management, better use of information technology, a larger

[57] Greenspan (2005).

share of the services sector in the GDP and sound budgetary policy. It is possible, therefore, that the risk premium for the real interest rate fell as well.

Both the lower long-term interest rate and the lower volatility seem to have contributed to a flattening of the curve. To support the qualitative findings, an empirical study was carried out into structural changes in the dynamics of the interest rate curve.[58] During the past 34 years, there have been regular structural breaks in the dynamics, especially around key events, such as the failure of Bretton Woods, the oil crises and sudden changes in monetary policy. Furthermore, the reunification of Germany and the signing of the Treaty of Maastricht may have affected the ratio between long-term and short-term interest rates. The most recent indication for a break dates from 2003 and may have been caused by excessive savings, pension regulation and lower risk premiums. Therefore the latter break in the dynamics relates in particular to a lower long-term interest rate and not so much to an increase in the short-term interest rate (as was the case in the past).

Empirical analyses also confirm that production and inflation affect the interest-rate curve dynamics and the 'yield spread' (the difference between the ten-year and the six-month interest rates) in Europe. Above-average inflation and production growth result in small and possibly negative spreads (flat curve), while below-average inflation and production growth lead to positive spreads (steeper curve). Furthermore, the variance in both inflation and production growth has displayed a remarkable decline since the second half of the 1990s, which may have contributed to lower risk premiums and thus to a smaller spread between long-term and short-term interest rates.

The notion that structural breaks may be frequently observed (particularly around key events) and the fact that inflation and production affect the dynamics of the interest-rate curve do not provide much of a starting point for the future. They offer no guarantee of the permanence of the curve's flatness. On the contrary, inflation and production developments are cyclical and will therefore lead to fluctuations in the dynamics of the interest-rate curve. There is a chance, though, that if the volatility of inflation and production is permanently lower, the risk premiums may be permanently smaller. However, the latter is not supported by hard evidence.

[58] The interest rates and interest-rate curves were based on the Deutsche Bund, since this market is much more complete and the current Dutch interest rates are virtually parallel to the German rates.

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