Danmarks Nationalbank

# Danish Government Borrowing and Debt

2008

DANISH GOVERNMENT BORROWING AND DEBT 2003
Print: Schultz Grafisk A/S
ISSN: 1399-2023
1398-3881 (online)

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**Explanation of Symbols**
- \- Magnitude nil
- 0 Less than one half of unit employed
- • Category not applicable

In tables figures may not add because of rounding.

This publication is based on information available up to 6 February 2004.

This publication is a translation of "Statens låntagning og gæld 2003".

# Contents

# Foreword

In connection with the management of the Danish central-government debt Danmarks Nationalbank issues the publication "Statens låntagning og gæld" (Danish Government Borrowing and Debt). The publication describes the development during the preceding year and reports on other issues of relevance to debt management.

The aim of the publication is to give a deeper understanding of Denmark's government debt policy. *Key Elements of the Government Debt Policy* summarises the key conclusions regarding government debt policy in 2003, and activities and trends within government debt management.

Chapter 1 gives a general presentation of the *key principles* for the government debt policy.

Chapters 2-7 constitute the *Report section.* They present the considerations and factors governing borrowing and debt management during the preceding year, together with an account of the strategy for 2004. Chapter 2 describes domestic borrowing, and Chapter 3 foreign borrowing. Chapter 4 presents the application of interest-rate and currency swaps. Chapter 5 describes the management of the assets of the Social Pension Fund. Chapter 6 gives an account of various types of risk and how they are managed. Finally, the development in the government debt and the debt of a number of government-guaranteed entities is reviewed in Chapter 7.

The *Special-topic section* comprises Chapters 8-11. Chapter 8 focuses on the Treasury bill programme, including price formation and participation at Treasury bill auctions.

Chapter 9 describes the introduction of electronic trading and market-making in the market for Danish government securities including the introduction of the trading platform MTS and a primary dealer system.

Chapter 10 reports on a new scheme whereby Danish Ship Finance has gained access to a central-government re-lending facility.

Chapter 11 contains a description of the framework for determining strategies, as well as new initiatives in risk management.

The *Appendix* presents announcements relating to central-government borrowing and debt. *Danish Government Debt Management Strategy in 2004* describes the borrowing requirement and borrowing strategy for 2004, as well as the on-the-run issues eligible for buy-back. The section reproduces an announcement of the government debt strategy

in 2004, issued in December 2003. In addition, there is a comprehensive Appendix of Tables with detailed statistics on central-government borrowing and debt. Finally, a glossary presents explanations of a number of key financial terms used in the area of government debt management.

# Key Elements of the Government Debt Policy

## SUMMARY

2003 was characterised by low interest rates and favourable demand. Combined with a government-budget surplus this contributed to reducing interest costs and debt. During the year Government Debt Management launched a number of new initiatives to enhance efficiency and liquidity in the market for government securities. Furthermore, the tools for risk management of the government debt were improved.

Initiatives aimed at efficiency and liquidity:

- Introduction of the electronic trading platform MTS in the wholesale market for Danish government securities.
- Establishment of a primary dealer system with an obligation to quote prices on MTS within predefined spreads and amounts.
- Establishment of electronic trading and market-making on the retail market for Danish government securities on the Copenhagen Stock Exchange.
- Building up 2- and 5-year on-the-run issues to an outstanding amount of at least DKK 35 billion and the 10-year issues to at least DKK 60 billion to match comparable issues in the euro area.

New initiatives in the risk management of the government debt:

- Duration continues to be managed within a given target band, currently 3 years +/- 0.5 year. New in 2004 is the daily management of a duration based on a fixed discount rate within a narrower band of 3 years +/- 0.25 year.
- The duration target is supplemented with interest-rate fixing, a new measure for the interest-rate exposure in a given year. Interest-rate fixing is compiled as the amount in the debt portfolio for which a new interest rate is to be fixed during the following year, i.e. the redemptions in the following year, debt at floating rates and the swap portfolio.
- Government Debt Management's Cost-at-Risk model is further developed to comprise e.g. new methods for quantifying risk.

## BUDGET SURPLUS AND LOW INTEREST RATES IN 2003

Over a number of years the government-budget surplus has reduced the government debt. The ratio of the central-government debt to GDP has been reduced from 57 per cent in 1995 to 37 per cent in 2003. In absolute terms the central-government debt decreased by DKK 6 billion in 2003 and totalled DKK 515 billion at the end of 2003.

The generally low level of interest rates in 2003 made it possible for the central government to refinance relatively high-interest debt at lower interest rates. This resulted in a lower average interest rate on the debt portfolio. Compared to 2002, the interest costs fell by DKK 4 billion in 2003 to DKK 27 billion.

## INTRODUCTION OF ELECTRONIC TRADING AND MARKET-MAKING IN DANISH GOVERNMENT SECURITIES

In 2003, Government Debt Management together with the market participants introduced electronic trading and market-making in Danish government securities. This has created a more efficient market for Danish government securities that are now traded according to international standards. This has generated renewed interest from international banks and investors and attracted new active market participants.

On 4 November 2003 trading opened in the wholesale market, i.e. the inter-dealer market, for Danish government securities on the MTS trading platform. Where trading previously took place predominantly via telephone, Danish government securities are now traded electronically on the same platform as government securities in most other EU member states.

Alongside the introduction of electronic trading, a primary dealer system was established whereby a number of banks are obliged to currently quote bid and ask prices on MTS within predefined spreads and amounts. There are currently 13 primary dealers.

The retail market also opened for electronic trading of government securities in 2003. On 1 December a market-making scheme took effect in the retail market for Danish government securities. At present 6 banks are obliged to currently quote bid and ask prices on an electronic trading platform on the Copenhagen Stock Exchange. The scheme has made it possible also for private, small investors to place orders directly with the Copenhagen Stock Exchange.

The introduction of electronic trading has enhanced the transparency of the market for Danish government securities. Specific pre-trade in-

formation concerning prices and volumes for trading is now available in both the wholesale and retail markets.

These initiatives imply that Danish government securities can now be traded electronically in both wholesale transactions between investment banks and in retail transactions by small investors. In addition, since the autumn of 2003 Danish government securities have been traded on the international trading platforms TradeWeb and BondVision where both securities dealers and institutional investors participate.

## ISSUING STRATEGY WITH FOCUS ON LIQUIDITY, CONTINUITY AND TRANSPARENCY

Both domestic and foreign borrowing are based on long-term strategies that match the objective to cover the central-government financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk.

By building up liquid benchmark series in a few key maturity segments the central government can achieve a liquidity premium and cover its borrowing requirement at a lower interest rate. The borrowing strategy focuses on issuance in the 2-, 5- and 10-year maturity segments that are also internationally the key maturity segments, and the series are built up to an appropriate outstanding amount.

For 2004, the issuing strategy is as follows:

- The domestic borrowing requirement in 2004 of DKK 73.5 billion is financed by issuing fixed-rate bullet loans with approximately 40 percent in the 2-year maturity segment, 20 per cent in the 5-year segment and 40 per cent in the 10-year segment. Buy-backs of securities maturing in subsequent years or currency swaps from kroner to euro will increase the domestic borrowing requirement.
- The financing contribution from the Treasury bill programme is expected to be around zero.
- 2- and 5-year on-the-run issues will be built up to an ultimate outstanding amount of at least DKK 35 billion and 10-year issues to at least DKK 60 billion. This is in line with comparable benchmark issues in the euro area and will support liquidity and trading on electronic trading platforms.
- The foreign borrowing requirement of DKK 16.1 billion in 2004 is financed primarily by issuing a euro loan in the 5-year segment.

## OPENING OF 3 NEW SERIES OF DOMESTIC GOVERNMENT SECURITIES IN 2004

All on-the-run government securities will be replaced in 2004:

- On 13 January 2004 sales of 3 per cent Treasury notes maturing in November 2006 commenced.
- On 12 February 2004 sales of 4 per cent bullet loans maturing in November 2015 commenced.
- In the 2nd or 3rd quarter a new government bond will be opened in the 5-year maturity segment.

## NEW EURO LOAN IN 2004

Since 2002 the cornerstone of the strategy for foreign borrowing has been to issue large euro loans in the 5-year maturity segment. In 2003 foreign borrowing consisted of a 5-year euro loan of DKK 17 billion issued via a syndicate of international banks. Pricing and trading of the loan are in line with equivalent issues from other highly rated EU member states. In 2004 the foreign borrowing requirement of DKK 16 billion is expected to be financed primarily by issuing a new euro loan in the 5-year maturity segment. The loan is expected to be issued in the first half of 2004.

## NEW INITIATIVES IN RISK MANAGEMENT OF CENTRAL-GOVERNMENT DEBT

The overall objective of the government debt policy, i.e. to cover the central-government financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk, is pursued by setting strategic benchmarks for *liquidity* and *interest-rate exposure*.

Liquidity is supported by the issuance strategy and the new market initiatives mentioned above. The interest-rate exposure is expressed in terms of duration and interest-rate fixing which are set on the basis of a long-term analysis and the weighing of costs against risk. In 2003 new initiatives in risk management were introduced:

- The central strategic benchmark for interest-rate exposure is still the duration of the total government debt. This target summarises the weighing of costs against risk in the government debt policy. A new initiative in the day-to-day management is a narrower duration band based on a fixed discount rate. The band for 2004 is set symmetrically around the duration of the government debt at the beginning of 2004 at 3 years +/- 0.25 and based on the average of interest rates at the start of 2004.

- In 2004 interest-rate fixing is being introduced as a new supplementary measure of interest-rate exposure. Interest-rate fixing is compiled as the amount in the debt portfolio for which a new interest rate is to be fixed in the following year, i.e. redemptions, floating-rate debt and the swap portfolio. Interest-rate fixing supplements the duration target with information on the exposure in the individual years.
- Finally, Government Debt Management's Cost-at-Risk model, used to quantify the trade-off between costs and interest-rate risk, has been expanded to include the foreign government debt. Furthermore, calculations of new risk measures supporting the setting of the strategic benchmarks for interest-rate exposure have been introduced.

# Main Principles

CHAPTER 1

# Main Principles of Government Borrowing

## SUMMARY 1.1

The overall objective of the government debt policy is to cover the central government's financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk.

The overall strategy for government borrowing is agreed at quarterly meetings between the Ministry of Finance and Government Debt Management at Danmarks Nationalbank. Implementation of this strategy is undertaken by Government Debt Management. Government Debt Management is divided into front, middle and back offices, ensuring a separation of the functions.

An agreement between the central government and Danmarks Nationalbank sets out the framework for the scope and distribution of the central government's domestic and foreign borrowing. Domestic and foreign borrowing norms have been determined. Together they support the separation of fiscal and monetary policy.

Both domestic and foreign government borrowing are based on long-term strategies aimed at meeting the overall objective, including to observe a prudent degree of risk. It is emphasised that the overall borrowing strategies must be consistent over time, and known to market participants. The strategy for domestic borrowing is based on building and maintaining an attractive range of on-the-run issues in the 2-, 5- and 10-year maturity segments. The strategy for foreign borrowing is based on building up a range of large euro loans in the 5-year maturity segment.

Government Debt Management attaches importance to transparency vis-à-vis the general public and the financial markets. Information on government borrowing and debt is published on a regular basis.

## MANAGEMENT OF THE GOVERNMENT DEBT 1.2

The central-government debt is compiled as liabilities comprising the domestic and foreign central-government debt, as well as the assets of the Social Pension Fund and the balance of the central government's account with Danmarks Nationalbank.

Government debt management entails preparation and implementation of strategies for the management of the central-government debt. The choice of strategy is based on a long-term analysis and weighing of costs and risk. In addition, Government Debt Management administers re-lending and guarantees for a number of companies.

**Legislative basis for central-government borrowing**

Under the Danish Constitution, loans can be raised by the central government according to law. The statutory basis for the central-government borrowing is set out in the Act on the authority to raise loans on behalf the central government of 1993[1]. The Act authorises the Minister of Finance to raise loans on behalf of the central government for a maximum amount of DKK 950 billion. Thus this amount is the upper limit for the total domestic and foreign debt. In connection with ongoing debt management, the Minister of Finance is moreover authorised to enter into swap agreements and other financial transactions.

The central government's costs of borrowing, e.g. interest costs and capital losses on issue (the difference between the market and nominal values of the loans), must be appropriated under the annual finance acts.

**Division of responsibilities between the Ministry of Finance and Danmarks Nationalbank**

The Minister of Finance holds the overall, and political, responsibility for government borrowing and debt, including relations to the Folketing (Parliament). Since 1991, Danmarks Nationalbank has undertaken the management of the central-government debt. This division of work is set out in an agreement between the Ministry of Finance and Danmarks Nationalbank.

The overall strategy for government borrowing is agreed at quarterly meetings between the Ministry of Finance and Government Debt Management at Danmarks Nationalbank on the basis of written proposals from Government Debt Management. The Ministry of Finance authorises Government Debt Management to execute the adopted strategy. At the meeting in December, the overall strategy for the following year is determined, including the duration target, on-the-run issues, securities eligible for buy-back and re-lending, and the securities lending facilities. At the subsequent quarterly meetings, any adjustments and further specifications of the overall strategy for the year are adopted. Follow-up is done by monthly status reports to the Ministry of Finance and by reporting at the quarterly meetings.

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[1] Act No. 1079 of 22 December 1993 as amended.

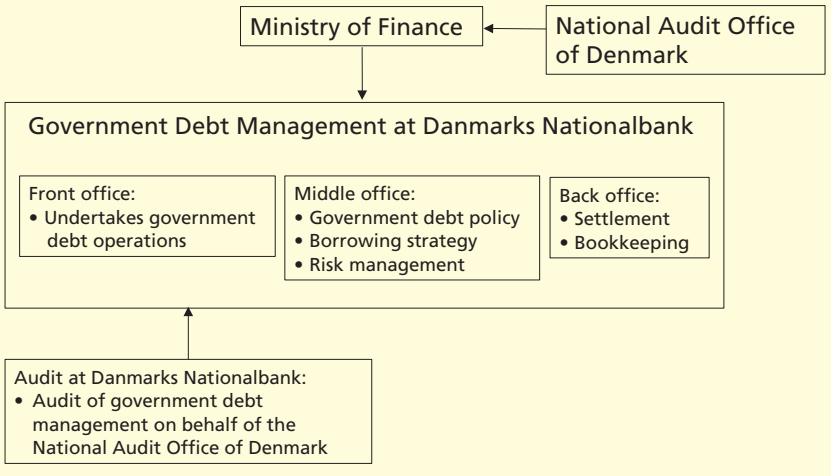
**Organisation of Government Debt Management at Danmarks Nationalbank**

At Danmarks Nationalbank, the tasks related to the management of the government debt are undertaken by Government Debt Management within Financial Markets, Market Operations, Accounting, Government Debt Accounting, and Audit. Government Debt Management is thus divided into front, middle and back offices, each responsible for separate functions. A clear division of functions and clear procedures reduce operational risks and facilitate internal control. A well-defined division of responsibilities ensures that various categories of professional expertise are utilised optimally, and that tasks related to the management of government debt are undertaken independently of other activities at Danmarks Nationalbank. Box 1.1 summarises the organisational structure of Government Debt Management.

Government Debt Management within Financial Markets is responsible for middle-office functions, and therefore formulates the general principles concerning government debt policy, prepares proposals for borrowing strategies and undertakes risk management and ongoing analyses. It also sets out the guidelines for Market Operations with regard to issuance, buy-backs and other transactions, including swap transactions.

Market Operations is responsible for the operational parts of the government debt policy, including issue of government securities, buy-backs, swap transactions and a number of related transactions.

STRUCTURE OF GOVERNMENT DEBT MANAGEMENT Box 1.1



Back-office functions such as settlement and bookkeeping are undertaken by Accounting and by Government Debt Accounting.

The management of central-government debt is audited by Audit at Danmarks Nationalbank on behalf of the National Audit Office of Denmark. The National Audit Office of Denmark is empowered to audit the central government's accounts, and to investigate whether government funds are managed as determined by the Folketing (Parliament). The National Audit Office of Denmark publishes the results of its investigations on an ongoing basis, e.g. at www.rigsrevisionen.dk.

Like all staff at Danmarks Nationalbank, the staff engaged in government debt management are bound to observe insider rules based on the guidelines for speculative transactions of the Danish Financial Supervisory Authority.

## THE NORM FOR DOMESTIC AND FOREIGN BORROWING 1.3

The central-government borrowing norm sets out the framework for the distribution and scope of the central government's domestic and foreign borrowing. The norm is set out in an agreement between the government and Danmarks Nationalbank. Domestic and foreign borrowing norms have been determined. Together they support the separation of fiscal and monetary policy.

The domestic norm states that domestic krone-denominated borrowing in principle covers the central government's gross domestic financing requirement, i.e. the central government's current deficit and redemptions on the domestic debt. The norm for foreign borrowing implies that the foreign borrowing requirement corresponds to the redemptions on the foreign debt, which is raised in order to maintain an adequate foreign-exchange reserve. Box 1.2 presents the definitions of the domestic and foreign gross financing requirements.

According to the EU Treaty, the central government's account with Danmarks Nationalbank may not show a deficit. Central-government borrowing is therefore planned to ensure an appropriate balance on the central government's account, which can absorb fluctuations in central-government receipts and payments. Uncertainty concerning the balance of the central government's account is associated with e.g. predicting the receipts from various taxes.

In the light of e.g. market conditions the central government may also continue to issue government securities, even though the borrowing requirement for the year has been financed. In that case, these issues will cover part of the borrowing requirement for the next year.

KEY CONCEPTS IN THE COMPILATION OF GOVERNMENT BORROWING AND DEBT — Box 1.2

**Compilation of central-government debt**

The central-government debt is compiled as the central government's total domestic and foreign debt less the assets of the Social Pension Fund and the balance of the central government's account with Danmarks Nationalbank, cf. the Table below.

COMPILATION OF CENTRAL-GOVERNMENT DEBT, NOMINAL VALUE

| DKK billion | End-2002 | End-2003 |
|---|---|---|
| Domestic debt | 625 | 611 |
| Foreign debt | 84 | 84 |
| The Social Pension Fund | -141 | -139 |
| The central government's account with Danmarks Nationalbank | -46 | -41 |
| Total central-government debt | 521 | 515 |
| Total central-government debt as a percentage of GDP | 38.3 | 37.0 |

**Gross domestic financing requirement and borrowing requirement**

The domestic borrowing requirement is defined as:

+ Expenditure by the central government (including interest costs and disbursement of re-lending)
– Receipts to the central government (including interest income and repayments of re-lending)
= *Net financing requirement*
+ Redemptions on the domestic debt
+ Net bond purchases by the Social Pension Fund
= *Gross domestic financing requirement*
– Reduction of the balance of the central government's account with Danmarks Nationalbank
= Domestic borrowing requirement

The *gross domestic financing requirement* is increased by transacting currency swaps from kroner to euro and via buy-backs of domestic securities maturing in subsequent years. The effect from currency swaps is due to the fact that the krone leg of the central government's currency swaps from kroner to euro is calculated as redemptions on the domestic debt when the swap is transacted, and as borrowing when the swap expires. The effect of buy-backs is due to the fact that buy-backs in domestic government securities are calculated as redemptions on the domestic debt at the time of buy-back. The gross domestic financing requirement is covered by sales of government bonds, Treasury notes, net sales of Treasury bills and any reduction of the central government's account with Danmarks Nationalbank.

*Continued*

CONTINUED Box 1.2

The central government's *domestic borrowing requirement* is the part of the gross domestic financing requirement which is planned to be financed by issuing domestic government securities. Issuance of government securities are planned on the basis of estimates of the domestic borrowing requirement published in the *Budget Review* of the Ministry of Finance. Daily compilations of the domestic borrowing requirement are presented at Danmarks Nationalbank's website, www.nationalbanken.dk.

**Gross foreign financing requirement**
The gross foreign financing requirement is compiled as:

+ Redemptions on the foreign debt
= *Gross foreign financing requirement*

The foreign borrowing requirement corresponds to the gross foreign financing requirement, provided that there is no deviation from the foreign borrowing norm.

The foreign borrowing requirement is covered primarily by raising loans in euro, as well as domestic issues combined with currency swaps from kroner to euro.

The purpose of the central government's foreign borrowing is to maintain an adequate foreign-exchange reserve. In situations where the foreign-exchange reserve either decreases or increases more than is found appropriate, redemptions on the central government's foreign debt may not match foreign borrowing. If the foreign-exchange reserve decreases more than is considered necessary, the central government will raise loans in foreign exchange. If the foreign-exchange reserve increases more than is considered necessary, foreign borrowing may fall below the level determined by the foreign norm, provided that the balance of the central government's account allows this. Moreover, the foreign borrowing requirement may be redistributed between different years, e.g. in connection with the building-up of loans in euro.

## OBJECTIVE AND STRATEGIC BENCHMARKS IN THE GOVERNMENT DEBT POLICY 1.4

The overall objective of the government debt policy is to cover the central-government financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk.

Furthermore, the aim is to support a well-functioning domestic financial market, and to facilitate the central government's access to the financial markets in the longer term. The objectives of the Danish central-government debt policy correspond to international standards.

The overall objective is observed by determining intermediate targets, known as strategic benchmarks, for liquidity and interest-rate exposure.

The overall objective of the lowest possible long-term borrowing costs is observed by ensuring a high degree of liquidity in government securities. By building up liquid securities the central government can achieve a liquidity premium. The specific strategic benchmarks related to liquidity are the ultimate minimum amount in the individual issues and distribution targets for issuance of government securities. A smooth redemption profile within the next few years contributes to maintaining a stable borrowing programme.

The overall objective implies a weighing of the costs against risk on the central-government debt. The strategic benchmarks for interest-rate exposure reflect this weighing. The central strategic benchmark for interest-rate exposure is the duration target for the central-government debt. The target sums up the trade-off between costs against risk under the government debt policy. In addition, a supplementary measure for interest-rate exposure is applied, i.e. the amounts in the debt portfolio for which a new rate of interest is to be fixed in the following year. This is called interest-rate fixing. The interest-rate fixing at a given point in time comprises redemption in the following year, the size of the floating-rate debt, and the swap portfolio on which a new interest rate will be determined within a year.

Government Debt Management has developed a model (the Cost-at-Risk model) for quantifying the trade-off between costs against interest-rate risk. It is a key instrument in the preparation of borrowing strategies, including the setting of strategic benchmarks for interest-rate exposure. The Cost-at-Risk model may also be applied as a scenario model for analysis of the implications of the government debt policy to outstanding amounts in the individual issues. Thus the model is also a key instrument for setting strategic benchmarks for liquidity.

## STRATEGY AND INSTRUMENTS FOR CENTRAL-GOVERNMENT BORROWING 1.5

Both domestic and foreign central-government borrowing are based on long-term strategies aimed at meeting the overall objective, including to observe a prudent degree of risk.

To support openness and credibility regarding government debt management, it is emphasised that the overall borrowing strategies must be consistent over time, and known to market participants. Furthermore, only standardised, well-known instruments are used.

Management of the central-government debt is planned with due consideration of the central government's dominant role in the domestic

market. The transactions are aimed to be distributed smoothly throughout the year.

With a view to maintaining efficiency in government debt management, the strategies prepared and their implementation are evaluated on an ongoing basis.

**Domestic borrowing strategy and instruments**

The overall strategy for domestic borrowing is to build and maintain an attractive range of on-the-run issues. This is achieved by ensuring liquid series of fixed-rate bullet loans in the 2-, 5- and 10-year segments. To support liquidity and trading on electronic platforms, the 2- and 5-year on-the-run securities are built up to an outstanding amount of at least DKK 35 billion, and the 10-year on-the-run securities to at least DKK 60 billion. Liquidity in the on-the-run securities contributes to ensuring low borrowing costs for the central government. The issues are spread across various points of the yield curve to e.g. achieve a broad investor base. This reduces the risk of falling demand from one type of investor leading to an increase in the borrowing costs for the central government.

Internationally, the 2-, 5- and 10-year segments are also the key maturity segments. Standardised issues help to make the bond series attractive to both domestic and foreign investors.

On-the-run issues include Treasury bills, which are short-term zero-coupon government securities. The Treasury bill programme is also aimed at building up liquid series. Treasury bills are issued at monthly auctions. The short maturities of the Treasury bills make the auction method the most appropriate way to issue, given the need to build up liquid series. A new 12-month Treasury bill series is opened every third month. Issuance takes place in the series for as long as the remaining maturity exceeds 3 months.

In addition to the issue policy buy-backs and securities lending are used to support liquidity in the government securities. Buy-backs of securities maturing in subsequent years thus move the redemptions forward to the buy-back year, thereby increasing the domestic borrowing requirement and issuance in on-the-run securities.

The central government and the Social Pension Fund have established securities lending facilities that together cover most domestic government securities and can be used by entitled participants.

The domestic debt has been given the highest rating by Moody's (Aaa), Standard & Poor's (AAA) and FitchRatings (AAA).

**Foreign borrowing strategy and instruments**

The foreign debt of the central government, which is raised for foreign-exchange-reserve purposes, is exposed exclusively in euro. Loans are

raised with exposure in euro – either directly or by using currency swaps to euro.

Most of the central government's foreign borrowing requirement is covered via syndicated euro loans. By raising loans directly in euro, a simple loan structure is ensured, while the credit risk on transacting currency swaps to euro is avoided. The strategy is to continue to build up a range of large euro loans in the 5-year maturity segment.

To supplement euro loans, domestic issues combined with currency swaps from kroner to euro are used. This type of foreign borrowing can be attractive in price terms and supports the build-up of domestic on-the-run issues.

In order to ensure an adequate balance on the central government's account, or if there is a need to quickly augment the foreign-exchange reserve, the central government can also issue Commercial Papers (CPs).

The foreign debt has been given the highest rating by Moody's (Aaa), Standard & Poor's (AAA) and FitchRatings (AAA).

## RISK MANAGEMENT OF THE GOVERNMENT DEBT 1.6

Determination and implementation of borrowing strategies and the day-to-day administration of the central-government debt policy take due account of various types of risks.

As stated above, *interest-rate risks* are managed on the basis of a strategic benchmark for duration and interest-rate fixing. The duration can be changed by using interest-rate swaps to restructure the central government's interest payments between fixed and floating interest rates. Interest-rate swaps make it possible to separate the issuing strategy aimed at issuance in liquid bond series from the management of the interest-rate risk on the central-government debt. Interest-rate fixing can e.g. be managed via distribution of central-government issues on different maturity segments and buy-backs.

*Exchange-rate risks* are managed by limiting the currency exposure on the foreign central-government debt to euro. In view of Denmark's fixed-exchange-rate policy vis-à-vis the euro this ensures a low exchange-rate risk. Foreign government borrowing is undertaken in order to maintain an adequate foreign-exchange reserve, which is also predominantly exposed in euro.

To limit *credit risks*, the central government only transacts swaps with counterparties with a relatively high rating who have signed a collateral agreement.

It is sought to minimise *operational risks* by separating the various government debt management functions, and via well-defined proce-

dures. Furthermore, operational risks are limited in that Government Debt Management only uses standardised, well-known instruments.

*Legal risks* are minimised by using standardised contracts.

## MARKET STRUCTURE AND BORROWING IN PRACTICE 1.7

Government bonds and Treasury notes are issued by Danmarks Nationalbank on behalf of the central government.

On 4 November 2003 trading opened in the wholesale market for Danish government securities on the MTS trading platform. The switch to electronic trading and market-making means that Danish government securities are now traded electronically and on the same platform as the government securities of most other EU member states, whereas most trading previously took place in the telephone market.

In connection with the switch to electronic trading, a primary dealer scheme was established. Under this scheme, a number of banks – the primary dealers – have a market-making obligation, i.e. an obligation to quote current bid and ask prices within predefined spreads and amounts. The central government's transactions in government bonds and Treasury notes take place in the wholesale market with the primary dealers as counterparties.

Trading in Danish government securities on the MTS platform takes place in a special market segment, MTSDk. Government bonds and Treasury notes are now issued electronically on MTSDk with primary dealers as the only counterparties. Issuance primarily takes place via current sales, i.e. tap sales. Tap sales imply that issuance takes place throughout the year, and that favourable market conditions are exploited. The market-making of the primary dealers ensures ongoing prices and bids/offers in the market. In connection with tap sales the central government issues at the best bid price in the market, but does not quote offers itself.

When new government securities are opened, the government enters the offered volume and price in the market. When matching bids are made by primary dealers, trades are concluded.

Government buy-backs also take place at MTSDk with the primary dealers as counterparties. Securities with a remaining term to maturity of more than 13 months are comprised by the primary dealers' market-making. The central government buys back these securities by trading at the best offer price in the market. In connection with the buy-back of securities with a shorter term to maturity than 13 months the central government enters bid volume and price in the market. When matching offers are made by primary dealers, trades are concluded.

MTSDk is described in more detail on www.mtsdenmark.com.

In the retail market too, 2003 saw the establishment of electronic trading and market making in government securities. On 1 December 2003 a new price-quote scheme was launched, allowing private individuals and small investors to trade in Danish government securities in an electronic market according to the same principles as for trading in the wholesale market. Government Debt Management at Danmarks Nationalbank has concluded an agreement with a number of banks which have committed themselves to quoting current bid and ask prices within agreed spreads and for DKK 3 million per security per bank. The agreement comprises the Danish government securities subject to market-making in the wholesale market. Trading takes place on an electronic trading platform based on the Saxess trading system. The Copenhagen Stock Exchange is responsible for the day-to-day administration and monitoring of the scheme. The trading system is open to all members of the bond market of the Copenhagen Stock Exchange. In addition, private investors may enter orders into the system via connections to their banks or brokers.

Treasury bills are issued at monthly auctions. Dealers licensed to trade in the bond market of the Copenhagen Stock Exchange and Danmarks Nationalbank's monetary-policy counterparties may participate in these auctions.

All domestic government securities are listed on the Copenhagen Stock Exchange.

On raising syndicated euro loans, a syndicate of well-reputed banks is established to act as intermediaries for these loans.

Government bonds, Treasury notes and Treasury bills are registered at VP Securities Services (VP). It is also possible to deposit Danish government securities with Euroclear and Clearstream. Trades in government securities are usually settled via VP, but may also be settled via Euroclear and Clearstream.

## INFORMATION POLICY 1.8

It is an important element of the government debt policy to give market participants and the public at large access to information on the central-government borrowing strategies and their ongoing implementation. A wide range of data concerning central-government borrowing and debt is published on a regular basis.

Information is published via e.g. the Copenhagen Stock Exchange and DN-News[1]. Furthermore, information may be found at Danmarks Na-

[1] Danmarks Nationalbank's system for distributing information to connected news agencies.

tionalbank's website *www.nationalbanken.dk* under *Government debt*. From the website it is also possible to subscribe to the *News service*, i.e. automatic e-mail notification of new information on central-government borrowing and debt. Information on MTSDk and related trading can be found at *www.mtsdenmark.com*.

Every year in December and June the central government announces its borrowing strategy for the coming year or half-year, respectively.

Prior to the opening of a new series of government bonds or Treasury notes, an announcement is published with details of the new loan – including coupon, maturity date and opening date. Likewise, auctions of Treasury bills are announced, and subsequently the results of the auctions are published.

On the second banking day of each month information is published on central-government borrowing and redemptions during the last month, broken down by domestic and foreign debt.

In addition, the following information is published: daily statements of the central government's financing requirement, sales and buy-backs of government securities, and monthly statements of the central government's transaction of currency swaps from kroner to euro.

Finally, the annual publication *Danish Government Borrowing and Debt* includes a description of the development during the preceding year, detailed debt and transaction statements and reporting on issues of significance to debt management.

An overview of all information regularly published on central-government borrowing and debt can be found in the Appendices at the end of this publication.

# Report Section

CHAPTER 2

# Domestic Borrowing

## SUMMARY 2.1

In 2003 the gross domestic financing requirement was DKK 99.7 billion and issuance of domestic government securities totalled DKK 94.1 billion. In addition, DKK 5.8 billion was drawn on the central government's account. Domestic government issues were: 4 per cent Treasury notes 2004, 4 per cent Treasury notes 2005, 4 per cent bullet loans 2008, 5 per cent bullet loans 2013, and Treasury bills. The Treasury bill programme made a positive contribution to financing of DKK 2.3 billion.

In January 2004 a new 2-year Treasury note was opened, 3 per cent Treasury notes 2006, and in February a new 10-year bullet loan was opened, 4 per cent 2015. Later in 2004, the 5-year on-the-run issue will be replaced. In 2004 the sale of Treasury notes and government bonds will continue in the 2-, 5- and 10-year maturity segments.

The domestic borrowing requirement for 2004 is DKK 73.5 billion. The aim is to issue 40 per cent in the 2-year maturity segment, 20 per cent in the 5-year segment and 40 percent in the 10-year segment.

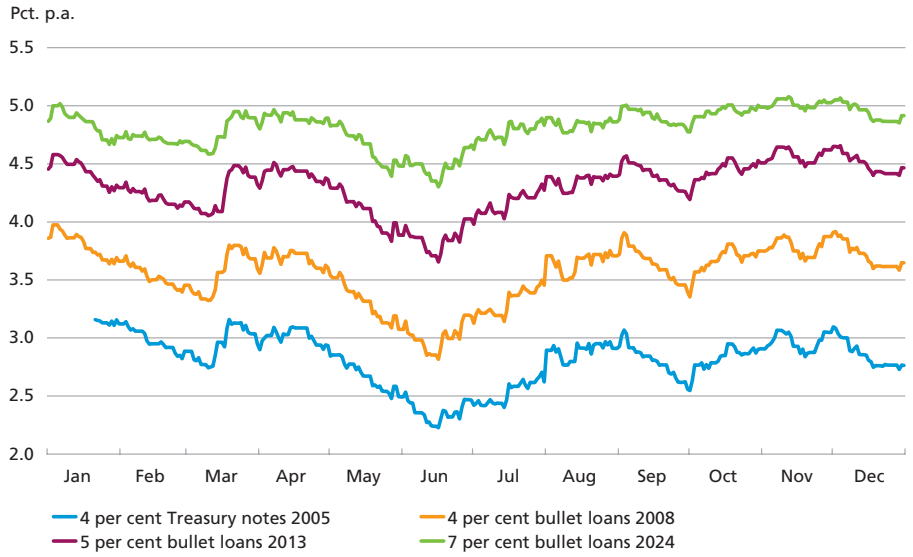
The aim is an outstanding amount of at least DKK 35 billion in the 2- and 5-year on-the-run issues and at least DKK 60 billion in the 10-year on-the-run issue before they are replaced as on-the-run issues.

## DEVELOPMENT IN INTEREST RATES 2.2

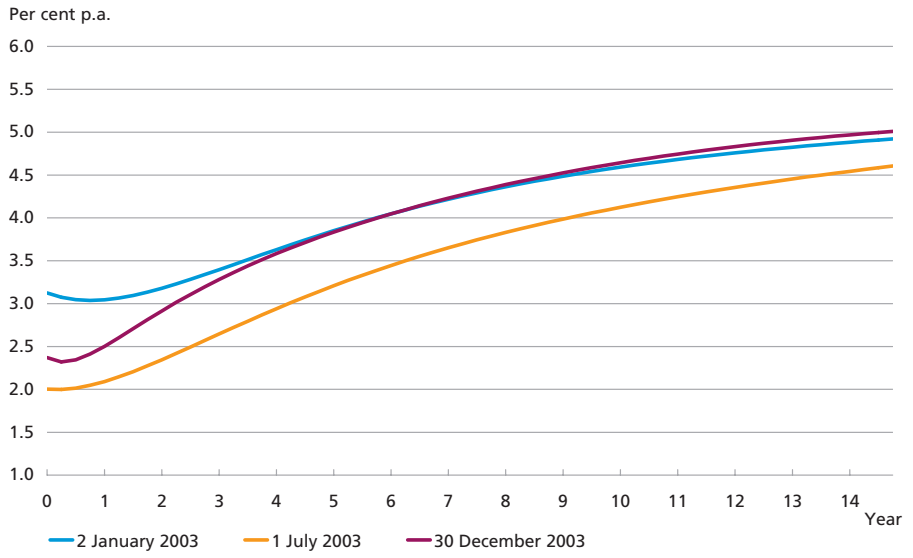
Yields on most government securities declined by 0.5-1 percentage point in the first half of 2003, followed by a reversal, cf. Chart 2.2.1. At the end of 2003 the yields in the long maturity segments had returned to the level at the beginning of the year, which was reflected in a steeper yield curve, cf. Chart 2.2.2. The interest-rate fluctuations predominantly related to the geopolitical situation and to expectations of a reversal of the economic cycle.

The 10-year yield differential to Germany was approximately 15 basis points throughout 2003, although it narrowed temporarily over the summer, cf. Chart 2.2.3.

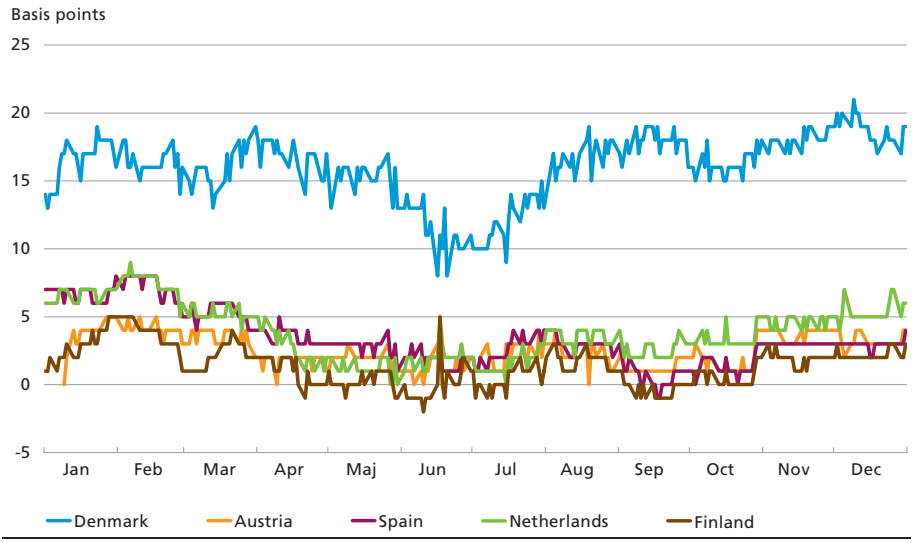
YIELD TO MATURITY ON SELECTED GOVERNMENT SECURITIES IN 2003 Chart 2.2.1




SELECTED ZERO-COUPON-YIELD CURVES IN 2003 Chart 2.2.2



10-YEAR YIELD DIFFERENTIALS TO GERMANY IN 2003 Chart 2.2.3




Note: The yield differentials are adjusted for differences in maturity.

## FINANCING REQUIREMENT 2.3

In 2003 the gross domestic financing requirement was DKK 99.7 billion, and issuance of domestic government securities totalled DKK 94.1 billion, cf. Table 2.3.1. In addition, DKK 5.8 billion was drawn on the central government's account.

THE CENTRAL GOVERNMENT'S CURRENT, INVESTMENT AND LENDING BUDGET, NET CASH BALANCE AND GROSS DEFICIT Table 2.3.1

| DKK billion | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|
| Current, investment and lending budget ..... | 30.7 | 24.0 | 25.8 | 12.8 |
| Re-lending of government loans ..... | -2.8 | -2.4 | -8.9 | -4.7 |
| Distributed capital losses on issue and due interest[1] ..... | 1.4 | 0.4 | -0.1 | -0.7 |
| Other capital items[2] ..... | -2.3 | 0.9 | -20.0 | -6.7 |
| Net cash balance ..... | 27.0 | 22.9 | -3.2 | 0.6 |
| Redemptions on domestic government debt ... | 91.3 | 101.2 | 112.4 | 107.3 |
| Redemptions on foreign government debt ..... | 15.7 | 17.8 | 22.5 | 17.1 |
| Gross deficit ..... | -80.0 | -96.2 | -138.1 | -123.8 |
| Gross domestic financing requirement[3] ..... | 62.3 | 81.1 | 115.5 | 99.7 |
| Sale of government securities, market value . | 65.7 | 87.7 | 121.9 | 94.1 |

Source: 2000-02 are figures from the central-government accounts. Provisional figures for 2003 are based on the forecast in *Budget Review 3*, December 2003, Danmarks Nationalbank's press release and the provisional central-government accounts.

[1] Including capital losses on buy-back.

[2] Includes e.g. movements in the central government's holdings, cf. *Budget Review 3*, December 2003.

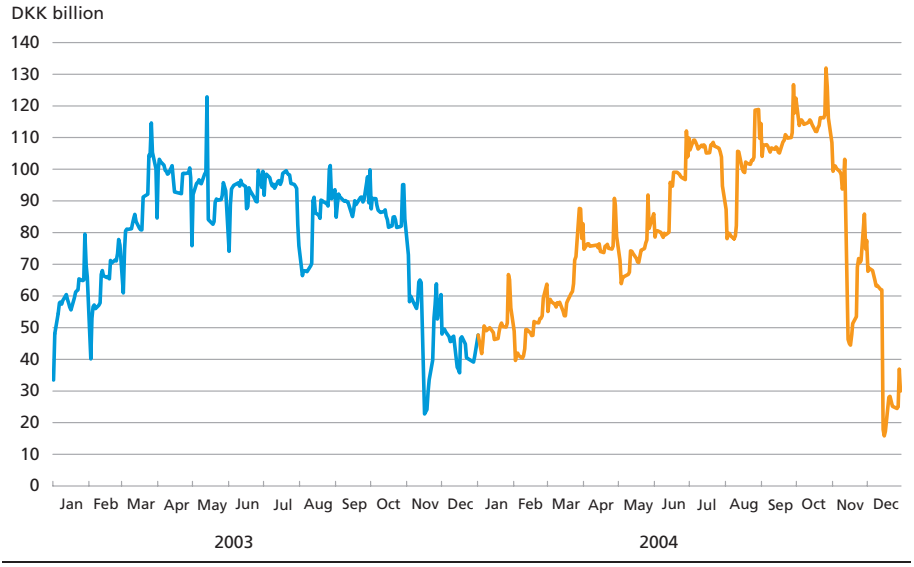
[3] Based on Danmarks Nationalbank's statistics at year-end. The figures therefore deviate from the accounting figures and *Budget Review 3*, December 2003.

| DOMESTIC GOVERNMENT BORROWING REQUIREMENT IN 2004 | Table 2.3.2 |
|---|---|
| DKK billion | |
| Gross domestic financing requirement, cf. *Budget Review 3*, 2003 ..... | 90.5 |
| Buy-backs in 2004 securities in 2003 after *Budget Review 3* ..... | 6.1 |
| Reduction of balance of the central government's account ..... | 10.9 |
| Domestic borrowing requirement ..... | 73.5 |

The gross domestic financing requirement for 2004 is estimated at DKK 90.5 billion in *Budget Review 3*, December 2003, cf. Table 2.3.2. In 2003 after publication of the *Budget Review*, securities for a nominal amount of DKK 6.1 billion maturing in 2004 were bought back, reducing the financing requirement for 2004. The remainder of the gross financing requirement is covered partly by issuing domestic government securities and partly by drawing on the central government's account. In 2004 a drawing on the central government's account of DKK 10.9 billion is expected so that the balance of the central government's account is expected to be DKK 30 billion at the end of 2004, cf. Chart 2.3.1.

The domestic borrowing requirement in 2004, which is covered by issuing domestic government securities, is DKK 73.5 billion. The domestic borrowing requirement will increase in 2004 by buy-back of domestic securities maturing after 2004 or by new currency swaps from kroner to euro.

BALANCE OF THE CENTRAL-GOVERNMENT ACCOUNT, 2003-04 — Chart 2.3.1




Note: Buy-backs of government securities maturing in the current year will smooth the balance of the central government's account in 2004.

## GOVERNMENT SECURITIES ISSUANCE AND STRATEGY 2.4

In 2004 as in previous years, an attractive range of liquid on-the-run issues will be maintained. The central government's domestic borrowing is conducted by issuing government bonds, Treasury notes and Treasury bills. The issues in government bonds and Treasury notes are concentrated in 3 maturity segments. Government bonds are issued in the 5- and 10-year maturity segments, while Treasury notes are issued in the 2-year maturity segment. The Treasury bills are the shortest on-the-run issues with maturity of up to 12 months.

### Government bonds and Treasury notes

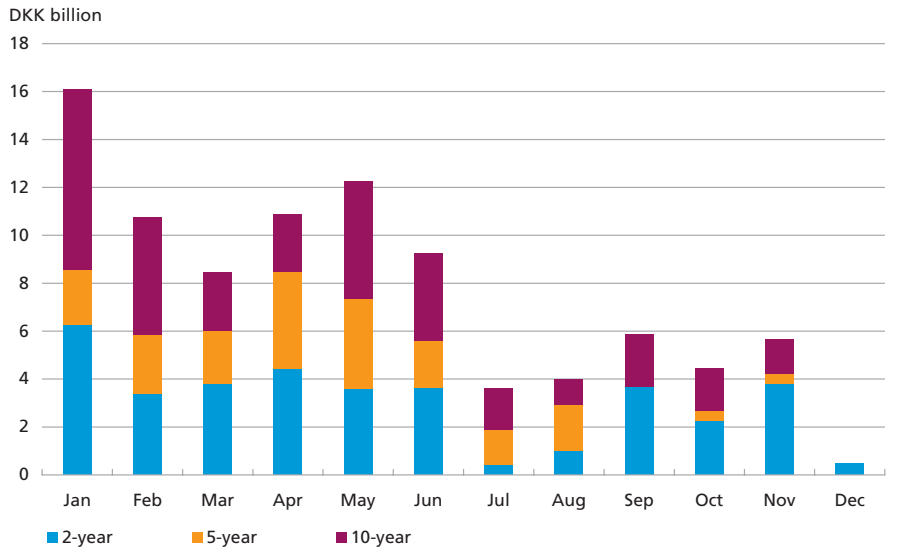
Government bonds and Treasury notes are fixed-rate bullet loans. This is the type of loan predominantly used internationally by government issuers.

On 21 January 2003 the 4 per cent Treasury notes 2005 opened with a nominal sale of DKK 4.6 billion on the opening day. At the same time, issuance in 4 per cent Treasury notes 2004 was closed. Table 2.4.1 presents the issuance distribution of the individual government securities in 2003.

DOMESTIC GOVERNMENT BORROWING IN 2003 Table 2.4.1

| DKK million | Issue | | | Nominal outstanding end-2003 |
|---|---|---|---|---|
| | Nominal | Market value | Capital loss | |
| 5 per cent bullet loans 2013 | 32,100 | 34,117 | -2,017 | 77,945 |
| 4 per cent bullet loans 2008 | 20,400 | 20,908 | -508 | 41,354 |
| Government bonds, total | 52,500 | 55,024 | -2,524 | |
| 4 per cent Treasury notes 2004 | 700 | 712 | -12 | 43,382 |
| 4 per cent Treasury notes 2005 | 35,150 | 36,070 | -920 | 35,150 |
| Treasury notes, total | 35,850 | 36,782 | -932 | |
| Government bonds and Treasury notes, total | 88,350 | 91,806 | -3,456 | |
| Treasury bills 2004 IV | 10,239 | 10,001 | 238 | 10,239 |
| Treasury bills 2004 III | 13,866 | 13,585 | 281 | 13,866 |
| Treasury bills 2004 II | 19,610 | 19,211 | 399 | 19,610 |
| Treasury bills 2004 I | 23,632 | 23,168 | 464 | 23,632 |
| Treasury bills 2003 IV | 11,392 | 11,212 | 180 | |
| Treasury bills 2003 III | 5,189 | 5,123 | 66 | |
| Treasury bills 2003 II | 379 | 376 | 3 | |
| Redemptions | 80,364 | 80,364 | | |
| Treasury bills, net | 3,943 | 2,311 | 1,632 | |
| Sales of government securities, total | 92,293 | 94,118 | -1,825 | |

ISSUANCE OF GOVERNMENT SECURITIES IN 2003 BY MATURITY SEGMENT Chart 2.4.1




Following the introduction of MTS in November 2003, government securities are issued to primary dealers in Danish government securities, cf. Chapter 9.

In Denmark, government bonds and Treasury notes are issued via tap sales. In 2003, a substantial part of the issues took place in the first half of the year, cf. Chart 2.4.1.

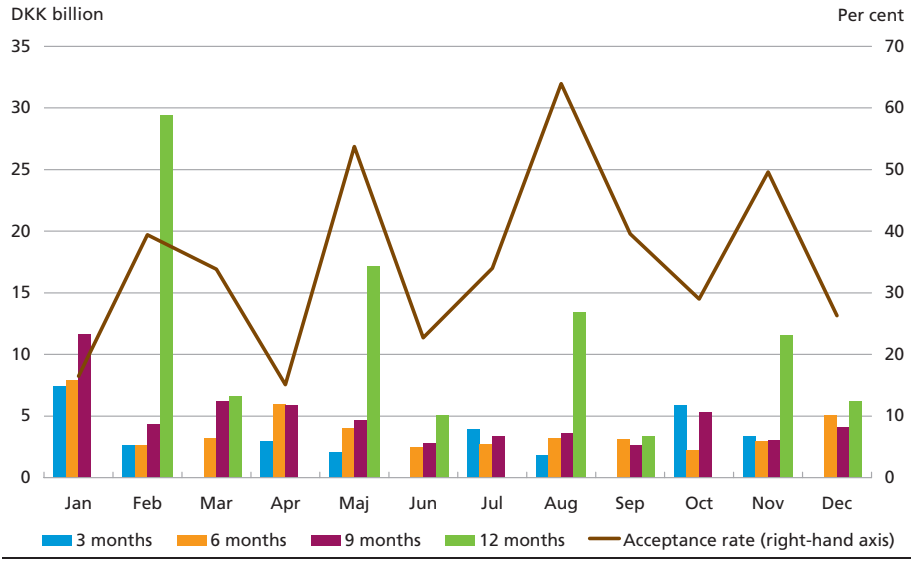
On 13 January 2004 the 3 per cent Treasury notes 2006 opened with a nominal sale of DKK 8 billion on the opening day. The new Treasury note replaced the 4 per cent Treasury notes 2005 as an on-the-run issue. On 12 February 2004 the 4 per cent bullet loans 2015 opened and replaced the 5 per cent bullet loans 2013 as on-the-run issue. The 5-year on-the-run issue will be replaced later in 2004.

Overall, during 2004 the aim is to issue 40 per cent in the 2-year maturity segment, 20 per cent in the 5-year segment and 40 per cent in the 10-year segment. Strategy simulations in the so-called scenario model show that the strategy is consistent over time with satisfactory build-up in the individual securities. The strategy implies that the issues are dispersed across various points of the yield curve in order to e.g. achieve a broad investor base in the on-the-run issues. The objective is an ultimate outstanding amount of at least DKK 35 billion in 2- and 5-year on-the-run issues and at least DKK 60 billion in the 10-year on-the-run-issue.

**Treasury bills**

Treasury bills are zero-coupon bonds, i.e. the investor does not receive ongoing interest payments on the Treasury bills. The yield is the differ-

BID VOLUMES AND ACCEPTANCE RATES AT TREASURY BILL AUCTIONS IN 2003 Chart 2.4.2




Note: 3 months includes securities with remaining maturities of 3 and 4 months. 6 months includes securities with remaining maturities of 5, 6 and 7 months. 9 months includes securities with remaining maturities of 8, 9 and 10 months, and 12 months includes securities with remaining maturities of 11 and 12 months.

ence between issue below par and redemption at par. Treasury bills are sold at monthly auctions.

The bid volume and acceptance rates at the Treasury bill auctions in 2003 are shown in Chart 2.4.2. The acceptance rate was generally higher than in 2002.

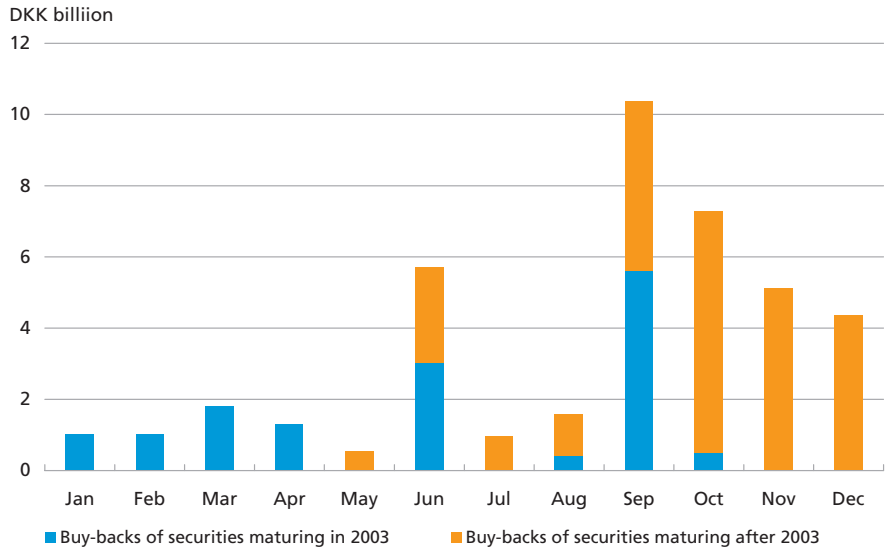
Overall, in 2003 the Treasury bill programme made a positive contribution to financing of DKK 2.3 billion.

At the end of 2003, the total outstanding amount in Treasury bills was DKK 67.3 billion, which was DKK 3.9 billion higher than at the end of 2002. In 2004, the Treasury bill programme is not expected to contribute to the financing. Chapter 8 contains a more detailed analysis of the Danish Treasury bill programme.

## BUY-BACKS 2.5

The central government conducts an active buy-back policy whereby outstanding government securities are bought back from the secondary market. The central government undertakes buy-backs both in government securities maturing within the current year and securities maturing in subsequent years. Buy-backs in government securities maturing in subsequent years are primarily undertaken in order to smooth the re-

CENTRAL-GOVERNMENT BUY-BACK IN 2003 Chart 2.5.1




demption profile of the debt, support liquidity in on-the-run issues, and during favourable market conditions cover part of the borrowing requirement in subsequent years. Buy-backs of government securities maturing in the current year do not affect the borrowing requirement for the year but smooth the borrowing requirement over the year and are primarily used to smooth the balance of the central government's account. Usually securities that are bought back are cancelled immediately thereafter.

In 2003 most buy-backs in government securities maturing later than 2003 were undertaken in the second half of the year, cf. Chart 2.5.1, when the major part of the year's financing requirement was covered.

BUY-BACK OF DOMESTIC GOVERNMENT SECURITIES IN 2003 Table 2.5.1

| DKK million | Buy-backs | | Nominal outstanding, end-2003 |
|---|---|---|---|
| | Nominal | Market value | |
| Buy-backs maturing in 2003: ..... | 14,600 | 14,711 | |
| Of which: | | | |
| 5 per cent Treasury notes 2003 ..... | 10,500 | 10,578 | |
| 8 per cent bullet loans 2003 ..... | 4,100 | 4,133 | |
| Buy-backs maturing after 2003 ..... | 25,020 | 26,357 | |
| Of which: | | | |
| 7 per cent bullet loans 2004 ..... | 25,020 | 26,357 | 42,081 |

CENTRAL GOVERNMENT'S BUY-BACK, 1999-2003, MARKET VALUE — Table 2.5.2

| DKK billion | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Redemption dates within the same year | 23.2 | 31.5 | 19.5 | 11.4 | 14.7 |
| Redemption dates in subsequent years | 5.5 | 17.8 | 20.1 | 27.5 | 26.4 |
| Total buy-backs | 28.7 | 49.3 | 39.7 | 38.9 | 41.1 |

In 2003, buy-backs at market value of 7 per cent bullet loans 2004 totalled DKK 26.4 billion, cf. Table 2.5.1, including DKK 16.8 billion bought from the Social Pension Fund. These buy-backs have reduced the borrowing requirement for 2004. The volume of buy-backs in 2003 in securities maturing in subsequent years is by and large similar to the volume in 2002, cf. Table 2.5.2.

For 2004 it has been decided that, except 7 per cent bullet loans 2024, the central government can conduct buy-backs in all government securities that are not on-the-run issues or benchmarks. The issues eligible for buy-back as of January 2004 are stated in the announcement from December 2003, *Danish Government Debt Management Strategy, 2004*. The announcement is included in the Appendices to this publication.

In addition to buy-backs by the central government, the Social Pension Fund purchases government securities for its own portfolio, cf. Chapter 5.

## SECURITIES LENDING 2.6

Under the central government's securities lending facility, securities can be borrowed for 1-5 banking days. The facility comprises on-the-run government issues and benchmark securities. Lending in other government securities can be conducted via the Social Pension Fund's securities lending facility, cf. Chapter 5.

In 2003, lending under the central government's securities lending facility amounted to DKK 13 billion, cf. Table 2.6.1, with approximately half in 4 per cent bullet loans 2008.

LENDING UNDER THE CENTRAL GOVERNMENT'S SECURITIES LENDING FACILITY, 2003 — Table 2.6.1

| DKK billion | |
|---|---|
| 4 per cent Treasury notes 2005 | 2.5 |
| 4 per cent bullet loans 2008 | 6.7 |
| 5 per cent bullet loans 2013 | 3.9 |
| Lending, total | 13.0 |

In connection with the introduction of electronic market-making via MTSDk, the fee for using the government's securities lending facility was reduced from 0.25 per cent p.a. to 0.20 per cent p.a. for on-the-run issues with an outstanding amount of less than DKK 20 billion and from 0.50 per cent p.a. to 0.40 per cent p.a. for government securities with an outstanding amount exceeding DKK 20 billion or government securities included in the Social Pension Fund's securities lending facility.

The terms for the government's securities lending facility are presented in the Appendices to this publication.

CHAPTER 3

# Foreign Borrowing

## SUMMARY 3.1

Since 2002 the cornerstone of the foreign borrowing strategy has been to issue large euro loans in the 5-year maturity segment. Any remaining foreign borrowing requirement is financed by domestic issues combined with currency swaps from kroner to euro.

Irrespective of the type of issuance, only simple loan structures that are well-known in the market are used.

In 2003 foreign borrowing consisted of a 5-year syndicated euro loan of DKK 17.0 billion at market value. In 2004 the foreign borrowing requirement is DKK 16.1 billion. A new euro loan is expected to be issued in the first half of 2004.

## FOREIGN BORROWING STRATEGY 3.2

The foreign borrowing requirement is equivalent to the annual redemptions on the foreign debt raised to maintain an adequate foreign-exchange reserve. The currency exposure of the foreign debt is exclusively in euro. The exchange-rate risk is hereby limited in view of Denmark's fixed-exchange-rate policy vis-à-vis the euro. Moreover, Danmarks Nationalbank's foreign-exchange reserve is predominantly exposed in euro.

### Issuance of euro loans

In 2002 and 2003 the central government raised 5-year loans directly in euro. Thus a simple loan structure with currency exposure in euro is achieved. Any borrowing in other currencies is converted to euro via currency swaps.

The issues have been syndicated bond loans whereby the loan is intermediated to the investors via a syndicate of banks, which arrange the practical execution of the sale. Syndicated issues are described in detail in *Danish Government Borrowing and Debt*, 2002, Box 3.1.

In an international context Danish government issues in euro are very limited and relatively rare. This scarcity supports demand for central-government bonds in euro from investors who require a diversified portfolio of highly-rated government bonds in euro.

EURO LOAN, 3.25 PER CENT 2008 Box 3.1

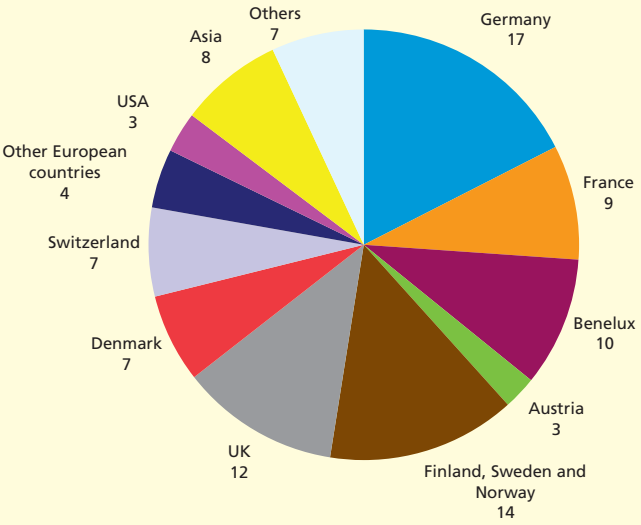
Characteristics of Kingdom of Denmark, euro loan 3.25 per cent 2008:

- Size: EUR 2.3 billion
- Maturity date: 14 November 2008
- Yield differential to Germany on launch: OBL141 +18 basis points
- Rating: AAA/Aaa
- Fee: 0.10 per cent
- Legal venue and jurisdiction: Danish
- Listed on: the Copenhagen Stock Exchange
- Registration: VP Securities Services
- Lead managers: ABN Amro, Deutsche Bank and JP Morgan
- Senior co-lead managers: Danske Bank and Nordea
- Co-lead managers: CSFB, Goldman Sachs, BNP Paribas and Morgan Stanley.

The Chart shows the geographical distribution of the investor bids received at the allotment rate or below. It illustrates the geographical distribution of investors' interest in the issue, but does not express the final investor distribution.

The investor bids for the euro loan had a somewhat larger proportion of European investors than was the case for the central government's syndicated euro loan issued in April 2002. One explanation is that the book-building process lasted less than one day due to significant investor interest.

GEOGRAPHICAL DISTRIBUTION OF INVESTOR BIDS RECEIVED AT THE ALLOTMENT RATE OR BELOW, PER CENT




Note: The Chart solely comprises bids at the allotment rate (OBL141 +18 basis points) or below.

The central government considers the borrowing costs of a syndicated issue in relation to the borrowing costs of similar issues from other highly-rated governments. The central government's peer group of government issuers includes Germany, Belgium, Finland, the Netherlands,

Spain and Austria. The borrowing costs are also considered in relation to the costs of other types of issuance.

**Commercial Paper**

Commercial Paper (CP) are short-term securities which can be issued quickly via banks with whom a CP borrowing programme has been established. The central government has two CP borrowing programmes, each with a maximum outstanding amount of USD 6 billion. The CP programme serves as a contingency facility that can be used to quickly increase the foreign-exchange reserve or the balance of the central government's account.

The central government's two CP programmes are aimed at the euro market and the US market, respectively. The euro-market programme can be used for issues in several currencies, while the US programme can solely be used for issues in dollars. Since the currency exposure of the foreign debt is exclusively in euro, CP issues in other currencies than euro are combined with forward contracts in foreign exchange, so that the final exposure is in euro.

**Foreign borrowing in 2004**

In 2004, the central government's foreign borrowing requirement is DKK 16.1 billion, which is equivalent to the redemptions on the foreign debt. A syndicated benchmark-size euro loan is planned to be issued in the first half of 2004. The timing of this issue takes into account the timing of other countries' issues in euro. Any remaining borrowing requirement is expected to be covered via issues in domestic on-the-run securities combined with currency swaps from kroner to euro.

## FOREIGN BORROWING IN 2003 3.3

In 2003, the central government's medium- and long-term foreign borrowing consisted of a syndicated euro loan of DKK 17.0 billion at market value (EUR 2.3 billion). The loan was by and large equivalent to the year's redemptions on the foreign debt.

The contingency facility for the central government's European CP programme was tested in May 2003.

**Syndicated loan in euro**

In May 2003 the central government issued a syndicated euro loan of EUR 2.3 billion maturing in November 2008 to finance the central government's foreign borrowing requirement for 2003. The characteristics and investor breakdown of the loan are described in Box 3.1.

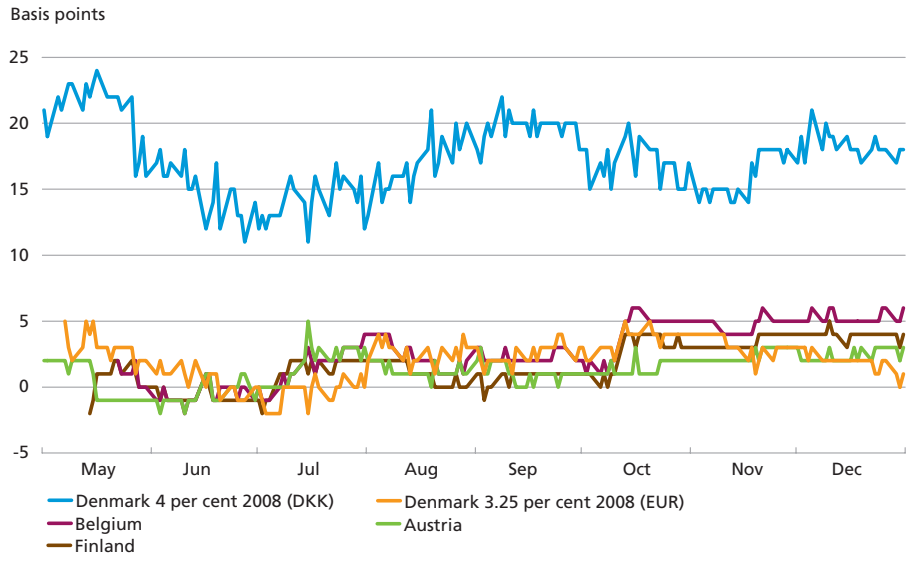
ABN Amro, Deutsche Bank and JP Morgan were appointed lead managers of the syndicate, assisted by Danske Bank and Nordea as senior co-lead managers and 6 other banks as co-lead managers.

During the entire issuance process, Government Debt Management was in contact with the lead managers of the syndicate, discussing the price, volume and timing of the issue. The issue was executed faster and at a better price than initially expected. The bids totalled EUR 8.4 billion, and more than 90 per cent were bids at the final allotment rate. The amount issued was EUR 2.3 billion, whereby no further foreign borrowing was required in 2003. The bids were submitted by a broad range of investor types, primarily fund managers, banks, central banks, insurance companies and pension funds. Bids from European countries clearly dominated, which can be partly attributed to the short book-building period for this issue.

The issue was priced 18 basis points above the yield on the German government bond OBL141. This price level was close to the euro benchmark curve, which is an interpolated curve for the yield to maturity for mainly German government bonds. The price level was in accordance with equivalent issues from the central government's peer group of countries.

The price of the issue has subsequently been stable vis-à-vis the euro benchmark curve, cf. Chart 3.3.1.

YIELD DIFFERENTIAL TO THE EURO BENCHMARK CURVE AS FROM 1 MAY 2003 UNTIL 31 DECEMBER 2003 Chart 3.3.1




Note: The yield differentials are adjusted for differences in maturity. The Finnish issue is 3 per cent 07/2008, the Belgian issue is 3 per cent 09/2008, and the Austrian issue is 4 per cent 07/2009.
Source: Bloomberg.

CHAPTER 4

# Interest-Rate and Currency Swaps

## SUMMARY 4.1

The central government uses swaps to restructure the interest-rate and currency terms of the central-government debt. In 2003 the central government transacted interest-rate swaps for a total of DKK 13 billion, half of which in the krone market and half in the euro market. Most of the interest-rate swaps transacted are 10-year swaps. In 2003 the central government transacted no currency swaps from kroner to euro.

## THE MARKET FOR INTEREST-RATE SWAPS 4.2

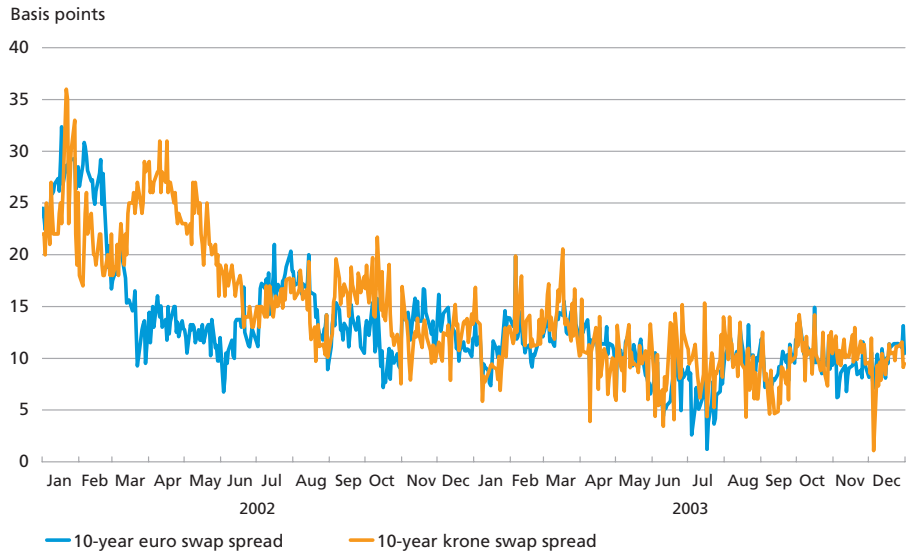
An interest-rate swap is an agreement between two parties to exchange interest payments over a fixed period. There is no exchange of principal between the parties to an interest-rate swap, but the interest payments are calculated on the basis of a notional principal. An interest-rate swap has two "legs". One "leg" is the cash flow to the counterparty (e.g. a floating interest rate), while the other "leg" is the cash flow from the counterparty (e.g. a fixed interest rate). Normally, the interest-rate swap is priced so that the present values of the cash flows in the two "legs" are the same at the time of the transaction.

The swap spread is the difference between the swap rate – the fixed-interest payment in the interest-rate swap – and the yield to maturity of government securities with an equivalent maturity. The swap spread is an indicator of how advantageous it is to transact interest-rate swaps at the time of the transaction.

The euro swap spread and the krone swap spread narrowed in 2002 and were at a low level throughout 2003 compared to previous years, cf. Chart 4.2.1.

The deterioration of several European countries' government budgets has increased the supply of government bonds. The increased supply of government bonds relative to the supply of bonds associated with a higher credit risk has contributed to narrowing the swap spread. In addition, a steeper yield curve makes it relatively more attractive to receive a

SWAP SPREAD ON 10-YEAR KRONE AND EURO INTEREST-RATE SWAPS, 2002-03 Chart 4.2.1




Note: The swap spread is the difference between the swap rate and the yield on a government bond with a similar maturity.
Source: Bloomberg.

fixed interest rate and pay a floating interest rate. The increased demand for a fixed interest rate, from e.g. institutional investors, has lead to a narrowing of the swap spread.

## CENTRAL GOVERNMENT'S USE OF INTEREST-RATE SWAPS 4.3

In the management of the duration of the central-government debt, the central government typically uses interest-rate swaps to restructure debt from fixed to floating interest rates. Interest-rate swaps make it possible to separate the issuance strategy and the management of the interest-rate risk on the debt. Interest-rate swaps are transacted in the krone and euro markets, depending on the market conditions.

The need for interest-rate swaps is based on the duration target, taking into account alternative strategies to achieve the desired duration of the central-government debt.

The basic principle is to spread the transaction of interest-rate swaps over the year. The specific timing and the choice of maturity and currency are based on swap spreads and the steepness and curvature of the swap curve. The swap markets are monitored closely. When a swap is to be transacted by the central government, 2-4 potential counterparties are contacted and asked to quote a price for the swap. The counterparty with the best bid wins the deal.

CENTRAL-GOVERNMENT INTEREST-RATE SWAP TRANSACTIONS, 2003 Table 4.3.1

| DKK million | 5-year | 7-year | 10-year | Total |
|---|---|---|---|---|
| 1st quarter | | | 900 | 900 |
| 2nd quarter | 300 | 800 | 900 | 2,000 |
| 3rd quarter | | 800 | 1,800 | 2,600 |
| 4th quarter | | | 800 | 800 |
| DKK interest-rate swaps, total | 300 | 1,600 | 4,400 | 6,300 |
| 1st quarter | | | | 0 |
| 2nd quarter | | | 4,169 | 4,169 |
| 3rd quarter | 372 | | 1,861 | 2,233 |
| 4th quarter | | | | 0 |
| Euro interest-rate swaps, total | 372 | 0 | 6,030 | 6,402 |
| Interest-rate swaps, total | 672 | 1,600 | 10,430 | 12,702 |

Note: When an interest-rate swap is transacted, the parties do not exchange principals, but the interest payments are calculated on the basis of a notional principal. The Table shows the notional principal values of the interest-rate swaps transacted by the central government in 2003. For euro interest-rate swaps the notional principal value is converted to Danish kroner at the euro rate of 7.4446, equivalent to the euro rate at the end of 2003.

In terms of notional principal value, in 2003 the central government transacted interest-rate swaps for a total of DKK 12.7 billion distributed on 9 different swap counterparties, cf. Table 4.3.1. The krone swap market accounted for DKK 6.3 billion and the euro swap market for DKK 6.4 billion. Most of the interest-rate swaps were transacted in the 10-year maturity segment where the central government receives a fixed interest rate for 10 years and pays a floating 6-month interest rate. Tables 4a, 4b and 4c present information on the central-government interest-rate swaps.

At the end of 2003 the central government's portfolio of interest-rate swaps amounted to DKK 96 billion in terms of notional principal value.

## CENTRAL GOVERNMENT'S USE OF CURRENCY SWAPS 4.4

Currency swaps are used to restructure debt among various currencies. In a currency swap from kroner to euro the central government pays a principal in kroner and receives a principal in euro. The central government pays interest in euro at a floating rate and receives interest in kroner at a floating rate. The two principals are exchanged again on expiry of the swap.

The central government uses domestic issues combined with currency swaps from kroner to euro to cover the part of the foreign borrowing requirement that is not covered by the euro loan. The central government transacted no currency swaps from kroner to euro in 2003, cf. Chapter 3. At end-2003 the central government's outstanding currency swaps from kroner to euro amounted to DKK 16.2 billion.

In 2003 the central government transacted two currency swaps from pounds sterling to euro to maintain the hedge of two sterling-denominated loans from the European Investment Bank.

In 2003 Danish Ship Finance (DSF) gained access to a central-government re-lending facility, cf. Chapter 10. The facility enables DSF to obtain re-lending in dollars. In this connection the central government will transact a currency swap from kroner to dollar. There was no re-lending in dollars to DSF in 2003.

CHAPTER 5

# The Social Pension Fund

## SUMMARY 5.1

The Social Pension Fund (SPF) was established in 1970 by the Social Pension Fund Act, whereby a special national retirement pension contribution was introduced. The proceeds were allocated to SPF and invested in bonds. With effect from 1982 the Act was amended, and the payments to SPF ceased. SPF continued as an asset of the central government. The management of SPF's capital is undertaken by Government Debt Management at Danmarks Nationalbank.

At the close of 2003 the nominal value of SPF's bond portfolio was DKK 138.7 billion of which government bonds accounted for 85 per cent. The remainder was mainly mortgage-credit bonds. At the close of 2003, the duration of SPF's bond portfolio was 4.2 years.

SPF's income from interest totalled DKK 9.6 billion in 2003. An amount of DKK 8.1 billion was transferred to the Ministry of Social Affairs to cover pension improvement measures, while DKK 1.3 billion was paid as pension-fund tax.

## SPF'S CAPITAL 5.2

Each year, the Danish Finance Act stipulates an amount to be transferred from SPF to the Ministry of Social Affairs to cover pension improvement measures. SPF's capital is placed in stock-exchange-listed bonds, primarily government bonds. SPF does not invest in on-the-run government issues or benchmark government bonds. The principles for the management of SPF's capital are described in Box 5.1.

SPF's income from interest was DKK 9.6 billion in 2003, cf. Table 5.2.1. An amount of DKK 8.1 billion was transferred to the Ministry of Social Affairs to cover pension improvement measures, while SPF's pension-fund tax amounted to DKK 1.3 billion. Bonds for a total of DKK 30.8 billion at market value were drawn or sold including a sale of 7 per cent bullet loans 2004 to the central government for DKK 16.8 billion.

In 2003 SPF bought 6 per cent bullet loans 2011 for DKK 22.5 billion at market value, 6 per cent bullet loans 2009 for DKK 5.4 billion, 5 per cent bullet loans 2005 for DKK 2.0 billion and 7 per cent bullet loans 2024 for

SPF'S REVENUE AND EXPENDITURE — Table 5.2.1

| DKK billion | 2002 | 2003 |
|---|---|---|
| *Revenue* | | |
| Interest, etc. | 9.6 | 9.6 |
| *Expenditure* | | |
| Transfer to the Ministry of Social Affairs | 7.9 | 8.1 |
| Pension-fund tax | 2.0 | 1.3 |
| Net | -0.3 | 0.2 |

Note: Figures for 2002 are taken from the central-government accounts, while figures for 2003 are provisional figures from the central-government accounts.

DKK 0.4 billion. SPF's purchases in 2003 totalled DKK 30.3 billion at market value.

At year-end SPF's bond portfolio totalled DKK 138.7 billion at nominal value and DKK 152.4 billion at market value, cf. Table 5.2.2. The portfolio's nominal value decreased by DKK 2.7 billion from 2002 to 2003.

Government bonds account for 85 per cent of the total bond portfolio, cf. Table 5.2.3. SPF owns a relatively large proportion of the total outstanding amount in several government securities series. The remainder of the portfolio predominantly comprises mortgage-credit bonds and index-linked bonds.

MANAGEMENT OF SPF — Box 5.1

SPF was established in 1970 by the Social Pension Fund Act, whereby a special national retirement contribution was introduced. The proceeds were allocated to SPF and invested in bonds. With effect from 1982 the Act was amended, and the payments made to SPF ceased. SPF was continued as an asset of the central government.

SPF is part of the remit of the Ministry of Social Affairs and the Ministry of Finance. The governance of SPF's capital is handled by a committee with representatives from the Ministry of Finance, the Ministry of Social Affairs and Danmarks Nationalbank. The management of the assets of SPF is handled by Government Debt Management at Danmarks Nationalbank.

The principles for the management of SPF's capital are set out in a regulation. The regulation states that the aim is to achieve a satisfactory return on SPF's assets, while taking due account of the overall budgetary consequences of SPF's transactions. Moreover, the regulation states that the capital is to be invested primarily in government bonds. It is the intention for SPF's purchases to take place without significantly affecting the formation of interest rates in the bond market.

The interest on SPF's bond portfolio after payment of pension-fund tax is used to finance pension improvement measures or is allocated to SPF. SPF's core capital can be used to finance pension improvements, should the cost of such measures exceed SPF's income from interest.

The Danish Finance Act stipulates the amount to be transferred from SPF to the Ministry of Social Affairs on a current basis to cover the costs of the pension improvement measures taken with reference to SPF.

SPF'S BOND PORTFOLIO, YEAR-END 1998-2003 Table 5.2.2

| DKK billion | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Nominal value | 143.6 | 141.6 | 139.6 | 141.1 | 141.4 | 138.7 |
| Market value | 159.8 | 150.7 | 149.1 | 150.5 | 155.0 | 152.4 |

Note: The figures for nominal value include index-linked bonds at indexed value. The market value is calculated on the basis of the official market prices at the end of 2003 in accordance with the accounting practice for the central-government accounts.

SPF'S BOND PORTFOLIO DISTRIBUTED BY BOND TYPES, END-2003 Table 5.2.3

| Nominal value | DKK billion | Per cent | Per cent of total outstanding amount in the government security |
|---|---|---|---|
| 7 per cent bullet loans 2004 | 2.2 | 1.6 | 5.2 |
| 5 per cent bullet loans 2005 | 5.0 | 3.6 | 8.6 |
| 8 per cent bullet loans 2006 | 25.7 | 18.5 | 45.3 |
| 7 per cent bullet loans 2007 | 27.6 | 19.9 | 53.0 |
| 6 per cent bullet loans 2009 | 29.2 | 21.0 | 43.8 |
| 6 per cent bullet loans 2011 | 27.7 | 20.0 | 45.7 |
| 7 per cent bullet loans 2024 | 0.4 | 0.3 | 1.4 |
| 10 per cent serial loans 2004 | 0.5 | 0.4 | 55.8 |
| Government bonds, total | 118.1 | 85.2 | |
| Mortgage-credit bonds, etc.[1] | 13.0 | 9.3 | |
| Index-linked bonds[2] | 7.6 | 5.5 | |
| Total | 138.7 | 100.0 | |

[1] Mortgage-credit bonds, etc. comprise mortgage-credit and in addition municipal, Fisheries Bank and Ship Credit Fund bonds other than index-linked bonds.
[2] Indexed value.

SPF's portfolio distributed by year of maturity is presented in Chart 5.2.1. With the exception of 7 per cent bullet loans 2024 all government securities mature in 2011 or earlier, while the mortgage-credit bonds or index-linked bonds predominantly mature after 2011. The ongoing management of SPF's capital is aimed at smoothing the placement requirement.

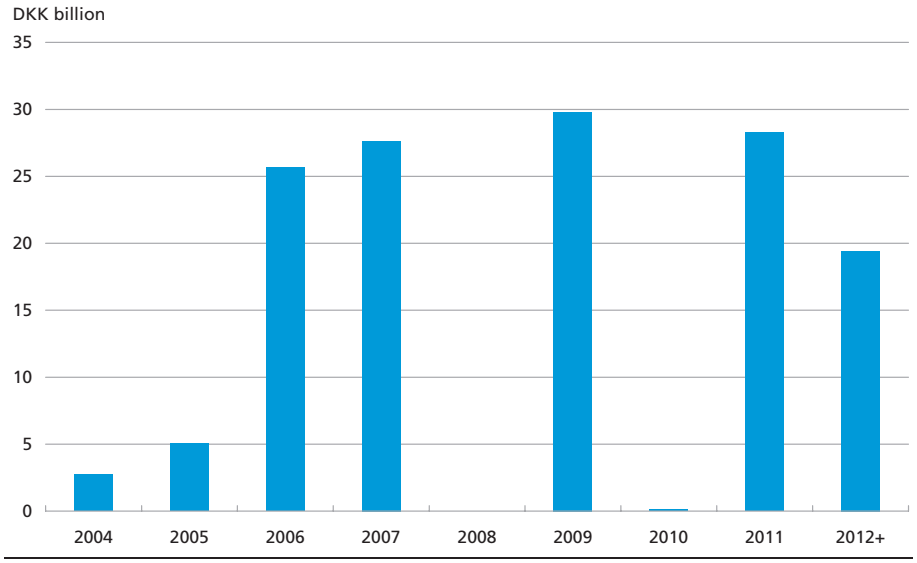
The duration of SPF's bond portfolio was 4.2 years at the close of 2003, cf. Table 5.2.4. The duration of the portfolio of government bonds has

DURATION OF SPF'S BOND PORTFOLIO Table 5.2.4

| Year | End-2002 | End-2003 |
|---|---|---|
| Government bonds | 3.8 | 4.2 |
| Mortgage-credit bonds, etc. | 0.7 | 1.1 |
| Index-linked bonds | 10.3 | 10.0 |
| Total portfolio | 3.7 | 4.2 |

Note: For callable mortgage-credit bonds an option-adjusted duration is used, and the duration of index-linked bonds is calculated using an inflation assumption of 2 per cent per year.

SPF'S BOND PORTFOLIO DISTRIBUTED BY YEAR OF MATURITY, END-2003, NOMINAL VALUE — Chart 5.2.1




increased, which can be attributed primarily to the sale of 7 per cent bullet loans 2004 and the subsequent purchase of 6 per cent bullet loans 2011. The duration of SPF's bond portfolio is part of the management of the overall duration of the central-government debt.

## SPF'S SECURITIES LENDING FACILITY 5.3

SPF's securities lending facility comprises SPF's government bonds of the type bullet loans. The facility supports liquidity in off-the-run government issues. Lending requires a fee to SPF and is collateralised by other government securities. In November 2003 the fee for using SPF's securities lending facility was reduced from 0.5 per cent to 0.4 per cent. In

LENDING UNDER SPF'S SECURITIES LENDING FACILITY, 2003 — Table 5.3.1

| DKK billion | |
|---|---|
| 5 per cent bullet loans 2005 | 0.5 |
| 7 per cent bullet loans 2007 | 5.7 |
| 6 per cent bullet loans 2009 | 3.2 |
| 6 per cent bullet loans 2011 | 0.9 |
| 7 per cent bullet loans 2024 | 0.1 |
| Total | 10.4 |

2003 lending predominantly comprised 7 per cent bullet loans 2007 and 6 per cent bullet loans 2009, cf. Table 5.3.1.

The fee income from the facility totalled DKK 0.3 million in 2003.

The terms for SPF's securities lending facility are presented in the Appendices to this publication.

CHAPTER 6

# Risk Management of Central-Government Debt

## SUMMARY 6.1

Risk management of the central-government debt comprises management of interest-rate risk, exchange-rate risk, credit risk and operational risk.

*Interest-rate risk* is managed by determining a duration band for the government debt supplemented with interest-rate fixing, i.e. the amount in the portfolio for which a new interest rate is to be fixed in the following year. The duration band for 2004 is set at 3.0 years +/- 0.5 years, i.e. symmetrically around the duration level at the end of 2003.

The Cost-at-Risk model (CaR model) is a simulation model used to quantify interest costs and risk. In the model costs and risk are calculated subject to various assumptions concerning the government debt policy. The CaR model thereby supports the choice of strategy for the government debt policy.

The foreign government debt is exposed in euro. In view of Denmark's fixed-exchange-rate policy vis-à-vis the euro this entails a low *exchange-rate risk*. Moreover, Danmarks Nationalbank's foreign-exchange reserve is predominantly exposed in euro.

The use of swaps entails a swap counterparty *credit risk* for the central government. The credit exposure on the swap portfolio fell by DKK 2.7 billion to DKK 5.5 billion in 2003. The central government only enters into new swaps, if the counterparty is willing to provide collateral for the swap value. The central government has entered into collateral agreements with 22 counterparties. Swaps transacted with these counterparties cover 93 per cent of the total swap portfolio in terms of loan principal.

In recent years Government Debt Management has identified and reduced *operational risks* by e.g. implementing a new portfolio management system for the central-government debt.

## RISK MANAGEMENT 6.2

Government Debt Management manages the risk on the central-government debt defined as the domestic and foreign debt less the bal-

ance of the central government's account and the Social Pension Fund's portfolio. In addition, the re-lending portfolio is also part of the risk management. The central government's assets from re-lending are thus taken into account in the calculations of duration, compilation of currency exposure, etc.

## INTEREST-RATE RISK 6.3

Interest-rate risk is the risk of higher interest costs on the central-government debt as a consequence of the development in interest rates. In the CaR model the interest costs on the government debt are simulated on the basis of 2,500 different interest-rate scenarios. In the model the annual distribution of interest costs is simulated 10 years ahead. Various measures of costs and risk can be compiled based on the distributions. The key measures used in Government Debt Management's analysis of costs and risk are shown in Table 6.3.1.

### Duration

Duration expresses the portfolio's average fixed-interest period. Short duration typically entails low average costs as the interest rate normally increases with maturity. On the other hand, short duration means that within a short period a new interest rate must be fixed for a larger proportion of the portfolio, which increases the risk. Duration thus contains information on the chosen trade-off between costs and risk for the central-government debt.

VARIOUS COST AND RISK MEASURES Table 6.3.1

| Measure | Explanation |
|---|---|
| Expected interest costs | The mean of the calculated cost scenarios in a given year |
| Absolute CaR | Maximum costs with a probability of 95 per cent in a given year |
| Relative CaR | The difference between absolute CaR and expected interest costs. Relative CaR thus indicates the maximum increase in costs compared to the mean in a given year with a probability of 95 per cent |
| Tail CaR | Mean of the costs in a given year, given the costs are higher than absolute CaR |
| Duration | The portfolio's average fixed-interest period |
| Interest-rate fixing | Portfolio measure including the redemptions within one year as well as the size of the floating-rate debt and the swap portfolio for which a new interest rate is to be fixed within one year |
| Redemption profile | Year-on-year distribution of debt maturing. Measure of re-financing risk in a given year |

Each year in December a duration band for the total government debt is determined at a meeting between Government Debt Management and the Ministry of Finance. During the following year, Government Debt Management manages the duration of the portfolio within this band.

Duration has been reduced by approximately 1 year since 1998. The reduction should be seen in the light of the declining government debt. The budgetary significance of the risk of rising interest costs on the government debt is thereby reduced. This has led to a strategic decision to change the weighing of costs against risk towards shorter duration.

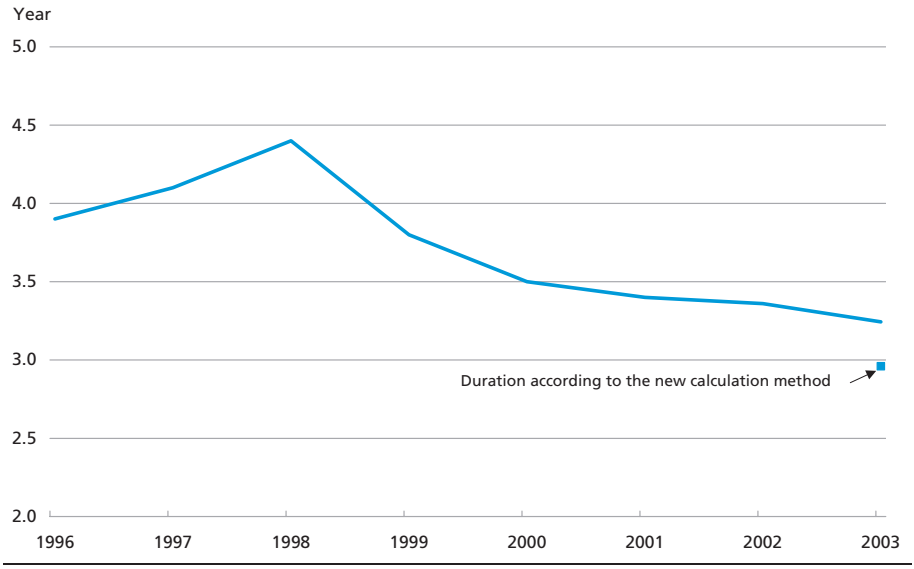
In recent years, the duration of the central-government debt has been at the lower half of the duration band of 3.5 years +/- 0.5 years, cf. Chart 6.3.1.

In 2003, a methodological change of the duration calculation, cf. Box 6.1, reduced the duration by approximately one quarter of a year, whereby the duration was 3.0 years at the end of 2003.

Against the backdrop of the new calculation method, the duration band for 2004 has been set at 3.0 years +/- 0.5 years, i.e. a symmetrical band around the duration level at the end of 2003.

Interest-rate changes affect the duration but not the actual fixed-interest period of the portfolio. Therefore duration is also calculated using a fixed discount rate.

DURATION OF THE CENTRAL-GOVERNMENT DEBT, YEAR-END — Chart 6.3.1




Note: As from 2004 a break appears in the calculation of the duration due to a change in the method of duration calculation. According to the new method the duration of the government debt at end-2003 is calculated as 3 years.

DURATION Box 6.1

Every year in December the target for the duration of the total government debt is set. Duration is a summary measure of the cost and risk profile of the debt. The duration of the government debt is a central strategic benchmark applied as a guide to the ongoing risk management of the government debt.

*Macauley duration and option adjustment*: The duration of the debt is calculated as a Macauley duration ($V_{Mac}$) defined as:

$$V_{Mac}(s,i_s) = \sum_t (t-s) \frac{C_t (1+i_s)^{-(t-s)}}{\sum_u C_u (1+i_s)^{-(u-s)}}$$

where *s* is the time of calculation, $i_s$ is the discount rate, and *t* is the time of the future payment $C_t$. Duration can also be expressed by $\Sigma_t$ (t-s) $w_t$, where $w_t$ is the payment at time t as a proportion of the total present value of the payments. Duration is thus a weighted average of the length of the periods until each payment. As regards SPF's holding of callable mortgage-credit bonds it is necessary to apply an option-adjusted duration. Callable bonds are included with a shorter duration than equivalent non-callable securities, due to the probability of early redemption.

*Average fixed-interest period:* Government Debt Management uses duration to express the average fixed-interest period. Long duration means that for a large proportion of the debt the interest rate is locked for a long period. Long duration reduces the variation in the annual interest costs and thus implies a low risk on the government debt.

*Floating and fixed discount rates:* Duration can be calculated using a floating or fixed discount rate. Interest-rate changes influence the weighting of the individual payments on the portfolio and thus the duration of the portfolio. However, interest-rate changes do not influence the time of the actual payments, nor the risk profile of the portfolio. Calculating duration on the basis of a fixed discount rate eliminates the fluctuations in the duration, which are exclusively the result of interest-rate changes. In the day-to-day risk management the duration of the central-government debt, calculated on the basis of a fixed discount rate, is applied.

*Weighing of government debt instruments:* Until end-2003 the duration of the government debt was calculated by weighing together the duration of the sub-portfolios of the debt with their respective nominal shares of the total debt.

As from 2004 the duration of the total government debt is calculated by weighing together the duration of the individual sub-portfolios with their respective market values. At end-2003 the new calculation method reduces duration by approximately one quarter of a year.

The duration of the liabilities in the portfolio is calculated with a positive sign, while the duration of the portfolio's assets is calculated with a negative sign. The duration of the central government's account with Danmarks Nationalbank is 0.

In the day-to-day risk management the duration of the central-government debt, calculated on the basis of a fixed discount rate, is applied. For 2004 a band of 3.0 years +/- 0.25 years is set for the duration of the central-government debt, calculated using a fixed discount rate.

The duration calculated using a floating discount rate must still comply with the wider band of 3.0 years +/- 0.5 years. The wide band is used to capture the effect of interest-rate changes on duration.

At the end of 2004 the use of the duration band based on the fixed discount rate will be evaluated.

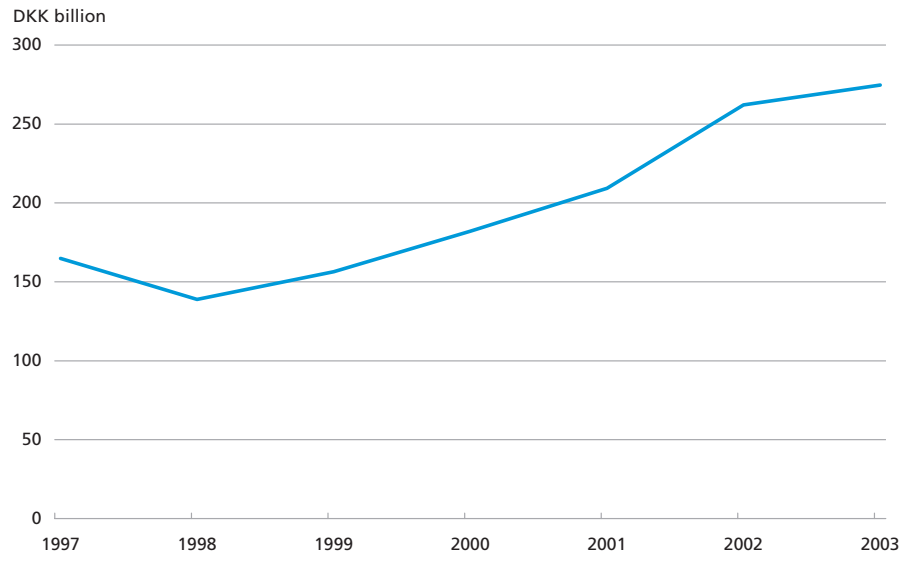
**Interest-rate fixing and redemption profile**

Duration is a measure of the portfolio's average fixed-interest period. As an average measure, duration does not shed light on the dispersion of the interest-rate exposure over time.

By dispersing the central government's interest-rate exposure over time it is avoided that a new interest rate is fixed on a relatively large proportion of the portfolio in a given year. Therefore the duration target is supplemented with a portfolio measure for the interest-rate fixing. The interest-rate fixing at a given point in time includes the redemptions maturing within one year as well as the size of the floating-rate debt and the swap portfolio for which a new interest rate is to be fixed within one year.

During recent years the interest-rate fixing has increased, cf. Chart 6.3.2. One of the reasons is that the duration of the government debt portfolio has been reduced by transacting interest-rate swaps. Interest-rate swaps from fixed to floating interest rates shorten the duration and increase the interest-rate fixing as the interest rate on the floating leg is fixed every six months.

THE INTEREST-RATE FIXING, YEAR-END — Chart 6.3.2



At end-2003 the interest-rate fixing was DKK 275 billion. All other things being equal this means that a general rise in interest rates by 1 per cent will entail increased interest costs of DKK 2.75 billion.

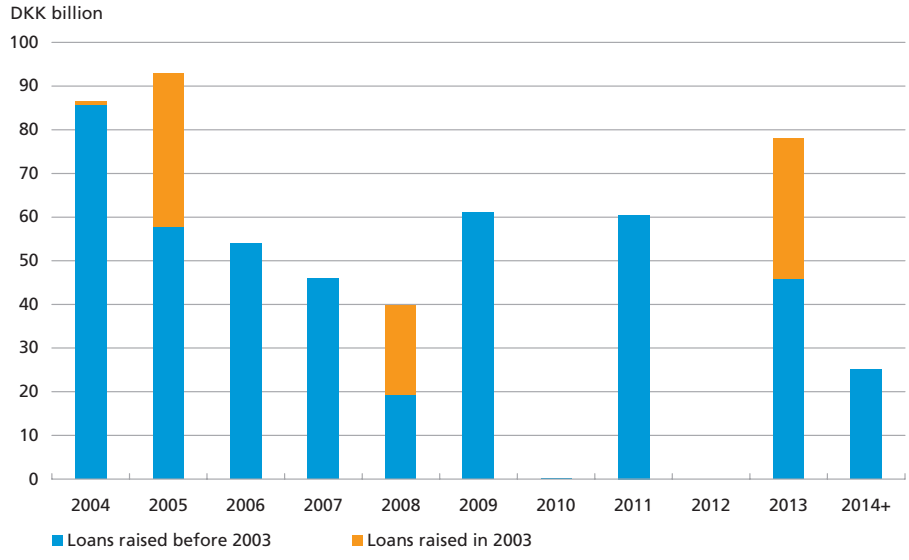
In order to disperse and thereby reduce the risk, the government debt policy is planned to ensure a comparatively smooth redemption profile in the next few years, taking new issues into account. This contributes to maintaining a stable borrowing programme. The redemption profile for domestic and foreign government debt appears from Charts 6.3.3 and 6.3.4.

Chapter 11 presents new initiatives in the area of interest-rate-risk management of the government debt.

**The Cost-at-Risk (CaR) model**

The CaR model is used to quantify interest costs and risk on the government debt subject to various strategic assumptions concerning the government debt policy including various duration levels of the portfolio. In the CaR model 2,500 scenarios for the central government's annual interest costs are simulated 10 years ahead. On this basis, the expected interest costs and risks can be calculated. In 2003, the CaR model was expanded to include the foreign government debt, cf. Box 6.2. It now comprises the domestic and foreign government debt as well as the swap portfolios.

REDEMPTION PROFILE – DOMESTIC CENTRAL-GOVERNMENT DEBT, END-2003 Chart 6.3.3




Note: Excluding Treasury bills.

REDEMPTION PROFILE – FOREIGN CENTRAL-GOVERNMENT DEBT, END-2003 Chart 6.3.4

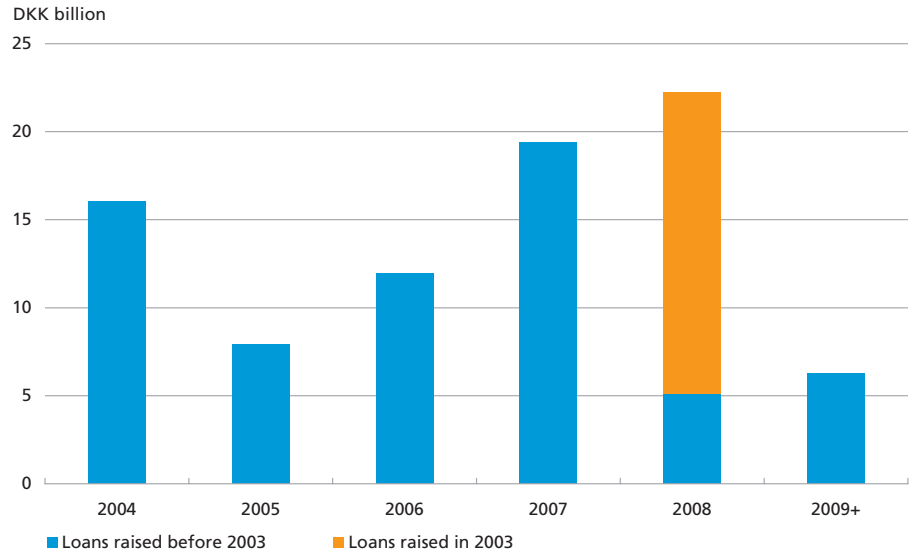



Chart 6.3.5 presents the CaR figures for the interest costs on the domestic and foreign debt up to and including 2013. Based on medium-term projections from the Ministry of Finance, the CaR model assumes a central-government surplus in the following 10 years. The assumption of a surplus reduces the government debt and thereby the expected interest costs. On the other hand, the assumption of higher interest rates in the CaR model implies higher expected interest costs. The two opposite effects result in a relatively stable development in expected interest

MODELLING FOREIGN GOVERNMENT DEBT IN THE CAR MODEL Box 6.2

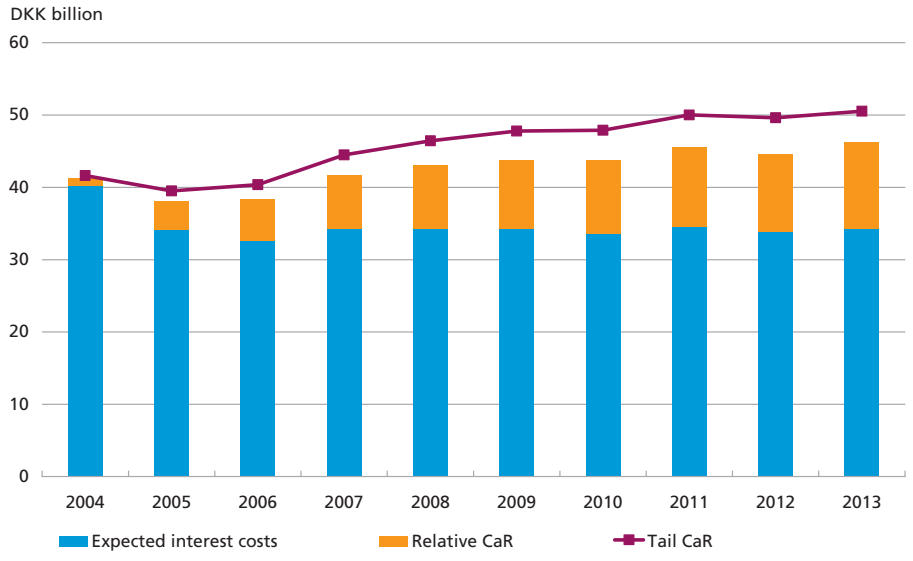
The Cost-at-Risk model previously comprised only the domestic government debt making up the main part of the government debt. In 2003 the model was expanded to include the foreign government debt of approximately DKK 84 billion to achieve a more complete calculation of the interest costs and risk on the government debt.

All existing foreign loans and swaps are included in the model. The model assumes that the foreign borrowing requirement is covered by issuing one euro loan every year. In addition, currency swaps from kroner to euro can be simulated.

Modelling of domestic and foreign interest rates is analogous, based on a CIR[1] interest-rate process for the short-term Danish interest rate and the short-term German interest rate. In the interest-rate simulation the two processes are exposed to the same shock which leads to correlation between the individual scenarios for the domestic and foreign interest rates.

[1] Cox, J. C., Ingersoll, J. E. and Ross, S. A., 1985, A Theory of the Term Structure of Interest Rates, *Econometrica*, vol. 53, No. 2, pp. 385-407.

COST-AT-RISK FOR DOMESTIC AND FOREIGN CENTRAL-GOVERNMENT DEBT Chart 6.3.5




costs as from 2005. According to the CaR simulations, the expected interest costs on the domestic and foreign government debt will be approximately DKK 34 billion as from 2005.

The uncertainty associated with the estimates of the central government's interest costs increases with the time horizon, as a larger proportion of the existing debt will be refinanced at unknown future interest rates, and as the interest-rate sample space increases over time. Measured in terms of relative CaR, the uncertainty regarding interest costs rises from DKK 1 billion in 2004 to DKK 12 billion in 2013.

Absolute CaR is the 95th percentile in the simulated cost distributions and thus expresses the maximum interest costs, with a probability of 95 per cent, for the central government in a given year. Absolute CaR is the sum of expected interest costs and relative CaR in Chart 6.3.5. Tail CaR is used as a measure of the central government's expected interest costs if one of the 5 per cent highest interest-cost scenarios is realised. Tail CaR is the central government's expected interest costs if the costs are higher than absolute CaR. In 2013 tail CaR is estimated at approximately DKK 50 billion.

## EXCHANGE-RATE RISK 6.4

The purpose of the central government's foreign borrowing is to refinance debt raised to maintain an adequate foreign-exchange reserve. Foreign borrowing means that the central government incurs an ex-

change-rate risk, i.e. the risk that the value of the debt in kroner increases as a consequence of a change in exchange rates. The foreign debt of the central government is exposed exclusively in euro. In view of Denmark's fixed-exchange-rate policy vis-à-vis the euro this entails a low exchange-rate risk. Moreover, the foreign-exchange reserve is predominantly placed in euro.

In 2003, Danish Ship Finance gained access to re-lending by the central government. Under this agreement the central government could potentially incur dollar-denominated debt. However, the dollar debt would be offset by a dollar asset, whereby the central government would assume no exchange-rate risk due to the re-lending facility. The details on the re-lending scheme are described in Chapter 10.

## CREDIT RISK 6.5

The central government's swap portfolio is associated with a credit risk for the central government. On transaction of a swap the market value is normally zero. The credit risk arises because over time – depending on interest-rate and exchange-rate developments – a swap may achieve a positive market value for the central government. A swap with a positive market value is an asset for the central government and therefore subject to a credit risk, since the central government is exposed to the swap counterparty's ability to pay.

It is sought to minimise the central government's credit risk by observing a number of credit management principles. The key principle is to disperse the credit risk on a number of highly-rated counterparties who pledge collateral if the market value of the swap portfolio is in the central government's favour. The central government can terminate swaps early, if the counterparty's rating falls below a certain level. The central government's credit management principles are described in more detail in the Appendices.

In 2003, the central government entered into 39 new swaps with a total principal of DKK 13 billion. During 2003 21 swaps expired. At end-2003, there were 294 swaps with a total principal of DKK 138 billion, cf. Table 6.5.1.

At end-2003, the market value of the central government's swap portfolio was DKK 2.3 billion, i.e. DKK 5.4 billion less than at end-2002, cf. Table 6.5.2. The decline can primarily be attributed to the dollar's depreciation in the course of 2003, as a large proportion of the transacted currency swaps has been used to restructure USD exposure to EUR exposure.

Today, the swap portfolio's market value is less sensitive to the dollar exchange rate than previously, cf. Table 6.5.3, primarily due to a smaller

CENTRAL-GOVERNMENT SWAP PORTFOLIO, 2001-03, YEAR-END — Table 6.5.1

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| Number of counterparties | 33 | 31 | 29 |
| Number of swaps | 233 | 276 | 294 |
| | | DKK billion | |
| Interest-rate swaps, Danish kroner | 27.4 | 37.0 | 43.6 |
| Interest-rate swaps, other currencies | 27.6 | 51.9 | 52.7 |
| Currency swaps, excluding DKK-EUR swaps | 59.5 | 39.9 | 24.1 |
| DKK-EUR swaps | 4.8 | 16.2 | 16.2 |
| Structured swaps | 1.7 | 1.7 | 1.6 |
| Principal, total | 121.0 | 146.8 | 138.2 |

portfolio of currency swaps from dollars to euro. This is the result of the expiry of previously transacted currency swaps from dollars to euro, and of the fact that the central government's foreign borrowing in 2002-03 solely consisted of direct borrowing in euro or transaction of currency swaps from kroner to euro, cf. Chapter 3.

Falling interest rates increase the market value of the central government's interest-rate-swap portfolio, since interest-rate swaps are typically used to restructure debt from long-term to short-term interest rates. At end-2003, the market value of the central government's interest-rate swaps was by and large unchanged compared to end-2002, which can be attributed primarily to the fact that the interest rates on the calculation dates were at similar levels despite significant interest-rate fluctuations during 2003.

Fluctuating market values do not reflect an actual gain or loss for the central government. If the central government terminates a swap early, e.g. due to downgrading of the counterparty, a new swap identical to the terminated swap must be transacted in order to maintain the expo-

NET MARKET VALUE OF SWAP PORTFOLIO, 2001-03, YEAR-END — Table 6.5.2

| DKK billion | 2001 | 2002 | 2003 |
|---|---|---|---|
| Interest-rate swaps, Danish kroner | 1.3 | 3.8 | 4.0 |
| Interest-rate swaps, other currencies | 0.1 | 2.5 | 2.4 |
| Currency swaps, excluding DKK-EUR swaps | 7.9 | 1.2 | -4.2 |
| DKK-EUR swaps | 0.0 | -0.0 | -0.0 |
| Structured swaps | 0.3 | 0.2 | 0.1 |
| Total | 9.6 | 7.7 | 2.3 |

Note: The net market value of the swap portfolio is the sum of the market values of the individual swaps. Calculation of the central government's credit exposure is based on the net market value of the central-government swap compiled for each swap counterparty. This is due to the fact that netting is used in case of a swap counterparty's default, whereby swaps with negative market values are offset against swaps with positive market values in the calculation of the final claim on the liquidation estate.

EXCHANGE-RATE SENSITIVITY OF THE SWAP PORTFOLIO VIS-À-VIS USD, YEAR-END — Table 6.5.3

| DKK billion | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|
| Change in market value on appreciation by 1 per cent of USD vis-à-vis DKK ..... | 0.40 | 0.49 | 0.32 | 0.18 |

sure. If the terminated swap had a positive market value for the central government, the new swap would, however, be transacted under less favourable terms than those applying when entering the original swap. The gain on early termination of the swap is thus offset by the loss arising from the transaction of an identical swap under less favourable market terms.

New swaps are transacted only with counterparties who have signed a unilateral collateral agreement. At end-2003 the central government's swap counterparties had pledged collateral for DKK 3.4 billion, which contributed to reducing the credit exposure, cf. Table 6.5.4. The credit exposure on the swap portfolio fell by DKK 2.7 billion to DKK 5.5 billion in 2003.

The central government has entered into collateral agreements with 22 counterparties. Swaps transacted with these counterparties cover 93 per cent of the total swap portfolio measured in terms of principals, cf.

CREDIT QUALITY OF THE SWAP PORTFOLIO, 2001-03, YEAR-END — Table 6.5.4

| | 2001 | | 2002 | | 2003 | |
|---|---|---|---|---|---|---|
| Rating | Number of counter-parties | Credit exposure (DKK billion) | Number of counter-parties | Credit exposure (DKK billion) | Number of counter-parties | Credit exposure (DKK billion) |
| AAA ..... | 9 | 2.4 | 7 | 1.0 | 6 | 0.8 |
| AA+ ..... | 3 | 1.1 | 3 | 1.8 | 3 | 1.1 |
| AA ..... | 5 | 2.1 | 2 | 0.7 | 5 | 1.4 |
| AA- ..... | 12 | 3.6 | 9 | 2.3 | 7 | 1.2 |
| A+ ..... | 3 | 0.3 | 10 | 2.4 | 7 | 1.0 |
| A ..... | 1 | 0.3 | - | - | - | - |
| A- ..... | - | - | - | - | 1 | 0.0 |
| Total ..... | 33 | 9.9 | 31 | 8.2 | 29 | 5.5 |
| Of which: | | | | | | |
| - Current market value .... | | 10.0 | | 8.6 | | 6.2 |
| - Collateral pledged ..... | | -4.0 | | -4.4 | | -3.4 |
| - Potential exposure ..... | | 4.0 | | 4.0 | | 2.8 |

Note: The credit exposure comprises both the current credit exposure, equivalent to positive market values, calculated in net terms for each swap counterparty, and the potential credit exposure, which is an estimate of future positive market values. Pledged collateral is deducted from the calculation. A more detailed description of the calculation method for credit exposure is found in *Danish Government Borrowing and Debt 2000*, Appendix 11.B.

COVERAGE OF SWAP PORTFOLIO BY COLLATERAL AGREEMENTS
DISTRIBUTED BY RATING, END-2003 Table 6.5.5

| Rating | Counterparties | Principal, DKK billion | Per cent with collateral agreement | Credit exposure, DKK billion |
|---|---|---|---|---|
| AAA | 6 | 12 | 50 | 0.8 |
| AA+ | 3 | 27 | 93 | 1.1 |
| AA | 5 | 24 | 99 | 1.4 |
| AA- | 7 | 34 | 95 | 1.2 |
| A+ | 7 | 32 | 99 | 1.0 |
| A- | 1 | 8 | 100 | 0.0 |
| Total | 29 | 138 | 93 | 5.5 |

Table 6.5.5. In the coming years the coverage ratio will increase on an ongoing basis as swaps with counterparties, with whom collateral agreements do not exist, expire. A collateral agreement with a swap counterparty entails that the swap counterparty must pledge collateral when the market value in the central government's favour exceeds an agreed amount. The central government can thus still be exposed to a credit risk on the swap counterparty.

Chart 6.5.1 shows the distribution of the swap portfolio by counterparty rating. No significant shifts took place in 2003, but one counterparty, with whom a collateral agreement exists, was downgraded two notches from A+ to A-.

SWAP PORTFOLIO DISTRIBUTED BY COUNTERPARTY RATING, YEAR-END Chart 6.5.1

## OPERATIONAL RISK 6.6

The Bank for International Settlements (BIS) has defined operational risk as "…the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events".[1]

In recent years, Government Debt Management has increased its focus on management of operational risks.

Government Debt Management is divided into front, middle and back offices, entailing a clear division of functions and responsibilities.

The individual tasks of Government Debt Management are described in clear procedures that are updated on an ongoing basis. Clear procedures reduce operational risk and facilitate internal control.

In 2003, Danmarks Nationalbank implemented a new portfolio management system (PSS) for the central-government debt. The system has improved the day-to-day risk management of the central-government debt and reduced operational risks, cf. Box 6.3.

In addition, Government Debt Management uses only standardised and well-known financial instruments, thereby reducing operational risks.

A contingency plan ("Second Site") has been prepared so that key parts of Government Debt Management can continue in case of major business disruption.

Standardised contracts are used in order to minimise legal risks.

NEW PORTFOLIO MANAGEMENT SYSTEM (PSS) FOR THE CENTRAL-GOVERNMENT DEBT Box 6.3

In 2003, a new portfolio management system for the central-government debt was implemented. The new system is updated once a day with information on the central government's transactions on the previous day. Transactions are entered automatically from the back-office systems. In addition, price information and master data concerning the portfolio securities are entered automatically. Relevant key indicators in the day-to-day risk management are calculated based on this information. The Government Debt Management staff has access to the key indicators via an internal web portal.

A group of administrators at Danmarks Nationalbank undertakes the day-to-day operation and maintenance of the portfolio management system. Apart from being responsible for the day-to-day operation of the system, this group has the exclusive right to modify the portfolio management system.

The new portfolio management system integrates the government's daily transactions, portfolio compilations and market information on the central government's securities in one joint system. This has improved the daily monitoring and reporting of key indicators for the government debt.

A more detailed description of the technology behind the new portfolio management system is found in Danmarks Nationalbank, *Financial Management at Danmarks Nationalbank,* 2004, Chapter 14.

[1] *Sound Practices for the Management and Supervision of Operational Risk*, February 2003, Basel Committee on Banking Supervision.

CHAPTER 7

# Government Debt and Government-Guaranteed Entities

## SUMMARY 7.1

The central-government debt decreased by DKK 6 billion as a result of the surplus on the government finances and amounted to DKK 515 billion at the end of 2003. In 2003 the interest costs on the central-government debt fell by DKK 4 billion compared to 2002 and amounted to DKK 27 billion. The fall in interest costs is attributable to the low level of interest rates in 2003.

According to the Ministry of Finance estimate, the general-government surplus was DKK 18.5 billion in 2003, corresponding to 1.3 per cent of GDP. The gross general-government debt (EMU debt) is estimated at DKK 597 billion at end-2003, corresponding to 42.8 per cent of GDP.

At the end of 2003 non-resident investors owned 27 per cent of Danish government securities. The non-resident ownership share of the 10-year benchmark bond rose to just above 30 per cent at end-2003.

The total government-guaranteed debt of the government-guaranteed entities amounted to DKK 78 billion at end-2003.

Outstanding re-lending administered by Government Debt Management totalled DKK 15 billion at end-2003.

## GOVERNMENT DEBT AND INTEREST COSTS 7.2

This Chapter describes the assets and liabilities of the central government which are managed by Government Debt Management at Danmarks Nationalbank. In other contexts other concepts of central-government debt can be used. There are also broader definitions of general-government debt which include the debt of local government, etc. (e.g. EMU debt).

### Central-government debt

The central-government debt is compiled as the total domestic and foreign debt less the assets of the Social Pension Fund and the balance of

COMPILATION OF CENTRAL-GOVERNMENT DEBT AND INTEREST COSTS Box 7.1

*The central-government debt* is compiled as the nominal value of domestic and foreign debt minus the balance of central government's account with Danmarks Nationalbank and the assets of the Social Pension Fund (SPF). The compilation of the central-government debt only includes liabilities related to re-lending, i.e. government issues to finance re-lending, whereas the central government's claims on entities that receive re-lending are not included. Re-lending thereby in isolated terms contributes to increasing the central-government debt. The central-government debt adjusted for re-lending is the central-government debt less outstanding re-lending to Ørestadsselskabet I/S, A/S Øresund and A/S Storebælt.

The change in the central-government debt corresponds to the net borrowing at nominal value minus the change in SPF's assets. Net borrowing at nominal value consists of borrowing at market value with addition of value adjustments in connection with issuance and buy-backs. In isolated terms, re-lending increases net borrowing by the central government because the central government finances re-lending by issuing on-the-run securities.

The distribution on respectively domestic and foreign borrowing and debt is based on currency. Domestic debt is exposed in kroner, while foreign debt is exposed in currency.

*Interest costs* related to the central-government debt comprise interest, distributed capital losses on issue and realised exchange-rate losses. Interest on government issues to finance re-lending is thus included in interest costs. On the other hand, interest income to the central government in connection with re-lending is not included in the compilation of interest costs in Table 7.2.2. Both interest costs and interest income on re-lending are included in the compilation of the central government's net financing requirement.

Interest and capital losses on issue are accrued on the basis of an earnings principle. The interest costs are compiled as a ratio of the interest credited for the year, equivalent to the number of days that a loan has run in that year. The capital loss on issue is the difference between the nominal value and market value on issue, and is distributed over the time to maturity of the loan.

the central-government account with Danmarks Nationalbank. The debt is compiled at nominal value, cf. Box 7.1.

At end-2003 the central-government debt compiled at a nominal value was DKK 515 billion, cf. Table 7.2.1. This represents a decrease by DKK 6 billion from 2002. Central-government debt as a ratio of GDP has declined since 1995 and amounted to 37 per cent of GDP in 2003, cf. Chart 7.2.1. Compiled at market value, the central-government debt totalled DKK 540 billion at end-2003, cf. Box 7.2.

Re-lending constitutes central-government loans to first and foremost Ørestadsselskabet I/S, A/S Storebælt and A/S Øresund, which together account for by far the majority of total re-lending by the central government. The central government finances re-lending by issues in on-the-run securities, thereby increasing the gross financing requirement

NET BORROWING AND CHANGES IN THE GOVERNMENT DEBT, 2000-04 Table 7.2.1

| DKK billion | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| *Net borrowing* | | | | | |
| Domestic borrowing | -27.8 | -14.0 | 8.6 | -13.6 | -12.9 |
| Foreign borrowing[1] | -5.2 | -1.0 | -0.1 | -0.2 | 0.0 |
| Drawing on the central government's account at Danmarks Nationalbank | 3.9 | -8.3 | -6.3 | 5.1 | 10.9 |
| Net borrowing at market value | -29.1 | -23.3 | 2.2 | -8.7 | -2.0 |
| *Capital losses* | | | | | |
| Domestic capital losses on issue[2] | 3.2 | 1.0 | 5.3 | -0.4 | 2.3 |
| Foreign capital losses on issue[2] | -0.0 | -0.1 | 0.0 | 0.1 | 0.0 |
| Exchange-rate adjustments | 0.4 | -0.4 | 0.0 | 0.2 | 0.0 |
| Capital losses, total | 3.6 | 0.6 | 5.4 | -0.1 | 2.3 |
| Net borrowing at nominal value | -25.5 | -22.7 | 7.5 | -8.7 | 0.3 |
| *Balance-sheet items, year-end, nominal value* | | | | | |
| Domestic debt | 624.0 | 611.0 | 624.9 | 611.0 | 600.3 |
| Foreign debt | 85.2 | 83.8 | 83.7 | 83.9 | 83.9 |
| Central government's account at Danmarks Nationalbank[3] | -31.3 | -39.6 | -46.0 | -40.9 | -30.0 |
| The Social Pension Fund[4] | -139.6 | -141.1 | -141.4 | -138.7 | -138.2 |
| Government debt at nominal value | 538.3 | 514.1 | 521.3 | 515.3 | 516.0 |
| Outstanding re-lending[5] | 3.5 | 5.8 | 12.5 | 14.7 | 18.8 |
| Government debt adjusted for re-lending | 534.9 | 508.3 | 508.8 | 500.6 | 497.2 |

Source: Central-government accounts 2000, 2001 and 2002. For 2003 provisional figures from the central-government accounts. Estimated figures for 2004 are based on the Finance Act 2004.

1 For 2000 including proceeds of DKK 1.0 billion received in connection with the reduction of the market value of a swap.

2 Including capital losses on buy-backs.

3 For 2003 the central government's account is compiled in accordance with the monthly balance sheet of Danmarks Nationalbank.

4 The Social Pension Fund's portfolio of index-linked bonds is compiled at indexed value.

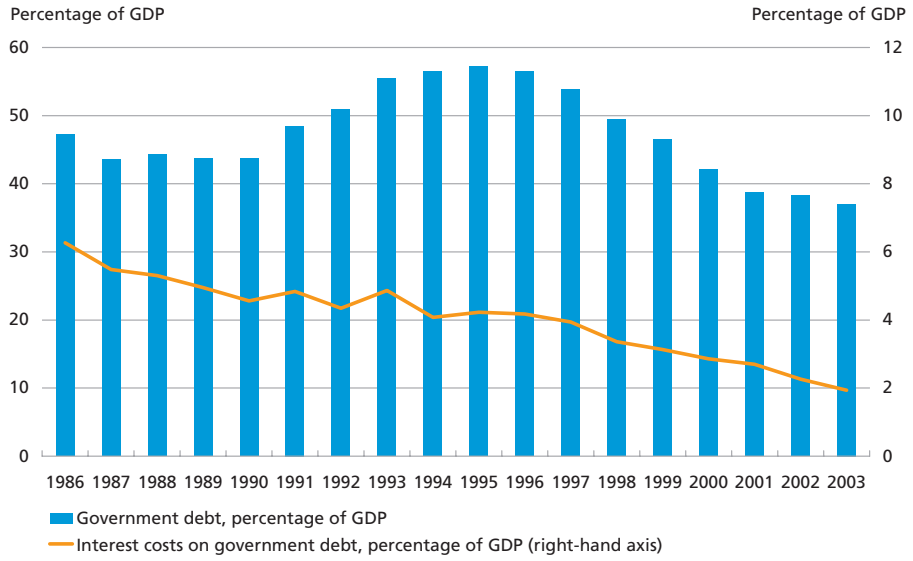
5 Re-lending to Ørestadsselskabet I/S, A/S Storebælt and A/S Øresund.

and the central government's liabilities. The central government's gross financing requirement is reduced in the years when the loans mature. Re-lending to government-guaranteed entities represents central-government claims on the entities. The central-government debt is defined excluding central-government assets related to such re-lending. If central-government assets related to re-lending are included in the compilation of the central-government debt, the debt amounted to DKK 501 billion at the end of 2003, cf. Table 7.2.1.

**Interest costs**

Interest costs on the central-government debt in 2003 totalled DKK 27 billion, equivalent to a decrease of DKK 4 billion from 2002, cf. Table

DEVELOPMENT IN GOVERNMENT DEBT AND INTEREST COSTS — Chart 7.2.1




7.2.2. The decline in the central government's interest costs is attributable to lower interest rates which have enabled the central government to refinance debt at lower interest rates.

INTEREST COSTS ON THE GOVERNMENT DEBT, 2000-04 — Table 7.2.2

| DKK billion | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| *Domestic debt* | | | | | |
| Interest | 42.4 | 39.8 | 37.4 | 34.7 | 32.2 |
| Distributed capital losses on issue | 2.3 | 2.7 | 2.3 | 1.6 | 0.8 |
| Interest costs, total | 44.7 | 42.5 | 39.8 | 36.3 | 33.0 |
| *Foreign debt* | | | | | |
| Interest | 3.9 | 4.0 | 3.2 | 2.0 | 1.6 |
| Realised exchange-rate losses on redemptions | 0.0 | 0.8 | -0.7 | 0.0 | -0.0 |
| Distributed capital losses on issue | 0.1 | 0.0 | -0.0 | 0.0 | 0.0 |
| Interest costs, total | 4.0 | 4.7 | 2.6 | 2.0 | 1.6 |
| *Interest concerning* | | | | | |
| Central government's account at Danmarks Nationalbank | -2.1 | -2.2 | -1.9 | -1.8 | -1.5 |
| The Social Pension Fund | -10.0 | -9.3 | -9.6 | -9.6 | -9.5 |
| Total | 36.6 | 35.8 | 30.8 | 27.0 | 23.7 |

Note: Interest income from re-lending is not included in the compilation of interest costs.
Source: Central-government accounts 2000, 2001 and 2002. For 2003 provisional figures from the central-government accounts. Estimates for 2004 are from the Finance Act 2004.

GOVERNMENT DEBT COMPILED AT MARKET VALUE Box 7.2

In the central-government accounts the government debt is compiled at nominal value. The debt is typically held until maturity and redeemed at par. Furthermore, the entire debt will not be settled or restructured over a short time horizon.

A compilation at market value provides additional information on the central-government debt.

When the market interest rate is lower than the borrowing rate, the market value is higher than the nominal value. The opposite is the case if the market interest rate is higher. In the Danish government debt management duration is used as an expression of the average fixed-interest period. Duration also expresses the interest-rate sensitivity of the market value. The longer the duration, the greater the sensitivity of the market value of the debt to changes in interest rate.

GOVERNMENT DEBT AT NOMINAL AND MARKET VALUE, END-2003

| DKK billion | Nominal value | Market value |
|---|---|---|
| Domestic debt | 611 | 650 |
| Foreign debt | 84 | 83 |
| The Social Pension Fund | -139 | -152 |
| Central government's account at Danmarks Nationalbank | -41 | -41 |
| Government debt, total | 515 | 540 |
| Outstanding re-lending | 15 | 16 |
| Government debt adjusted for re-lending | 501 | 524 |

Note: The market value is calculated on the basis of the official market prices at the end of 2003 in accordance with the accounting practice for the central-government accounts. Instruments for which no official market prices exist, e.g. swaps, are valued at market value on the basis of the current level of interest rates.

## THE GROSS DEBT OF THE GENERAL GOVERNMENT (EMU DEBT) 7.3

Besides the central-government debt, the general government's gross debt also includes the local-government debt, etc. The central-government debt accounts for most of the gross debt of the general-government sector.

The gross general-government debt is compiled in accordance with the EU Treaty. The debt is compiled on a gross basis, but the general-government sector may consolidate the debt with claims on itself. This e.g. means that the portfolio of government securities of the Social Pension Fund (SPF) and social security funds (including ATP) may be deducted from the debt. This is not the case for the balance of the central government's account with Danmarks Nationalbank and SPF's and social security funds' portfolio of non-government bonds.

The European Commission and the Ecofin Council monitor the development in the budgetary situation of the member states in order to

GENERAL-GOVERNMENT BUDGET BALANCE AND DEBT, 2000-04 Table 7.3.1

| | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| General-government balance in DKK billion | 32.5 | 37.5 | 21.2 | 18.5 | 20.7 |
| General-government balance as a percentage of GDP | 2.5 | 2.8 | 1.6 | 1.3 | 1.4 |
| Gross debt in DKK billion | 606.3 | 601.4 | 621.6 | 597.1 | 590.0 |
| Gross debt as a percentage of GDP | 47.3 | 45.4 | 45.5 | 42.8 | 40.6 |

Source: *Economic Survey*, December 2003, Ministry of Finance.

assess whether budgetary discipline is maintained. This evaluation is based on the criteria set out in the EU Treaty and in the Stability and Growth Pact. According to the EU Treaty, as a general rule the general-government deficit may not exceed 3 per cent of GDP, and the general-government debt as a general rule may not exceed 60 per cent of GDP.

The general-government surplus is estimated at DKK 18.5 billion in 2003, equivalent to 1.3 per cent of GDP. At end-2003 the gross general-government debt is estimated at DKK 597 billion or 42.8 per cent of GDP, cf. Table 7.3.1.

## OWNERSHIP DISTRIBUTION OF GOVERNMENT SECURITIES 7.4

A broad investor base for government securities supports the build-up of a liquid government securities market. A broad investor base reduces

OWNERSHIP DISTRIBUTION OF DOMESTIC GOVERNMENT SECURITIES, END OF QUARTER Table 7.4.1

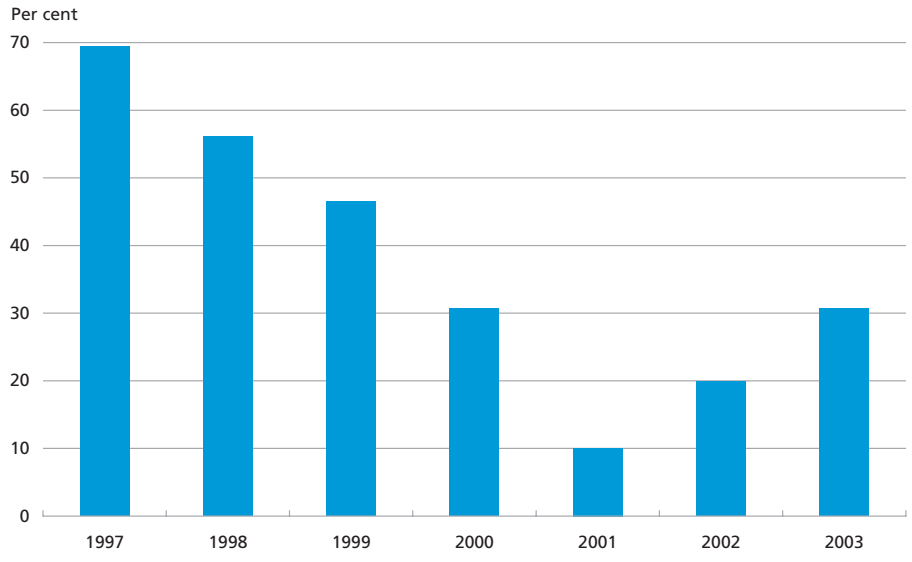
| Per cent of nominal outstanding volume | Q4 02 | Q1 03 | Q2 03 | Q3 03 | Q4 03 |
|---|---|---|---|---|---|
| Non-financial corporations | 3 | 2 | 2 | 3 | 3 |
| Financial institutions, including Danmarks Nationalbank | 23 | 27 | 26 | 24 | 22 |
| Insurance companies and pension funds | 16 | 16 | 18 | 19 | 22 |
| General government | 23 | 21 | 22 | 21 | 23 |
| Households, etc. | 2 | 2 | 2 | 2 | 2 |
| Non-residents | 32 | 30 | 29 | 29 | 27 |
| Not stated | 1 | 1 | 1 | 2 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Total nominal outstanding volume, DKK billion | 642.7 | 676.5 | 663.2 | 665.2 | 627.9 |
| Total market value, DKK billion | 691.1 | 728.3 | 722.8 | 717.3 | 670.1 |

Note: Danmarks Nationalbank has adjusted the figures for repurchase agreements between Danish banks and non-residents. Moreover, adjustments are made on an estimated basis for residents' holdings in securities accounts abroad.

Source: Danmarks Nationalbank.

NON-RESIDENT OWNERSHIP SHARE OF 10-YEAR BENCHMARK BOND, YEAR-END

Chart 7.4.1




Note: Adjustment is made for repurchase agreements between Danish banks and non-residents. Moreover, adjustments are made on an estimated basis for residents' holdings in securities accounts abroad.
Source: Danmarks Nationalbank.

the risk of failing demand from one type of investors leading to an increase in borrowing costs.

The ownership distribution by sector of Danish krone-denominated government securities is presented in Table 7.4.1. The non-resident ownership share decreased in 2003. Viewed over a longer horizon, the non-resident share has declined from approximately 40 per cent in 1998 to 27 per cent in 2003. Adjusted for the Social Pension Fund's holdings of government securities, the non-resident ownership share of Danish government securities was 33 per cent at end-2003.

In 2003 non-resident investors increased their ownership share of benchmark government securities. This share was just above 30 per cent for the 10-year benchmark bond at the end of 2003, cf. Chart 7.4.1. The ownership distribution of Danish government securities is also described at Danmarks Nationalbank's website, www.nationalbanken.dk, under "Statistics".

## GOVERNMENT-GUARANTEED ENTITIES 7.5

The central government provides guarantees for the borrowing and related financial transactions of a number of companies. These are typically structured as government-owned limited-liability companies, and

their tasks are defined in an act or legal document which also gives access to government guarantees for loans within a certain limit. The board of directors and management of each government-guaranteed entity are responsible for the entity's financial transactions, risk management, etc.

The central government sets out guidelines for the government-guaranteed entities' activity in the loan markets, since the central government assumes a risk by guaranteeing the loans. In principle, the financial risks incurred by the central government in connection with guarantees are equivalent to the risks assumed when borrowing directly in the central government's own name. It should therefore be ensured that the government-guaranteed entities do not in their borrowing, etc. assume risks that the central government would not assume directly. For example, the entities' currency exposure should be limited to euro at the outset. The guidelines for borrowing by the entities are described in Box 7.3.

A government guarantee is attractive to the borrower since it reduces borrowing costs. When a loan is guaranteed by the central government, the lender's credit risk on the loan will be reduced, so that the lender will typically be willing to lend at a lower interest rate.

The government-guaranteed entities administered by Government Debt Management are A/S Storebælt, A/S Øresund, Øresundsbron (the

GUIDELINES FOR BORROWING BY THE ENTITIES — Box 7.3

The guidelines apply to A/S Storebælt, A/S Øresund, Ørestadsselskabet I/S, Øresundsbron (the Øresund Bridge), DSB (the Danish State Railways), Hypotekbanken (the Mortgage Bank of the Kingdom of Denmark) and Danmarks Radio (the Danish Broadcasting Corporation). The guidelines for borrowing by the entities are stated in a set of agreements comprising three elements. An agreement between respectively the Ministry of Finance, the Ministry of Culture or the Ministry of Transport and Danmarks Nationalbank; an agreement between the Ministry and the individual entity; and finally a list of acceptable loan types. This list is drawn up and updated by Government Debt Management at Danmarks Nationalbank.

The list of acceptable loan types is based on the following criteria:

- Transactions must be customary, i.e. known and used in the market by reputed borrowers.
- Transactions must be built up from simple elements that make them transparent. This applies to transactions before swaps, and to swaps and other derivatives.
- It is emphasised that the management of the credit risk should take place on the basis of a rating-based limit system.
- Steps should be taken to establish agreements on the provision of collateral (CSA agreements) to minimise the credit risk at all times.
- The currency exposure should as a general rule be limited to euro (or Swedish kronor for Øresundsbron).

GOVERNMENT-GUARANTEED DEBT — Table 7.5.1

| DKK billion | End-2003 |
|---|---|
| Hypotekbanken | 3.4 |
| A/S Storebælt | 35.2 |
| A/S Øresund | 6.4 |
| Øresundsbron | 23.5 |
| DSB and DSB S-tog A/S | 8.0 |
| Danmarks Radio | 1.5 |
| Total | 78.0 |

Note: The debt of Øresundsbron is guaranteed jointly by the Swedish and Danish central governments.

Øresund Bridge), Hypotekbanken (the Mortgage Bank of the Kingdom of Denmark), DSB (the Danish State Railways) and Danmarks Radio (the Danish Broadcasting Corporation).

Together, the Swedish and Danish central governments guarantee the debt of Øresundsbron. The borrowing, etc. of Øresundsbron is subject to guidelines laid down by the Swedish and Danish governments. These guidelines correspond to those for the other entities.

Overall, the government-guaranteed debt for the entities at the close of 2003 totals DKK 78 billion, cf. Table 7.5.1.

In addition to the above-mentioned entities, Ørestadsselskabet I/S is also subject to the guidelines for government-guaranteed entities. However, since the entity is a general partnership of which the central government is a co-owner no government guarantee is provided for the entity's borrowing. Government Debt Management also administers government loans to TV2/Danmark A/S and TDC A/S totalling DKK 0.5 billion of which TV2/Danmark A/S accounts for the largest share.

A/S Storebælt, A/S Øresund and Ørestadsselskabet I/S have access to re-lending. Outstanding re-lending totalled DKK 14.7 billion at end-2003.

In 2003 Ørestadsselskabet I/S took up re-lending for at total of DKK 1.7 billion, while A/S Øresund took up re-lending for DKK 0.5 billion.

Danish Ship Finance, a private independent institution, gained access to a re-lending facility in 2003. There was no re-lending to Danish Ship Finance in 2003. This scheme is described in more detail in Chapter 10.

# Special-Topic Section

CHAPTER 8

# The Treasury Bill Programme

## SUMMARY 8.1

The Treasury bill programme is part of the central government's strategy for domestic borrowing. In addition to issuance of government bonds and Treasury notes, Treasury bills with maturity of up to 1 year are issued on a monthly basis. The programme was introduced in 1990 when issuance of floating-rate loans was discontinued. Treasury bills are zero-coupon paper. The yield is the difference between issuing below par and redeeming at par on maturity.

The Treasury bill programme is an instrument for short-term borrowing. The programme enhances the flexibility of government borrowing, e.g. by expanding the investor base for government securities. The issuance of Treasury bills takes account of the central government's liquidity situation, but the programme is not a liquidity management instrument *per se*. In some countries liquidity management is the main purpose of short-term government borrowing programmes.

Treasury bills are issued at monthly auctions. This issuance method is used in order to quickly build up an appropriate outstanding amount. In recent years, good sales opportunities have prevailed at Treasury bill auctions. Participation at auctions has shown a tendency towards concentration, however, this does not seem to have affected price formation at the auctions. A comparison of prices at Treasury bill auctions and prices in the secondary market immediately after the auctions indicates fairly efficient pricing at the auctions. As in other countries, the price at Treasury bill auctions tends to be slightly lower than the subsequent trading price in the secondary market.

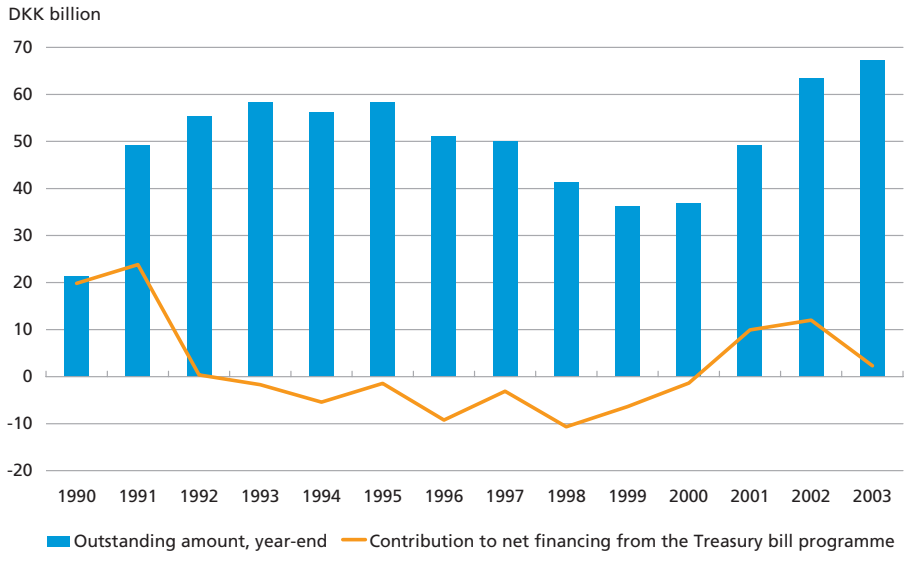
Secondary trading in Treasury bills is relatively limited. In the past two years around one quarter of the turnover has been generated on auction days when participants in the auctions resell to customers, including a number of non-resident investors.

## THE TREASURY BILL PROGRAMME AND THE GOVERNMENT DEBT POLICY 8.2

Short-term government borrowing programmes may serve several purposes. They may be part of a borrowing strategy utilising both long-term

OUTSTANDING AMOUNT AND CONTRIBUTION TO NET FINANCING FROM THE TREASURY BILL PROGRAMME

Chart 8.2.1




and short-term borrowing to achieve greater flexibility. For instance, Treasury bills may attract other types of investors and thus contribute to diversifying the investor base for government securities. In addition, Treasury bills can be used in the management of the duration for the debt portfolio.

Short-term government borrowing programmes are also commonly used to manage the central government's liquidity. For this purpose, securities may be sold directly to investors whenever the need for liquidity arises rather than by auction.

Furthermore, the introduction of a short-term government borrowing programme may contribute to developing the money market in countries without a well-functioning money market. Treasury bills can act as reference for the pricing of other money-market products and thus support the use of these instruments. However, in a developed money market such as the Danish market, a Treasury bill programme would be of limited significance to the money market.

In Denmark, the Treasury bill programme is part of the strategy for domestic borrowing. At Treasury bill auctions, the balance of the central government's account is considered, but the Treasury bill programme is not used as a liquidity management instrument *per se*. The central government's CP borrowing programmes[1] are used in the event that the balance of the central government's account needs to be increased.

[1] CPs (Commercial Paper) are short-term securities that can be issued quickly via banks with whom a CP borrowing programme has been established. The central government has established two CP borrowing programmes via a number of banks. Issuance takes place via the banks' direct sales to investors whereas Treasury bills are issued by auction.

At the end of 2003 the outstanding amount of the Treasury bill programme was DKK 67 billion, cf. Chart 8.2.1. After a relatively quick build-up of the programme in the 1990s, the outstanding amount decreased steadily over a number of years, as a consequence of inter alia the falling domestic borrowing requirement and the appearance of other money-market products. For the past three years the programme has again made a positive contribution to net financing due to e.g. the phasing-in of a new 12-month bill in 2001-02.

## TREASURY BILL AUCTIONS 8.3

Issuance of Treasury bills by auction is based on the principle that all accepted bids are accommodated at the same yield, i.e. the cut-off yield (uniform pricing). Box 8.1 describes the course of an auction.

Treasury bill auctions are subject to regular evaluations that may lead to adjustments of the auction format. The most recent adjustment was a reduction of the duration of the auctions from 1 hour to 30 minutes in April 2000. A relatively limited number of participants in Treasury bill auctions involves a greater need to regularly assess and, if required, adjust the auction format.

### Sales at auctions

Overall, the Treasury bill auctions function well. Even though the outstanding amount of the programme is larger than previously, it has not been difficult to achieve a sufficient bid volume at acceptable prices.

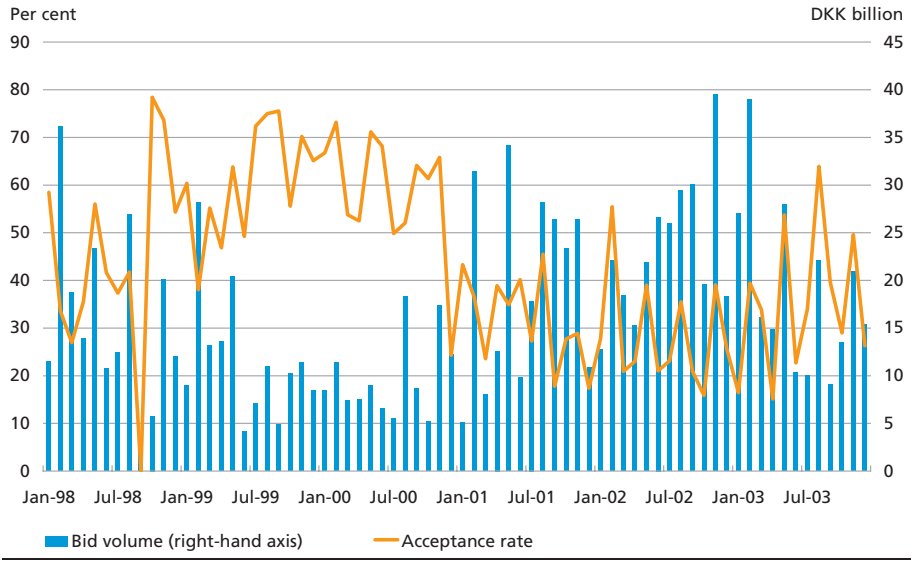
Until the end of 2000 the acceptance rates were relatively high, which inter alia reflected low bid volumes, cf. Chart 8.3.1. Subsequently, the demand for Treasury bills rose. The increase in demand more than offset the increased supply following the phasing-in of the new 12-month Treasury bill, and the acceptance rates decreased markedly.

TREASURY BILL AUCTIONS Box 8.1

The Treasury bill programme is based on monthly auctions, normally held on the penultimate banking day of each month. At each auction on-the-run Treasury bills with a remaining maturity of minimum three months are issued. Every three months a new 12-month bill is opened.

The ultimate deadline for submitting bids is 11:30 a.m. on the auction day with subsequent announcement of the auction result at 12:00 noon. Members of the Copenhagen Stock Exchange's bond market and Danmarks Nationalbank's monetary-policy counterparties can participate. The bids must be for a yield specified to two decimal points. On the basis of the bids received, a cut-off yield will be fixed. Bids for this yield or below will be accommodated at the cut-off yield. Pro-rata accommodation of bids at the cut-off yield may be made. An auction can be terminated without accommodation.

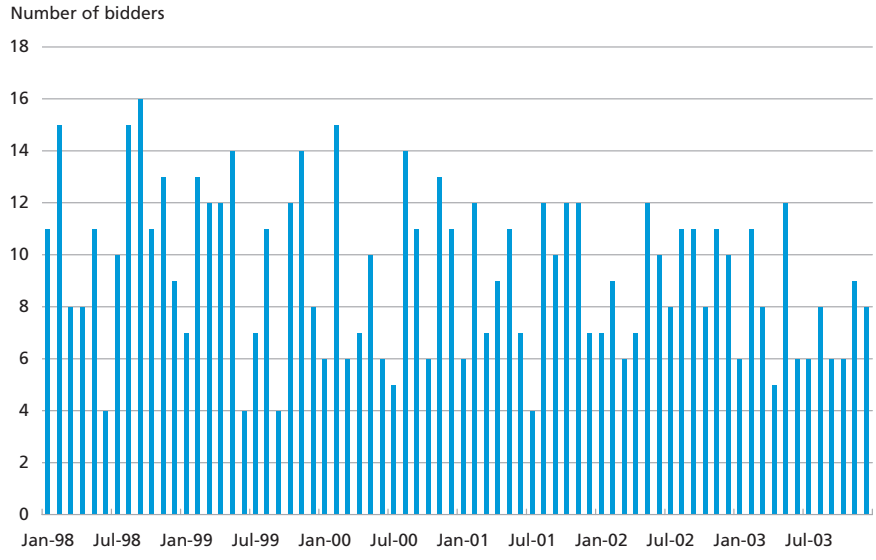
BID VOLUMES AND ACCEPTANCE RATES AT TREASURY BILL AUCTIONS — Chart 8.3.1




**Participation and bidding at auctions**

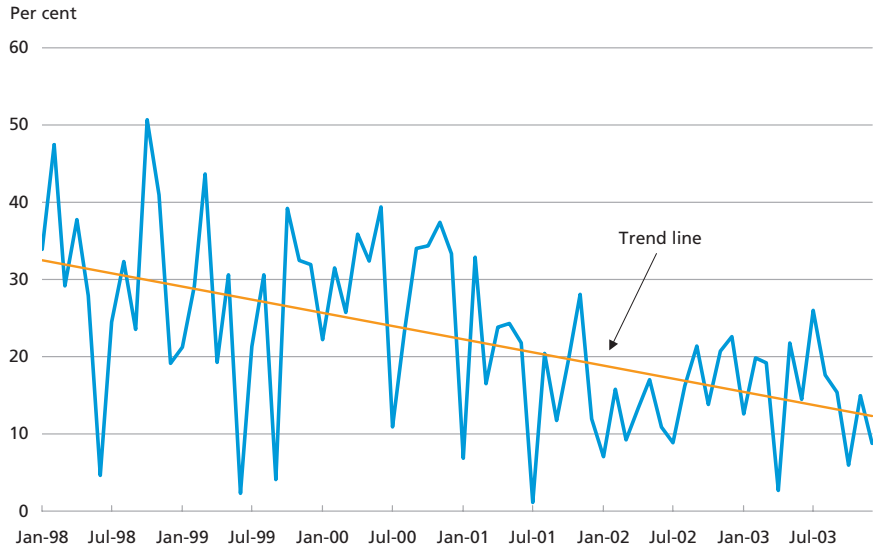
At auctions where a large volume of securities is offered for sale, turmoil in the financial markets can jeopardise the issuance process – especially if the number of bidders is low. Auctions with a limited number of participants also entail a greater risk of strategic behaviour up to the actual issuance compared to issuance via tap sale, in which case the market does not know the time and amount in advance.

NUMBER OF BIDDERS AT TREASURY BILL AUCTIONS — Chart 8.3.2



SHARE OF BIDS SUBMITTED BY SMALL BIDDERS AT TREASURY BILL AUCTIONS

Chart 8.3.3




Note: Small bidders include all participants except the three largest ones.

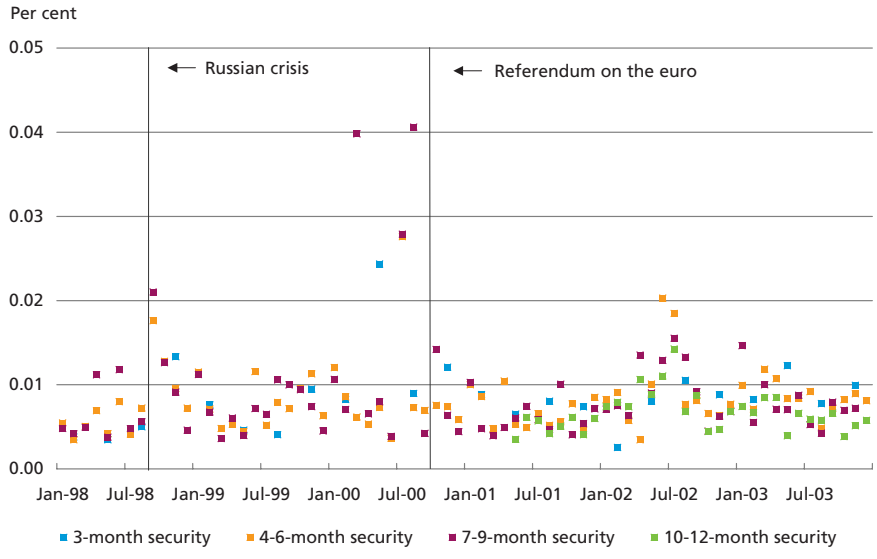
The number of bidders at Treasury bill auctions is rather limited. During the past six years there has been a tendency towards fewer auctions with an extraordinarily high number of participants, cf. Chart 8.3.2. Concurrently the share of bids submitted by small bidders at the auctions has decreased, cf. Chart 8.3.3. Overall, the two charts indicate a slightly increasing concentration trend in participation at the auctions.

The number of potential participants in Treasury bill auctions is also significant from a competition perspective. If pricing is inefficient, non-participating banks, which otherwise have to buy the bills at less favourable prices in the secondary market, can relatively easily participate in the auctions and thus increase competition. The use of uniform pricing means that banks which are not familiar with the Treasury bill market can participate in the auctions with no significant risk related to submitted bids far above the market level.[1]

During the period under review, the financial markets saw a few incidents of unrest, which were reflected in the bidding at Treasury bill auctions. In the wake of the Russian crisis there was no allotment at the auction settled in September 1998, and the dispersion of bid rates was

[1] This risk is particularly relevant in connection with multiple-price auctions where a winning bid is accommodated at bid price. Thus, an auction participant runs the risk that a winning bid is accommodated at a price far higher than the market price as perceived by the other participants. This effect may also occur at auctions with uniform pricing, especially if the number of bidders is limited. A bidder who is a dominant market player may thus influence pricing and possibly buy Treasury bills at a price higher than the market price as perceived by the other participants. This may be the case if the bidder has a need to buy the major part of the volume offered at the auction or as a consequence of great demand combined with a wrong perception of the market price.

STANDARD DEVIATION OF BID RATE AT TREASURY BILL AUCTIONS Chart 8.3.4




Note: The standard deviation of bid rates is weighted according to the size of bids.

relatively high, cf. Chart 8.3.4. Likewise, the period up to the Danish referendum on euro participation in September 2000 was characterised by a high dispersion of bid rates at Treasury bill auctions. Finally, bid dispersion tended to rise in the summer of 2002 in a highly volatile bond market, reflecting pronounced stock-price fluctuations as a consequence of inter alia a number of US accounting scandals.

**Pricing at auctions**

Empirical studies in a number of countries indicate that the auction prices of government securities are lower than the concurrent prices of the securities in the secondary market, cf. Box 8.2. This tendency is called "underpricing".

Underpricing may occur because bidders at auctions assume the risk of market-price movements during the period from submission of bids to receipt of information on the allotted volume of Treasury bills. It can be expected that bidders be compensated for this risk via a lower cut-off price than warranted by the concurrent market price.

Another explanation of underpricing may be a lack of competition at the government security auctions. Danish Treasury bill auctions are dominated by a limited number of bidders, cf. above, with a possible downward effect on the bid and the cut-off price.[1]

[1] In connection with an auction at the end of September 1990 there was clear evidence of a strong increase in the market interest rates in the days up to the auction, cf. *Danish Government Borrowing and Debt*, 1990 (in Danish only), pp. 79-87. At the time of the auction the development was seen as an attempt by the market participants to raise the cut-off yield at the auction.

EMPIRICAL ANALYSES OF UNDERPRICING AT GOVERNMENT SECURITY AUCTIONS Box 8.2

A number of empirical analyses of underpricing at government security auctions have been undertaken. The methodological approach has been to compare the auction price of a government security with a concurrent secondary-market price. Normally, the analyses indicate the existence of underpricing. The level of underpricing varies greatly in the analyses, and the underpricing is not always significantly different from zero.

**Estimating the secondary-market price**

Actual trading prices as on the auction days are usually not available when estimating the secondary-market price. Instead, the bid price, the ask price or the midpoint of the bid/ask spread is used. The time on the auction day when the applied prices were offered can also vary.

In countries with forward markets, a secondary-market price from the forward market as at the time of the auction is often used, which ensures that comparisons are based on concurrent auction and secondary-market prices. This often applies to analyses on US data. Thus in the USA forward markets for government securities already exist before the securities have been issued (when-issued markets).

**Empirical results**[1]

Most studies have analysed government security auctions as a whole, i.e. without taking the maturity of the securities into account. A long maturity can be expected to increase underpricing since the price volatility is higher for long-term than for short-term securities during an auction. However, analyses limited to Treasury bills have been undertaken on US data. These analyses indicate underpricing of Treasury bills of 0.01 to 0.04 per cent of the nominal value, which is usually, but not always, significant. An analysis on Norwegian Treasury bills shows significant underpricing corresponding to 0.036 per cent of the nominal value.[2] Analyses on Swedish, Norwegian and Finnish data in which government security auctions are analysed as a whole show underpricing of 0.020 per cent (Sweden), 0.133 per cent (Norway) and 0.041 per cent (Finland) of the nominal value, respectively.[3] In Norway and Finland, the underpricing is significantly different from zero.

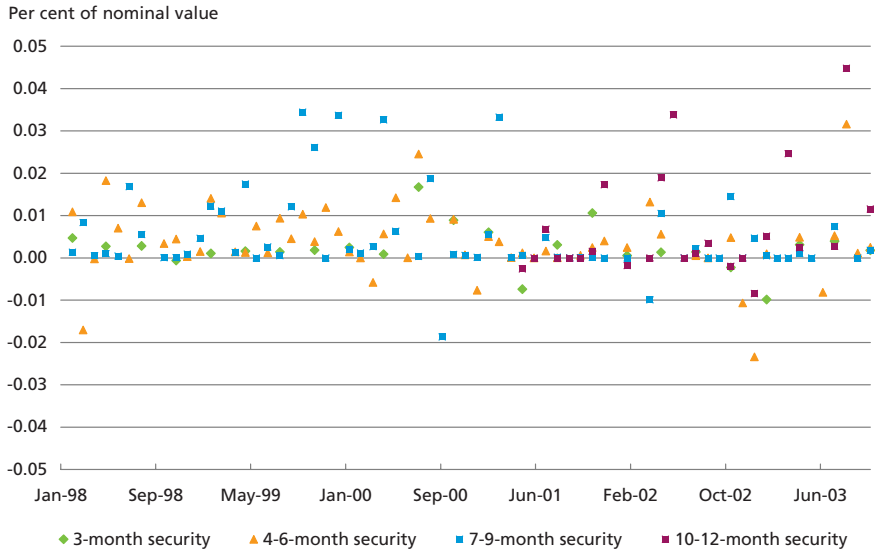
1 An overview table of empirical results is found in Sara G. Castellanos (2001), Banco de México, *A New Empirical Study of the Mexican Treasury Securities Primary Auctions: Is there more underpricing?*, Working paper.

2 Geir Høidal Bjønnes (2001a), *Winner's Curse in Discriminatory Price Auctions: Evidence from the Norwegian Treasury Bill Auctions,* SIFR research report series no. 3, Stockholm Institute for Financial Research.

3 Kjell Nyborg, Kristian Rydqvist, Suresh M. Sundaresan (2002), *Bidder Behaviour in Multi-Unit Auctions: Evidence from Swedish Treasury Auctions*, Journal of Political Economy, 2002, vol. 110, no. 2; Geir Høidal Bjønnes (2001b), Norwegian School of Management, *Bidder Behavior in Uniform Price Auctions: Evidence from Norwegian Treasury Bond Auctions,* Working paper; Matti Keloharju, Kjell Nyborg, Kristian Rydqvist (2002): *Strategic Behavior and Underpricing in Uniform Price Auctions: Evidence from Finnish Treasury Auctions,* Institute of Finance and Accounting, Working paper no. 367, London Business School.

Below, it is analysed whether underpricing occurs at Danish Treasury bill auctions. The method corresponds to the approach in other empirical studies on the subject. The cut-off price of a Treasury bill sold at auction is compared to an estimate of the bill's concurrent price in the secondary

UNDERPRICING AT TREASURY BILL AUCTIONS, 1998-2003 Chart 8.3.5




Note: Underpricing is calculated as the weighted average price of all actual trades executed on the auction day after 12:00 noon minus the cut-off price. The last observation is the auction settled in November 2003. One extreme observation was excluded (the auction of a 4-6-month security in January 1998 with underpricing of -0.08 per cent of the nominal value).

Source: The Copenhagen Stock Exchange, Danmarks Nationalbank and own calculations.

market. However, it is difficult to obtain concurrent prices in the secondary market at the time of the auction. The estimate is therefore calculated as the weighted average market price of all actual trades in the relevant Treasury bill executed after 12:00 noon on the auction day on the assumption that market movements during the auction days on average counterbalance each other. A narrower time criterion for secondary trades (e.g. only trades executed between 12:00 and 14:00) has no significant effect on the outcome.[1]

For the analysis a data set from the Copenhagen Stock Exchange providing trade information on Treasury bills was applied together with a data set with information on bids and cut-off prices at Treasury bill auctions. The analysis encompasses all auctions during the period from January 1998 to November 2003. In this period a total of 201 Treasury bill auction observations were recorded, but the number of observations was reduced to 170 as no secondary trading took place in several of the bills on the auction day (after 12:00).

Chart 8.3.5 shows the underpricing of each Treasury bill sold at auction, i.e. the secondary-market price of the bill minus its cut-off price,

[1] A narrower time interval leads to a relatively large loss of observations and reduces the power of the regression analyses below.

and it appears that underpricing predominantly occurs. The mean is 0.004 per cent of the nominal value, which is statistically significantly different from zero, cf. Table 8.3.1. The secondary-market price of Treasury bills at a nominal value of DKK 1 million immediately after an auction is thus DKK 40 higher on average than the price of the same volume at the auction. Compared to the results of similar studies of short-term government securities in other countries (and of government securities as a whole) this is a low level of underpricing, cf. Box 8.2.

**Regression analysis**

By means of linear regression it is analysed which factors may affect the level of underpricing of the securities sold at auction. The choice of explanatory variables is described in Box 8.3. The outcome of two regression analyses is presented in Table 8.3.2, columns I and II, respectively.

The remaining maturity of the Treasury bills has a positive, and significant, effect on the underpricing of the bills. This may be due to auction participants' preference for bills with a shorter remaining maturity because of their higher degree of liquidity in the secondary market. Another possible explanation is that a longer remaining maturity implies higher price volatility and thus a higher risk premium for the market participants.

A larger allotted volume of a Treasury bill sold at auction seems to entail a lower degree of underpricing. However, the effect is only significant at the 10 per cent level in one of the specifications. The negative correlation may be due to higher issuance in case of relatively aggressive bids. Bjønnes (2001b), cf. Box 8.2, finds the opposite effect in his analysis of auctions of Norwegian government bonds. In general, other studies find no significant correlation between the volume issued and the level of underpricing.

AVERAGE UNDERPRICING AT TREASURY BILL AUCTIONS, 1998-2003 — Table 8.3.1

| Per cent of nominal value | Underpricing | t-value | Observations |
|---|---|---|---|
| Auctions 1998-2003 | *** 0.004 | 4.56 | 170 |
| 1998 | 0.000 | 0.05 | 25 |
| 1999 | *** 0.007 | 4.68 | 28 |
| 2000 | *** 0.007 | 3.04 | 26 |
| 2001 | ** 0.003 | 2.23 | 34 |
| 2002 | * 0.003 | 1.91 | 29 |
| 2003 | 0.004 | 1.68 | 28 |

Note: Underpricing is calculated as the weighted average price of all actual trades executed on the auction day after 12:00 noon minus the cut-off price. The last observation is the auction settled in November 2003.
*** indicates a significance level of 1 per cent, ** of 5 per cent, * of 10 per cent.
Source: The Copenhagen Stock Exchange, Danmarks Nationalbank and own calculations.

EXPLANATORY VARIABLES IN THE REGRESSION ANALYSES Box 8.3

The regression analyses, which seek to explain the underpricing of Treasury bills at auctions, are inspired by similar analyses in the studies mentioned in Box 8.2. The regression analyses include the following variables:

- Interest-rate volatility up to the auction. Growing interest-rate volatility may increase underpricing as auction participants in periods of uncertainty assume a greater risk of market-price movements during the period from submission of bids to the announcement of allotted volumes. The interest-rate volatility is compiled as a 5-day moving average up to the auction day of the annualised standard deviation of a 3-month government zero-coupon rate.
- Number of bidders for the Treasury bill sold at auction. Fewer auction participants may lead to a higher degree of underpricing since a small number of participants increases the risk of strategic behaviour among the participants.
- Remaining maturity of the Treasury bill sold at auction. A longer remaining maturity may contribute to underpricing for several reasons. Firstly, the risk of the auction participants increases with the remaining maturity as price volatility is higher for long-term than for short-term securities. Secondly, auction participants may bid less aggressively for Treasury bills with a long remaining maturity as the outstanding amount (and the liquidity in the secondary market) is built up on an ongoing basis.
- Allotted volume of the Treasury bill sold at auction. The effect of this variable on underpricing can be either positive or negative. On the one hand, a larger allotted volume can be expected to reduce the price that the central government can obtain for the individual bill (and thus have a positive effect on underpricing). On the other hand, a larger allotted volume may reflect aggressive bids. If this is the dominating effect, the allotted volume may have a negative effect on underpricing.

In opening auctions, the volatility of interest rates has a significant positive effect on underpricing. Underpricing tends to increase with the interest-rate volatility. However, interest-rate volatility up to auctions of already opened Treasury bills has no significant effect on underpricing. Bjønnes (2001a) and (2001b) find an equivalent correlation. Other studies find a significant positive correlation between interest-rate volatility and underpricing at auctions as a whole.

A possible explanation of the positive correlation between underpricing and interest-rate volatility at opening auctions is that the pricing of a new security in a volatile market is subject to greater uncertainty than if a secondary market for the security already exists. The uncertainty related to the pricing of a new security in a volatile market may thus be reflected in less aggressive bidding and greater underpricing.

Column II in Table 8.3.2 includes a variable – the number of bidders for a Treasury bill at an auction – which can potentially approximate the competition level at auctions. However, as in other empirical studies this variable has no significant effect on underpricing.

REGRESSION ANALYSIS WITH UNDERPRICING AS DEPENDENT VARIABLE — Table 8.3.2

| Change in underpricing on a change of 1 unit in the explanatory variable, kroner per million issued | I | II |
|---|---|---|
| Constant | -6.9 | -0.2 |
| Remaining maturity of security sold at auction, months | ** 9.6 | *** 9.9 |
| Allotted volume of security, DKK billion | * -8.8 | -7.6 |
| Volatility at opening auction[1] | ** 44 | ** 43 |
| Volatility at auction[1] | -2.1 | |
| Number of bidders | | -1.7 |
| $R^2$ | 0.07 | 0.07 |
| Number of observations | 170 | 170 |

Note: The dependent variable is the underpricing variable defined in Table 8.3.1 multiplied by 10,000, corresponding to the underpricing in kroner per security sold at auction (bids are submitted for nominal units of DKK 1 million).
*** indicates a significance level of 1 per cent, ** indicates 5 per cent, * indicates 10 per cent.

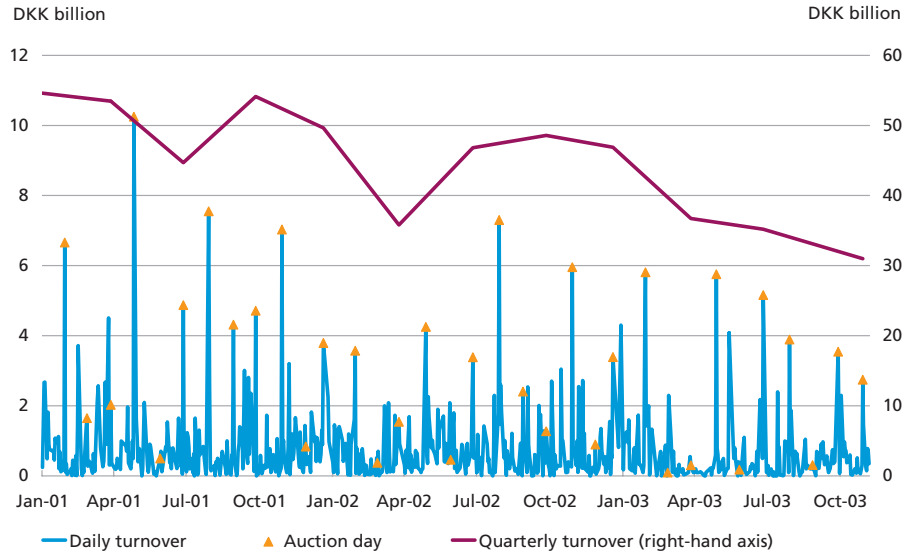
Source: The Copenhagen Stock Exchange, Bloomberg, Danmarks Nationalbank and own calculations.

[1] 5-day moving average up to the auction day of the annualised standard deviation of a 3-month government zero-coupon rate.

## SECONDARY TRADING IN TREASURY BILLS 8.4

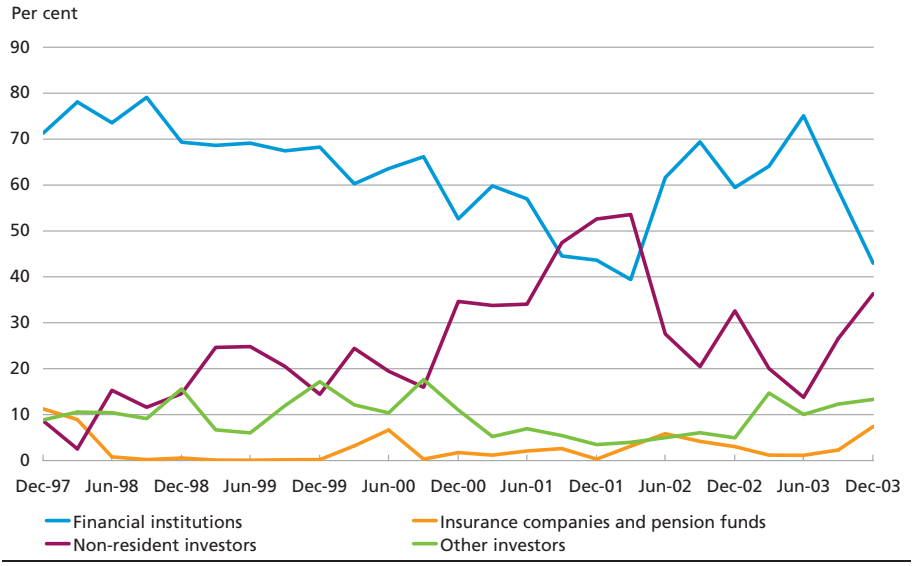
Treasury bills are an integrated part of a larger money market with a range of different instruments for short-term placements. Despite a growing outstanding amount in the Treasury bill programme in recent years the turnover of Treasury bills in absolute terms has been declining, cf. Chart 8.4.1. In the 3rd quarter of 2003 turnover relative to the outstanding amount (rate of turnover) was 0.5, corresponding to an annual

TURNOVER OF TREASURY BILLS — Chart 8.4.1




Note: The volume of Treasury bills issued at auction is not included in the turnover figures.
Source: The Copenhagen Stock Exchange, Danmarks Nationalbank and own calculations.

OWNERSHIP SHARES OF TREASURY BILLS Chart 8.4.2




rate of turnover of 2. For comparison, the annual rate of turnover of other government securities with longer maturities has been around 3 in recent years. The turnover of Treasury bills in the secondary market is supported by a market-making scheme comprising eight banks.

Most of the turnover of Treasury bills takes place immediately after the auctions when the auction participants resell bills to their customers. Since 2001, around one quarter of the turnover has taken place on the auction days.

The main investors in Danish Treasury bills are Danish financial institutions and non-resident investors. Other investors own less than one fifth of the bills, cf. Chart 8.4.2.

KAPITEL 9

# MTS Denmark and the Primary Dealer System for Danish Government Securities

## SUMMARY 9.1

Together with the market participants Government Debt Management at Danmarks Nationalbank has launched electronic trading and market-making in Danish government securities. The purpose was to enhance the efficiency of the marketplace and make it more attractive for new market participants to contribute to a well-functioning government securities market. It was necessary to modernise the Danish government securities market to ensure that it will continue to match government securities markets in other countries. An efficient government securities market is a precondition for competitive financing of the central government's borrowing requirement.

On 4 November 2003 trading opened in the wholesale market, i.e. the inter-dealer market, for Danish government securities on the trading platform MTS. Where trading previously took place predominantly via telephone, Danish government securities are now traded electronically and on the same platform as government securities from most other EU member states. The transition to MTS has increased international banks' and investors' interest in Danish government securities as well as attracted new active market participants.

Trading of Danish government securities on the MTS platform is established in a special market segment, MTS Denmark (MTSDk), on the Belgian MTS company, MTS Associated Markets (MTSAM).

A primary dealer system has been established in connection with the transition to electronic trading. The system obliges a number of banks, the primary dealers, to quote current bid and ask prices within predefined spreads and amounts.

On 1 December a price-quoting scheme took effect in the retail market for Danish government securities. A number of banks have signed an agreement with Government Debt Management at Danmarks Nationalbank. According to this agreement the banks are committed to quoting current bid and ask prices on an electronic trading platform on the Copenhagen Stock Exchange. The system has enabled members of the Co-

penhagen Stock Exchange's bond market as well as private and small investors to place orders directly, influence pricing, and execute trading in an electronic Danish government securities market.

As a consequence of the new initiatives, Danish government securities can now be traded electronically in both wholesale transactions between investment banks and retail transactions by small investors. In addition, since the autumn of 2003 Danish government securities have been traded on the international trading platforms TradeWeb and BondVision with the participation of both securities dealers and institutional investors. The result is a more efficient marketplace and enhanced transparency.

## THE PRIMARY DEALER SYSTEM FOR DANISH GOVERNMENT SECURITIES 9.2

In connection with the transition to electronic trading, a primary dealer system for Danish government securities was established.

Primary dealer systems are in place in most OECD countries. They comprise agreements which issuers conclude with a number of banks, the primary dealers, as part of an objective to ensure well-functioning wholesale markets for government securities. The primary dealer systems entail a combination of rights and obligations for the primary dealers. The aim is to give the primary dealers an obligation and an incentive to use the opportunities on the electronic trading platform and thus increase liquidity, efficiency and transparency in the market.

The key obligation is for the primary dealers to undertake efficient market-making, i.e. they must quote current bid and ask prices within predefined spreads and amounts. Market-making combined with an electronic trading system means that trades can be executed on the basis of specific pre-trade information. The key privilege is that the primary dealers are granted access to the primary market, i.e. they get the right to purchase government bonds on issuance.

Table 9.2.1 contains an overview of primary dealer systems and electronic market-making in the wholesale markets for government securities in the EU member states.

There is no international standard for primary dealer systems. In step with the internationalisation of the bond markets, especially in the euro area, there has been a tendency for greater convergence between primary dealer systems.

The primary dealer system for Danish government securities is in line with systems for government securities in other EU member states. The market-making obligation is the key obligation. The key privilege is the right to purchase government securities on issuance. Furthermore, the

ELECTRONIC MARKET-MAKING IN WHOLESALE MARKETS FOR GOVERNMENT BONDS IN EU MEMBER STATES Table 9.2.1

| | Electronic market-making | MTS/EuroMTS[2] | Primary dealer system |
|---|---|---|---|
| Belgium | Yes | Yes | Yes |
| Denmark | Yes | Yes | Yes |
| Finland | Yes | Yes | Yes |
| France | Yes | Yes | Yes |
| Greece | Yes | Yes | Yes |
| Netherlands | Yes | Yes | Yes |
| Ireland | Yes | Yes | Yes |
| Italy | Yes | Yes | Yes |
| Luxembourg[1] | No | No | No |
| Portugal | Yes | Yes | Yes |
| Spain | Yes | Yes | Yes |
| UK | Yes | No | Yes |
| Sweden | Yes | No | Yes |
| Germany | Yes | Yes | No |
| Austria | Yes | Yes | Yes |

Sources: OECD Public Debt Markets, Trends and Recent Structural Changes, 2002; OECD, Debt Management and Government Securities Markets in the 21st Century, 2002; the websites of the MTS Markets, and the websites of the government debt offices.

[1] Luxembourg's market for government bonds is of a very limited size.

[2] Alone or as one of several systems.

primary dealers are counterparties in the central government's buy-back transactions.

The launch of electronic trading on the MTS platform has, as intended, increased international banks' interest in participating actively in the Danish government securities market. Consequently, a number of new international banks have entered the market as primary dealers. From the launch of MTSDk the primary dealers were:

*ABN Amro, Amtssparekassen Fyn, Barclays Bank Plc, Danske Bank, Deutsche Bank, HSH Nordbank, JP Morgan, Morgan Stanley, Nordea Bank, Nykredit Bank, SE Banken, Svenska Handelsbanken and Sydbank.*

Primary dealer contracts for Danish securities are 1-year contracts expiring at the end of each calendar year. However, the contract concluded in 2003 on the transition to electronic trading on MTSDk runs until the end of 2004. Banks are granted primary dealer status only if there is an expectation that they are able to participate in long-term constructive cooperation on trading and disseminating Danish government securities. However, contracts can be terminated within a calendar year.

The group of primary dealers may be changed. Government Debt Management regularly evaluates the individual primary dealers' compliance with their market-making obligations and their other contributions

to a well-functioning market for Danish government securities. The purpose is to maintain the best possible group of primary dealers. For the primary dealers, the ongoing evaluation is an additional incentive to make an effort.

The evaluations are based on a broad range of criteria in order to take each primary dealer's overall contribution to a well-functioning market into account. The primary dealers are not classified according to narrow

THE MTS SYSTEM AND ITS SET-UP Box 9.1

MTS is an abbreviation of Mercato dei Titoli di Stato, which means "market for government bonds". The MTS system is a system for electronic trading based on the electronic trading platform Telematico. Today MTS is the dominating system for wholesale trading of European benchmark bonds. Most EU member states have implemented MTS solutions.

MTS S.p.A. is the company that administers Telematico. The company was founded in Italy in 1988 and privatised in 1997. Today it is owned by around 60 major international financial institutions.

Markets using MTS solutions are operated by MTS companies established for that purpose. Contrary to MTS S.p.A. these companies are so-called utilities, i.e. their purpose is not to generate a profit for the owners but to create the best and least expensive terms for trading in government securities. MTS S.p.A. makes the MTS trading platform available to the MTS companies free of charge in return for an ownership share of 20 per cent. The individual MTS companies determine the market structure, income structure, decision-making processes, etc. MTS S.p.A. does not participate in decisions concerning market structure, etc. not directly relating to technical changes of the MTS system. The companies' income consists of fixed membership contributions from all market participants as well as variable transaction costs paid by the market participants undertaking the transactions. The costs mainly consist of payments to MTS S.p.A. for consumption of computer capacity, i.e. cpu time. These are variable costs depending on how many changes – price changes, deals, etc. – the market participants make in the market. However, MTS S.p.A. is ensured a certain minimum payment for each financial year.

EuroMTS, the platform for trading in the largest European benchmark bonds (intended minimum outstanding amount of EUR 5 billion), is today fully owned by MTS S.p.A.

An MTS solution for trading in government securities can be made either by establishing a new independent MTS company or by setting up a new market segment on an existing MTS company.

Danish government securities are traded in a market segment, MTSDk, on the Belgian MTS company, MTSAM.

The recent development has been towards establishing more market segments on existing companies. In recent years market segments for Irish and Austrian government securities have been set up on EuroMTS, and the Belgian MTSAM includes segments for Belgian, Finnish and now also Danish government securities. The advantage of having several market segments on one company is e.g. that the market segments share the administration costs.

arithmetic criteria inter alia because this may lead to the wrong incentives, e.g. to arrange sales and buy-backs of securities solely to increase turnover.

Box 9.1 describes the MTS system, including MTS companies and market segments.

The establishment of the primary dealer system as well as electronic trading and market-making in Danish government securities is the result of close cooperation between Government Debt Management and the above-mentioned banks. Issues concerning the MTS platform for Danish government securities, MTSDk, and the Danish government securities market are discussed by Government Debt Management and the primary dealers in the so-called Primary Dealer Committee. Representatives from EuroMTS/MTS S.p.A. and the MTSAM administration also attend the Committee meetings e.g. to contribute technical know-how about the MTS system and report on developments in other MTS companies and MTSAM segments.

## MTSDk 9.3

Wholesale trading in Danish government securities takes place on MTSDk, a market segment on the Belgian MTS company, MTS Associated Markets, MTSAM. Section 9.4 describes MTSAM and explains how MTSDk is included in MTSAM.

### MTSDk participants

The following types of participants may operate on MTSDk:

- Government Debt Management at Danmarks Nationalbank
- Primary dealers in Danish government securities
- Market dealers (price takers), cf. below.

Government Debt Management participates in the market when undertaking issuance and buy-backs on behalf of the central government.

As mentioned, the primary dealers have an obligation to undertake market-making, i.e. to quote current bid and ask prices within predefined spreads and amounts. Besides quoting prices, which might generate trades, primary dealers may trade directly on the prices quoted by other primary dealers.

Market dealers are securities dealers who are not primary dealers but who may also trade directly on MTSDk. Market dealers cannot enter bid and ask prices in the system. However, they do have access to information on prices and market depth, and they may trade on the bid and ask prices quoted in the market. In this way the market dealers contribute to

a well-functioning market where government securities are marketable and subject to efficient pricing. The presence of market dealers entails a further incentive for the primary dealers to provide tighter bid and ask spreads in order to obtain a larger proportion of the trades.

In MTSDk as in other MTS systems the participants must be well-reputed institutions known in the market. They must comply with the current statutory requirements for operating as a securities dealer.

**Securities traded on MTSDk**

All government securities of the type bullet loans with a remaining maturity of more than 13 months are traded and included in the market-making on MTSDk. As regards the market-making requirements, a distinction is made between two groups of securities:

- Benchmark and on-the-run securities
- Other.

On 1 February 2004 the following securities are included in the market-making:

Benchmark and on-the-run securities:

4 per cent Treasury notes 2005
3 per cent Treasury notes 2006
4 per cent bullet loans 2008
5 per cent bullet loans 2013

Other:

5 per cent bullet loans 2005
8 per cent bullet loans 2006
7 per cent bullet loans 2007
6 per cent bullet loans 2009
6 per cent bullet loans 2011
7 per cent bullet loans 2024

Setting of the benchmark securities in the 2-, 5- and 10-year segments is determined and published by Government Debt Management after discussion in the Primary Dealer Committee. New on-the-run securities are included in the market-making when they reach an outstanding amount of at least DKK 5 billion.

Market-making by primary dealers in benchmark and on-the-run securities is subject to stricter requirements. All primary dealers must undertake market-making in these securities. As regards other securities on MTSDk, each security must be included in the market-making of at least five primary dealers. However, in practice primary dealers undertake market-marking in virtually all securities on MTSDk. As regards both on-

the-run/benchmark securities and other securities, each primary dealer must undertake market-making for at least five hours a day. After discussions in the Primary Dealer Committee, the market-making requirements may be adjusted on the basis of the market development and the current experience with the system.

On MTSDk, like on other MTS systems it is possible to establish trading in other government securities than those comprised by market-making, e.g. Danish government securities with a remaining maturity of less than 13 months. As appears from Box 9.2 these government securities can be traded in a separate sub-segment in connection with the central government's buy-backs.

After the transition to MTSDk, Danish government securities are still listed on the Copenhagen Stock Exchange and registered at VP Securities Services.

**Trading and pricing on MTSDk**

Primary dealers can – and typically will – provide tighter bid-ask spreads and venture larger amounts than required by the primary dealer contract. A deal is automatically executed if the system receives matching bids and offers in multiples of DKK 20 million.

All market participants have constant access to information on the five best prices in the market and on the corresponding market depth. Best prices are set on the basis of bids and offers in multiples of DKK 20 million.

Trading takes place on a no-name-give-up basis. Best-price information thus does not reveal the source of the bid/ask prices. The identity of the counterparty is not revealed to the dealers until the deal is closed.

As mentioned, market dealers can only trade on the prices quoted by the primary dealers. Besides quoting prices the primary dealers may also trade on prices quoted by others, i.e. they can act as market dealers.

**Market information**

According to the same rules as previously, members of the Copenhagen Stock Exchange's bond market are obliged to report their trades including trades closed on MTSDk.

MTSDk has enhanced transparency in the Danish government securities market. In contrast to previously, specific pre-trade information is now available concerning prices and volumes for trading. MTSDk participants have access to this information directly via the links to MTSDk. Furthermore, the pre-trade information is publicly accessible, against a fee, in real time via international market news services. MTSDk's website, www.mtsdenmark.com, offers free access to pre-trade information with

THE CENTRAL GOVERNMENT'S ISSUANCE AND BUY-BACKS ON MTSDk Box 9.2

The primary dealers are counterparties for the central government's transactions on MTSDk.

**Issuance**

The central government's issuance takes place on MTSDk, primarily as tap issuance, i.e. issuance in the secondary inter-dealer market. The central government sells at the best bid price in the market, i.e. the central government acts as market dealer. The market-making ensures that prices are quoted on an ongoing basis within predefined spreads and amounts. As primary dealers compete with each other, the bid-ask spreads are in practice tighter than required under the primary dealer contracts.

New central-government issues are opened in a specific sub-segment on MTSDk. In this sub-segment the central government may enter ask prices and volumes in the system, so in this case the central government does not act as market dealer. In the time up to the opening the primary dealers may enter their bid prices and volumes in the system. These bids form the demand curve at the opening. Shortly before the time of the opening Government Debt Management informs the primary dealers of the size of the initial offer and the maximum sale on the day. At the time of the opening the central government enters its initial combination of ask price and volume. The primary dealers' bids at and above the central government's ask price are then executed as deals at the respective bid prices, i.e. multiple pricing. If the central government does not sell the total volume offered, it may choose to remove the remainder from the system. On the opening day, after the initial sale, the central government may also continue to enter ask prices and volumes into the system. As from the day following the opening, additional issuance in the newly opened security takes place as tap issuance with the central government as market dealer. The first opening in this system took place on 13 January 2004 with the opening of 3 per cent Treasury notes 2006.

**Buy-backs**

The central government's buy-backs in securities with market-making on MTSDk are executed at the best ask price in the market. In addition, the central government purchases securities for the Social Pension Fund's portfolio.

There is no market-making in securities with a remaining maturity of less than 13 months. For these securities the central government conducts buy-backs in a specific sub-segment where the central government may continuously enter bid prices and volumes. In the same way primary dealers can enter their ask prices and volumes. The primary dealers' ask prices at and below the central government's bid price will be executed. Government securities may be open for buy-back in the specific segment from when the remaining maturity reaches 13 months and until maturity.

a lag of 15 minutes. This facility is not available on any other MTS system. The pre-trade information from MTSDk together with the pre-trade information from the new retail market for government securities, cf. Section 9.6, has ensured a degree of transparency in all segments of the Danish government securities market that is unique in an international context.

Trading statistics on MTSDk are accessible via the MTSDk website. The statistics comprise e.g. information on turnover and prices (highest, lowest and average) of each security on the previous trading day. Historic overviews of turnover on MTSDk[1] are also available.

**Clearing and settlement**

Since the launch on 4 November 2003 trades on MTSDk have been cleared and settled via VP Securities Services (VP). A specific VP solution has been developed with a so-called central clearing instruction. When a deal is closed between two parties on MTSDk, the MTS system submits the relevant information to VP and the transaction is immediately included in the clearing. Central clearing instruction is a standard feature on MTS systems.

Securities dealers who have not previously used VP have had to register with VP as participants. In practice, the new participants have linked up to VP via one of the banks that are already registered with VP and that offer this custody service.

In most MTS systems the dealers can choose from different clearing houses that compete directly with each other. Work is in progress on making it possible on MTSDk to choose from different clearing houses in addition to VP, including one or more large international clearing houses.

## MTS ASSOCIATED MARKETS (MTSAM) 9.4

As mentioned MTSDk is a market segment on MTSAM. MTSAM is an MTS company registered in Belgium and subject to Belgian supervision. In 2002 the original Belgian MTS company, MTS Belgium, was converted into MTSAM when a new market segment for trading in Finnish government securities was established. MTSAM then consisted of two market segments – one for Belgian and one for Finnish government securities – and a shared administration. The company structure remained unchanged. The owners were still primary dealers in Belgian government securities, the Belgian government debt management and MTS S.p.A.

In connection with the establishment of the new segment for Danish government securities, the primary dealers in Danish government securities requested joint ownership of MTSAM. The previous owners chose to comply with this request, and work was initiated to create a new company structure. The new MTSAM structure should be able to incorporate

[1] The Copenhagen Stock Exchange releases market statistics on the Danish government securities market based on information from dealers subject to a reporting requirement.

THE PRINCIPLES UNDERLYING THE COMPANY STRUCTURE IN MTSAM Box 9.3

The fundamental principle of the new MTSAM structure has been that each market segment should have virtually the decision-making competence they would have had as independent MTS companies.

This means e.g. that each market segment takes care of its own expenses and any profit is distributed within each segment.

**Organisational structure and decision-making competence**

- *The board of directors*: Makes major strategic decisions on issues concerning all market segments. May point out to market segments if their budgets seem unrealistically optimistic. The board of directors consists of six representatives from each of the market segments of which the primary dealers are co-owners, one representative from the Belgian government debt management, and two representatives from MTS S.p.A.
- *The market committees*: For each market segment there is a market committee consisting of representatives from the government debt management, the primary dealers and MTS S.p.A. Furthermore, a representative from the administration of MTSAM will always be present at the market committee meetings. As regards MTSDk, the market committee and the Primary Dealer Committee coincide. The market committees, like the independent MTS companies, determine their respective rules for market structure, income structure, decision-making competence, etc. In addition, the market committees determine how any profit in the segment is to be distributed – as return on shares and/or reduced transaction costs.

**Ownership structure**

The shares are divided into classes, each market segment having its own class of shares. Each class of shares is divided into three subclasses: For primary dealers, for MTS S.p.A. and for government debt management offices. However, shares for MTSDk are divided into two classes as Government Debt Management at Danmarks Nationalbank has refrained from ownership. It is not compulsory for primary dealers in Danish government securities to hold shares, but so far everybody has chosen to do so.

Except for MTS S.p.A that owns 20 per cent of the shares for each market segment, no shareholder can own more than 10 per cent of the share capital in MTSAM.

the new group of owners and also prepare the company to include future market segments with co-ownership. The principles of the new company structure are described in Box 9.3.

MTSAM is today the only MTS company that has already been prepared to offer opening of new market segments with co-ownership.

The day-to-day administration of MTSAM is based in Brussels and is undertaken by a staff of four. This administration handles e.g. the daily contact with MTS S.p.A., the setting-up of the trading system in accordance with the requirements of various market segments, and the preparation of trading statistics. In addition, the administration helps to

prepare the meetings of the various market segments' market committees, cf. Box 9.3. At least one representative from the administration always attends these meetings, e.g. to contribute technical know-how and report on the situation in other market segments of MTSAM.

## THE FIRST MONTHS' EXPERIENCE WITH MTSDk 9.5

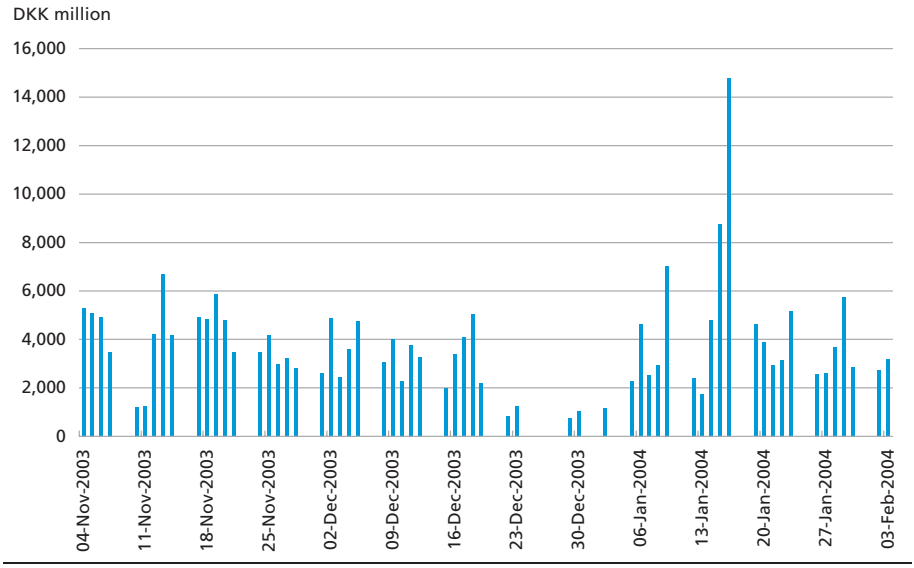
All primary dealers – national or international, large or small – were active in the market from the start of MTSDk. The technical features worked from the start, including both the trading system and the clearing and settlement procedure.

In the period until 3 February 2004 the average daily turnover on MTSDk was nearly DKK 4 billion[1], which is considered satisfactory in particular considering: Firstly, November was a "grace period" on MTSDk, i.e. a start-up period with no compulsory market-making, to allow the market participants to adjust to the new market. Secondly, trading in government securities in December is usually lower than in the other months of the year.

The distribution of turnover on primary dealers is shown in Chart 9.5.2.

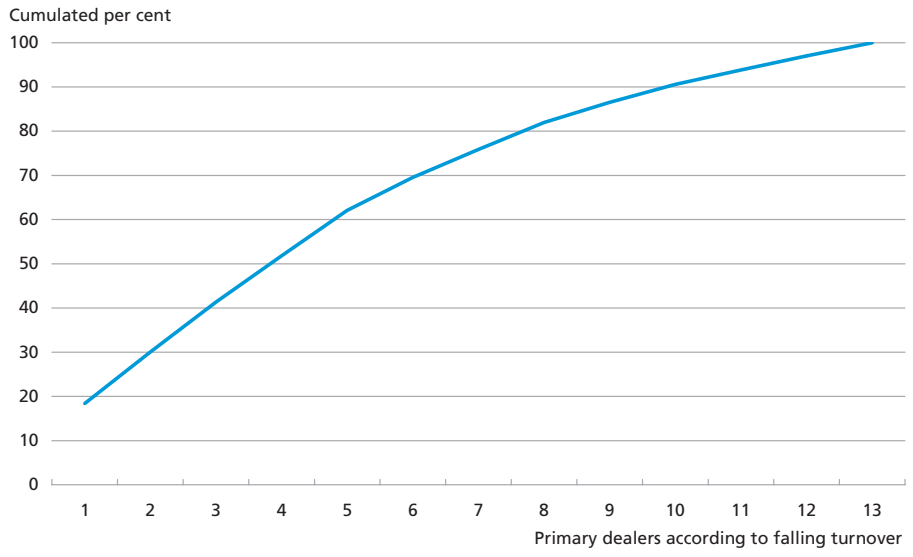
As can be seen, the six most active primary dealers account for approximately 70 per cent of the total primary dealer turnover.

TURNOVER ON MTSDk Chart 9.5.1




[1] As described in Box 9.2 opening of new government securities takes place in a separate sub-segment. On 13 January 2004 the central government opened 3 per cent Treasury notes 2006. Sales on the opening day totalled DKK 8 billion. This amount is not included in the daily turnover.

DISTRIBUTION OF PRIMARY DEALERS' TURNOVER ON MTSDk Chart 9.5.2




Note: Based on data from the period as from 4 November 2003 until 3 February 2004.

The new market participants joining in connection with the launch of MTSDk have in total contributed more than one third of the total turnover.

Both trading volume and market depth have increased since the start of MTSDk, and the bid-ask spreads are tighter than previously in the Danish government securities market. At the same time, activity in the market is generated by a larger number of active participants.

## ELECTRONIC TRADING IN ALL SEGMENTS OF THE DANISH GOVERNMENT SECURITIES MARKET 9.6

The MTSDk development process has contributed to boosting electronic trading in all segments of the Danish government securities market.

### Electronic trading platforms with the participation of securities dealers and institutional investors

Within a few months during the autumn of 2003 Danish government securities started trading on MTSDk, TradeWeb, and BondVision. As mentioned above, MTSDk is an inter-dealer platform, i.e. a wholesale market for trading between investment banks. TradeWeb and BondVision are leading international electronic dealer-to-customer platforms where investment banks quote prices in e.g. government securities to large customers including institutional investors.

The establishment of MTSDk has entailed a positive effect in that international banks and investors show greater interest in Danish government securities because they are now traded in the same way as government securities from most other EU member states. Major investment banks operating in Europe already use the MTS system and, can therefore now trade in Danish government securities without additional system costs. This has also paved the way for the inclusion of Danish government securities in large international electronic dealer-to-customer platforms. Banks' electronic quoting in inter-dealer markets is linked to their quoting in dealer-to-customer markets. Thus, MTSDk has facilitated trading in Danish government securities in the dealer-to-customer systems and reduced the costs. Like investment banks large investors have easier access to trade in Danish government securities when they are traded in the same way as government securities from other countries.

The market structure in the dealer-to-customer platforms differs from the set-up in the inter-dealer markets. For example, there is no market-making in the form of compulsory current quoting. The actual quoting is done by the quote-on-request where securities dealers offer prices on the basis of explicit trading interest from a customer or another securities dealer.

**Price-quoting scheme on the retail market for Danish government securities**

On 1 December 2003 a new price-quoting scheme was introduced. The scheme makes it possible for members of the Copenhagen Stock Exchange's bond segment as well as private and smaller investors to place orders themselves, influence pricing and execute deals in an electronic market for Danish government securities.

Government Debt Management has signed an agreement with the following six banks:

*Amtssparekassen Fyn, Danske Bank, Jyske Bank, Nordea Bank, Nykredit Bank and Sydbank,*

whereby the banks are obliged to quote current bid and ask prices within the predefined spreads and for DKK 3 million per security per bank. The agreement comprises the Danish government securities included in the market-making on MTSDk.

The group of banks may be changed. On a current basis evaluations are undertaken on how the banks comply with the market-making obligations. The price-quoting scheme is established on the Copenhagen Stock Exchange and is based on an extension of the Saxess trading sys-

tem. According to an agreement with Government Debt Management, the Copenhagen Stock Exchange undertakes the day-to-day administration and monitoring of the scheme. The trading system is open for all members of the Copenhagen Stock Exchange's bond market. Private and small investors have access via their bank or securities broker.

The price-quoting scheme is unique in an international context as it enables private and small investors to trade government securities in a way which is in principle the same as in the wholesale markets. The banks' price quoting means that the investors have access to specific pre-trade information concerning actual prices for trading. Another similarity with the wholesale market is that the investors may themselves place orders in the trading system and thus both execute deals and influence the pricing in the market[1]. The size of an order can be as little as DKK 0.01. Orders of nominally DKK 1,000 or more may influence the price. The trading functionality is so-called automatch, i.e. when the trading system registers two orders which may match a deal will automatically be executed – without e.g. the bank confirming the deal.

Overall, the initiatives regarding MTSDk and the new price-quoting scheme have entailed that Danish government securities can now be traded electronically whether in wholesale market transactions or retail transactions by small investors. The result is more efficient markets where the trading costs have been reduced and the transparency enhanced.

[1] However, private investors have to gain access via a link at their bank or securities broker.

CHAPTER 10

# Re-lending to Danish Ship Finance

## SUMMARY 10.1

In 2003 Danish Ship Finance (DSF) gained access to a central-government re-lending facility in connection with adoption by the Folketing (Parliament) of a temporary operating aid for Danish shipyards.

As an agent for the Ministry of Finance within the central-government debt area, Government Debt Management at Danmarks Nationalbank undertakes re-lending to DSF. The re-lending facility is subject to a system of agreements broadly similar to the system applying to government-guaranteed entities.

Re-lending to DSF can be in kroner or dollars. Re-lending is granted as fixed-rate serial loans with a maturity of up to 12 years. The interest rate on re-lending in kroner corresponds to the central government's borrowing rate. It is calculated by use of the zero-coupon yield curve for government securities estimated on the basis of the market prices of existing government securities. Thus lending to DSF reflects the terms of the central government's borrowing. When re-lending is in dollars the central government moreover transacts a swap from kroner to dollars converting underlying krone-denominated re-lending to dollar-denominated re-lending. The dollar payments in the swap offset the dollar payments in connection with re-lending, whereby the central government has no net exposure in dollars in connection with re-lending in dollars.

In connection with re-lending, DSF may enter into a forward contract with the central government to lock the interest rate on the re-lending for a period of up to three years before disbursement of the re-lending. DSF can redeem re-lending before maturity and terminate re-lending in the forward contract period at market value. Re-lending is uncallable without any option elements, e.g. redemption at par.

The central government finances re-lending to DSF by issuing domestic government securities as for re-lending to government-guaranteed entities.

## BACKGROUND 10.2

On 24 April 2003 the Folketing (Parliament) passed the Danish Act on temporary contract-related operating aid for the building of certain types of ships. The Act provides for operating aid for the building of certain types of ships at Danish shipyards, if the contracts are entered into in the period as from 1 January 2003 until 31 March 2004, cf. Box 10.1.

According to the explanatory notes to the Bill, co-financing by Danish Ship Finance is a precondition for operating aid from the central government, cf. the description of DSF in Box 10.2. On this basis, the Ministry of Economic and Business Affairs, on behalf of the central government, and DSF on 13 June 2003 concluded an agreement granting DSF the exclusive right, against a fee to the central government, to administer the scheme of CIRR financing (Commercial Interest Reference Rate) for shipbuilding, cf. Box 10.3. As part of the transfer of the CIRR scheme, DSF gains access to a central-government re-lending facility where DSF can borrow at an interest rate corresponding to the central government's borrowing rate. DSF uses re-lending to finance CIRR loans for shipbuilding at Danish shipyards.

ACT ON TEMPORARY CONTRACT-RELATED OPERATING AID FOR BUILDING OF CERTAIN TYPES OF SHIPS Box 10.1

The following are extracts from the explanatory notes to the Bill for the "Act on temporary contract-related operating aid for building of certain types of ships":

"As the European Commission has not achieved a voluntary agreement with Korea on fair and transparent competitive terms in the global shipbuilding market, the Council of the European Union as a countermeasure against Korean competition, decided temporarily to reopen access to state aid for newbuildings at shipyards, if the contracts are concluded up to and including 31 March 2004."

"Based on the global competitive situation […] it is expected that several shipbuilding EU member states will reintroduce state aid for the shipbuilding industry […]. Thus, it is proposed to introduce the temporary contract-related operating aid for building of certain types of ships as from 1 January 2003 up to and including 31 March 2004 to protect the Danish shipbuilding industry from distortion of competition from the shipbuilding industries in the closest EU competitor member states."

"A precondition for the central government's participation in the scheme has been that a voluntary agreement is concluded between the central government and Danish Ship Finance to the effect that Danish Ship Finance co-finances the aid. The central government's contribution to the financing is maximum DKK 325 million[...]".

DANISH SHIP FINANCE Box 10.2

Danish Ship Finance (DSF) is a private independent institution established in 1961 under the Danish Act on a Ship Finance Institute, which was most recently amended in 2002. The objective of DSF is to carry out ship financing activities including financing of newbuildings and conversion of ships as well as purchase, sale and refinancing of ships.

DSF grants loans against collateral. DSF's lending activities are predominantly financed by issuing krone-denominated bonds that are bullet loans. DSF's new-lending primarily consists of dollar loans. DSF transacts swap agreements to hedge differences in interest-rate and currency exposure between DSF's lending and borrowing to finance the lending activities.

DSF's capital and reserves serve as collateral for DSF's obligations. At the close of 2002 capital and reserves totalled DKK 8.3 billion of which DKK 300 million is guarantee capital subscribed by a number of guarantors. The guarantors include Danmarks Nationalbank, Danish banks and insurance companies as well as Danish shipowners and shipyards. DSF is rated Aa3 by Moody's.

DSF is governed by a Board of Representatives, a Board of Directors and a Management Board. The members of the Board of Representatives are appointed by Danmarks Nationalbank, the Danish Bankers' Association, the Danish Insurance Association, the Danish Shipowners' Association and the Association of Danish Shipbuilders.

Information on DSF is available on DSF's website, www.skibskredit.dk.

## AGREEMENTS REGARDING RE-LENDING TO DSF 10.3

The re-lending facility for DSF comprises three agreements: the agreement between the Ministry of Economic and Business Affairs and DSF, an agreement between the Ministry of Finance and DSF, and an agreement between the Ministry of Finance and Danmarks Nationalbank that participates in the re-lending scheme for DSF in its capacity of agent for the Ministry of Finance within the central-government debt area.

On the whole, the agreements correspond to the agreements for government guarantees and re-lending to government-guaranteed entities, cf. Chapter 7.

### Agreement between the Ministry of Economic and Business Affairs and DSF

The agreement between the Ministry of Economic and Business Affairs and DSF lays down the terms of the transfer of the CIRR scheme to DSF and the terms for DSF's CIRR lending to shipowners in connection with contracting of ships at Danish shipyards, cf. Box 10.3.

According to the agreement, DSF gains access to central-government re-lending in kroner or dollars at a fixed interest rate corresponding to

CIRR SHIP FINANCING Box 10.3

**CIRR ship financing in brief**

CIRR ship financing is officially supported export credits for shipbuilding covered by the OECD-wide terms stipulated in the OECD agreement "Arrangement on Guidelines for Officially Supported Export Credits" of 2002.

The OECD agreements stipulate specific guidelines for officially supported export credits for ships. According to the arrangement, CIRR is the minimum interest rate to be applied in connection with officially supported financing of shipbuilding. CIRR is usually fixed as the government bond yield in the relevant maturity segment plus 1 percentage point.

**The Danish scheme for CIRR ship financing**

Within the EU only officially supported export credits for ships complying with the terms of the OECD agreement are approved. On 28 November 2003 the European Commission approved the Danish scheme for CIRR financing, and the scheme became effective as from 15 December 2003.

DSF's CIRR lending to shipowners is granted as fixed-interest serial loans with biannual redemptions of equal size. The maturity fixed in advance can be up to 12 years from the shipyard's delivery of the ship to the shipowner.

As part of the transfer of the CIRR scheme DSF gains access to a government re-lending facility whereby DSF may borrow at an interest rate corresponding to the central-government borrowing rate. The re-lending to DSF is used to finance DSF's CIRR lending to shipowners contracting for shipbuilding and conversion of ships at Danish shipyards within the framework of the OECD terms concerning CIRR financing in the shipbuilding area. DSF lends to shipowners at an interest rate corresponding to the re-lending rate plus a margin determined by DSF. However, shipowners' interest rate on loans can never be lower than the OECD CIRR interest rate at the time of interest-rate fixing.

DSF pays the central government a fee for obtaining the exclusive right to administer the CIRR financing scheme. DSF's fee to the central government and the volume of re-lending are calculated on the basis of the volume of actual newbuilding contracts at Danish shipyards as from 1 January 2003 until 31 March 2004. Only contracting for ships covered by operating aid under the Danish Act on temporary contract-related operating aid for building of certain types of ship, where the ships are delivered three years after the final contract date at the latest, are included in the basis of calculation. The maximum volume of re-lending to DSF is DKK 18 billion. DSF's fee to the central government at the maximum volume of re-lending is DKK 250 million. Re-lending for disbursement within a single year may be up to DKK 8 billion.

Re-lending may be granted until 31 December 2012. DSF can lock the interest rate on the re-lending for a period of up to three years before disbursement of the re-lending by entering into a forward contract with the central government. Disbursement of re-lending may thus take place until 31 December 2015.

the central-government borrowing rate. The agreement also describes the conditions for access to the re-lending facility and the volume of central-government re-lending.

The CIRR financing scheme and the temporary operating aid for the shipbuilding industry are administered by the National Agency for Enterprise and Housing. Thus, the National Agency for Enterprise and Housing must approve the actual shipbuilding projects for loans at the CIRR rate, where re-lending to DSF can be undertaken.

**Agreement between the Ministry of Finance and DSF**
The detailed terms for the re-lending facility, including determination of the re-lending rate, cf. below, are laid down in the agreement between the Ministry of Finance and DSF. When requesting re-lending DSF must submit a copy of the National Agency for Enterprise and Housing's approval of eligibility for re-lending.

**Agreement between the Ministry of Finance and Danmarks Nationalbank**
In an agreement between the Ministry of Finance and Danmarks Nationalbank, Danmarks Nationalbank, as an agent for the Ministry of Finance within the central-government debt area, is authorised to grant re-lending to DSF on behalf of the Ministry of Finance.

## STRUCTURE AND PRICING OF RE-LENDING 10.4

In line with DSF's CIRR loans to shipowners, re-lending is granted to DSF as fixed-rate serial loans in kroner or dollars with biannual redemptions of equal size, and with a fixed maturity of up to 12 years.

DSF can enter into a forward contract with the central government to lock the interest rate on re-lending for a period (forward contract period) of up to three years before disbursement of the re-lending. The interest rate on the re-lending is fixed on the date of conclusion of the forward contract (contract date). The re-lending principal is disbursed to DSF on expiry of the forward contract period. DSF then repays re-lending at the interest rate fixed on the contract date.

**Construction and determination of interest rate on re-lending in kroner**
The interest rate on re-lending in kroner to DSF is calculated by use of the zero-coupon yield curve for domestic government securities estimated on the basis of the market prices of existing government securities.

On the day of fixing the interest rate (contract date), the interest rate on the re-lending is fixed so that the present value of the principal disbursed equals the present value of interest and redemptions. This corresponds to fixing the interest rate on the contract date so that the price

ILLUSTRATION OF CALCULATION OF INTEREST RATE ON RE-LENDING IN KRONER Box 10.4

This Box illustrates the calculation of the interest rate on re-lending to DSF. This is a calculation example, so no agreement is entered into on the re-lending in question.

In the calculation example, it is assumed that an agreement is entered into 20 November 2003 on 10-year re-lending in kroner of DKK 100 million where the principal is to be disbursed on 20 May 2005. Consequently, a forward contract is entered into for a period of 1½ years as from 20 November 2003 until 20 May 2005.

The present value on the contract date of the principal disbursement is calculated by discounting the principal disbursement on 20 May 2005 using the zero-coupon yield on 20 November 2003 for a remaining maturity of 1½ years, which is 2.64 per cent. The present value of the principal disbursement is thus: $100/(1 + 0.0264)^{1.5}$ = DKK 96.167 million.

The interest rate on the re-lending is fixed so that the present value of interest and redemptions on the re-lending equals DKK 96.167 million. There is a total of 20 payments (interest and redemptions) in a 10-year serial loan with biannual payments. The present value of interest and redemptions can be expressed as:

$b_1/(1 + r_1)^2 + b_2/(1 + r_2)^{2.5} + \ldots + b_{20}/(1 + r_{20})^{11.5}$

where $b_i$ is the *i*th interest payment and redemption and $r_i$ is the annual zero-coupon yield for the *i*th payment for i = 1, 2,…,20 on 20 November 2003.

Redemption on each payment date amounts to 100/20 = DKK 5 million. The interest payment on the *i*th payment date is given as $(c/2)\cdot(1 - (i-1)/20)\cdot$DKK 100 million, where c is the annual (coupon) interest rate on the re-lending. The annual interest rate is divided by 2, because interest is paid on a biannual basis. The *i*th interest and redemption payment, $b_i$, is thus given as $5 + (c/2)\cdot(1 - (i-1)/20)\cdot$ DKK 100 million. When the interest rate on re-lending, c, is fixed at 4.64 per cent the present value of interest and redemptions totals DKK 96.167 million, equal to the present value of the disbursement of principal. Thus the interest rate of the re-lending is fixed.

of the re-lending on the disbursement day (calculated on the contract date) is 100, cf. Box 10.4.

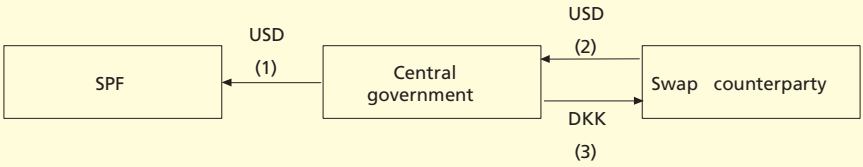
The central government finances the disbursement of re-lending to DSF by issuing on-the-run securities in the year of disbursement.

**Construction and determination of interest rate on re-lending in dollars**

For re-lending in dollars, (underlying) re-lending in kroner is converted to re-lending in dollars by the central government transacting a currency swap from kroner to dollars with a swap counterparty at market terms. The swap payments correspond to the central government lending kroner to the swap counterparty against borrowing dollars that are forwarded to DSF as re-lending in dollars. The dollar payments in the swap correspond to the dollar payments in the re-lending. The krone interest rate in the swap is determined as the interest rate on the underlying re-lending in kroner where the payment days are the same as for the dollar

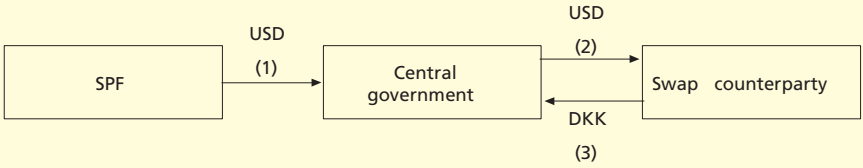
PAYMENTS IN CONNECTION WITH RE-LENDING IN DOLLARS Box 10.5

Payments in connection with re-lending in dollars are shown in the Chart below.




The disbursement from the central government to DSF of re-lending in dollars is stated as (1) in the Chart. The disbursement of re-lending corresponds to the swap counterparty's disbursement of principal in dollars to the central government, (2). On the contract date the value of the central government's payment of principal in kroner to the swap counterparty (3) corresponds to the value of the payment of principal in dollars from the swap counterparty. The exchange of principal in the swap takes place on the same day as the re-lending is disbursed to DSF. The central government finances the disbursement of re-lending to DSF by issuing domestic government securities. DSF lends the re-lending proceeds to the shipowners contracting for newbuildings and conversions at Danish shipyards at CIRR plus a margin set by DSF.

The ongoing payments in connection with re-lending in dollars are shown in the Chart below.




Interest and redemptions on re-lending in dollars from DSF to the central government are stated as (1) in the Chart. Interest and redemptions on re-lending correspond to interest and redemptions in dollars that the central government pays to the swap counterparty (2). The ongoing payments in kroner from the swap counterparty to the central government are stated as (3).

re-lending. The dollar interest rate is then determined upon entering into the swap agreement with the swap counterparty so that the value of the dollar payments corresponds to the value of the payments in kroner. When entering into a forward contract on re-lending in dollars the central government enters into the swap agreement on the same date as it enters into the forward contract. Exchange of principal in the swap takes place on expiry of the forward contract period on the day of disbursement of re-lending to DSF.

From the point of view of the central government the dollar payments in the swap offset the dollar payments in connection with the re-lending

to DSF. Thus the central government has no dollar exposure in connection with re-lending in dollars. Like re-lending in kroner, the central government finances re-lending in dollars by issuing domestic government securities in the year of disbursement of the re-lending. The payments in connection with re-lending in dollars are illustrated in Box 10.5.

The central government's borrowing terms are transferred to DSF since the swap interest rate in kroner is determined as the calculated government-security interest rate in the underlying re-lending in kroner. In addition, the re-lending interest rate is determined on the basis of the central government's swap terms. If the central government transacts swaps on more favourable terms than DSF the dollar interest rate in the swap will be lower than if DSF had transacted the swap.

**Early redemption of re-lending and termination of forward contract**

DSF can redeem re-lending before maturity and terminate re-lending in the forward contract period at market value. Re-lending is uncallable without any option element, e.g. redemption at par. In connection with re-lending in dollars this implies that the costs of terminating the swap are borne completely by DSF.

Furthermore, DSF can change the forward contract period. The period can be changed only if the expected delivery date of the ship in question is changed. In connection with changing the forward contract period, the market value of the original forward contract is included in the interest rate on the re-lending under the new forward contract.

## IMPLICATIONS FOR GOVERNMENT DEBT MANAGEMENT 10.5

As with re-lending to government-guaranteed entities, the central government finances re-lending to DSF by issuing domestic government securities in the year of disbursement of the re-lending.

Re-lending and forward contracts in connection with re-lending to DSF are taken into account in the management of duration, as is the case for re-lending to government-guaranteed entities. A forward contract with DSF implies that the central government gets a liability with a duration corresponding to the duration of the forward contract according to the central government's commitment to disburse the re-lending on expiry of the forward contract period. At the same time, the central government receives an asset with an interest-free and redemption-free period equivalent to the duration of the forward contract period followed by the re-lending. The duration contribution from the forward contract is included in the duration management of the government debt from the forward contract date.

The dollar principal of the swap in connection with re-lending will appear as dollar debt in the central government's foreign debt. In the compilation of currency exposure the central government's dollar asset in connection with re-lending is included together with the dollar debt from the dollar leg in the currency swap. Therefore the dollar asset from re-lending nets out with the dollar leg in the swap in the compilation of currency exposure.

In order to limit the credit risk, the central government's swap agreements in connection with re-lending in dollars is subject to the same credit management principles as apply to the central government's other swaps, including the requirement of collateral agreements with the swap counterparties, cf. Chapter 6.

CHAPTER 11

# Interest-Rate Risk Management – New Initiatives

## SUMMARY 11.1

The central-government debt is managed via strategic benchmarks for the distribution of borrowing by maturities and for the interest-rate exposure of the portfolio. The strategic benchmarks are determined on the basis of a long-term analysis of costs and risk. During the year the strategic benchmarks may be deviated from within fixed limits.

In 2003, a number of new initiatives were introduced within this framework. The foreign portfolio has been incorporated in the Cost-at-Risk (CaR) model, which is used to quantify interest costs and risk. The model now comprises the domestic and foreign debt and the swap portfolios.

The key strategic benchmark for the interest-rate exposure is the duration target for the central-government debt. Interest-rate fixing has been introduced as a supplementary exposure measure. The interest-rate fixing, calculated at a given time, is the amount in the debt portfolio for which a new interest rate is to be fixed in the following year. In addition to redemptions on the debt due within one year, the measure includes floating-rate debt and the interest-rate-swap portfolio for which a new rate of interest is to be fixed within one year. The interest-rate-swap portfolio now contributes significantly to the exposure. In order to relate the interest-rate exposure to the macroeconomic development, the interest-rate fixing as a ratio of GDP is applied as a measure of the central government's "real" exposure.

In addition, a new risk measure, conditional CaR, has been introduced. Conditional CaR quantifies the risk in the individual years seen over the same time horizon – e.g. the risk in 2006 seen from the beginning of 2005, and the risk in 2007 seen from the beginning of 2006. In other words, risk in a given future year is conditional on the development in the period up to that year.

Finally, a new estimation method has been introduced for the model used for interest-rate simulation in the CaR model, where model interest rates are fitted to forecasts of the future development in interest rates.

## THE FRAMEWORK FOR MANAGEMENT OF INTEREST-RATE RISK ON CENTRAL-GOVERNMENT DEBT 11.2

The overall objective of the government debt policy is to cover the central government's financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk. This objective implies weighing costs against risk in the strategic planning. To support the choice of a suitable strategy, an analysis is thus performed of the trade-off between costs and risk.

A strategy is formulated as strategic benchmarks for borrowing and the interest-rate exposure of the portfolio. The strategic benchmarks are used as guiding points in the subsequent implementation of the strategy.

### Issuance strategy vs. risk profile

The issuance strategy for government securities is determined on the basis of an objective to ensure liquid series in the internationally most important maturity segments. A liquidity premium is thereby achieved, which contributes to reducing the central government's borrowing costs. Building-up of the individual bond series to a sufficient amount reduces the scope for shifting borrowing from one maturity segment to another. The possibilities of influencing the risk profile via issuance are therefore limited.

The risk profile of the portfolio can, however, be managed independently of the issuance strategy by means of interest-rate swaps and buy-backs. Interest-rate swaps are used to shift the interest-rate exposure from one maturity segment to another, while buy-backs are used to smoothen the redemption profile and thus the size of the interest-rate exposure from year to year.

### Exposure vs. quantification

The risk profile for a given strategy is characterised by the portfolio's exposure measures, which comprise the duration and the size of the amount in the portfolio for which a new rate of interest is to be fixed from year to year.

The choice of a given strategy is made on the basis of quantification of costs and risk for different levels of the exposure measures. Quantification implies that the strategies are compared in terms of their consequences for the probability distribution of interest costs in the individual years over a long horizon. The future development in interest rates and budget are the central risk elements. Box 11.1 outlines the use of interest-rate simulations.

INTEREST-RATE SIMULATIONS Box 11.1

The CaR model's quantification of risk on the central government's interest costs is based on 2,500 simulated scenarios for the future development in interest rates using the CIR[1] interest-rate model. Two approaches are taken to estimation of the interest-rate model. One is based on the historical development in interest rates. This method is now supplemented with estimations based on the interest-rate forecasts from the Ministry of Finance. The purpose of estimating the CIR model on the basis of the historical development in interest rates is to recreate the empirical characteristics of the historical interest rates in the simulated interest rates, including interest-rate volatility and level. The choice of the historical estimation basis has a major impact on the simulated interest rates, so different historical periods are applied. The model is also fitted to the forecasts of future interest rates from the Ministry of Finance. This means that the simulated average interest rates are in accordance with the interest-rate forecasts from the Ministry of Finance.

The CIR model applied is a linear one-factor model where the only stochastic factor is the spot rate (the short-term interest rate). Changes in the spot rate are given by the following stochastic process:

$$dr(t) = \kappa(\theta - r(t))dt + \sigma\sqrt{r(t)}dW(t)$$

where $r(t)$ is the spot rate at the time $t$, $\theta$ is the equilibrium value for the spot rate, $\sigma$ scales the volatility of the spot rate, and $\kappa$ is the speed at which the spot rate returns to the equilibrium value $\theta$. $W(t)$ is a stochastic process – a so-called Wiener process where the increase, $dW(t)$, has a mean of $0$ and a variance of $dt$. In addition to these parameters, the model includes the parameter $\lambda$, which is called the price of risk and determines the average slope of the yield curve. Given these parameters, the zero-coupon rate for all maturities is given as a linear function of the spot rate.

The parameter set is estimated as described on the basis of the historical development in interest rates and the interest-rate forecasts from the Ministry of Finance, respectively. Given a set of parameters, 2,500 scenarios for the development in the spot rate from quarter to quarter over 10 years are simulated. On the basis of the simulated spot rates the associated zero-coupon curves are calculated. Via the zero-coupon curves, the yields to maturity are finally calculated for the various instruments simulated in the CaR model.

The CIR model is relatively easy to interpret and implement in practice. The model ensures that the simulated interest rates fluctuate at realistic levels and that there are no arbitrage opportunities in the yield curve. Since the model is relatively simple, it fails to describe certain empirical characteristics of the yield curve. For instance, the CIR model implies that interest-rate volatility decreases more strongly with maturity than observed empirically. Consequently, there is a tendency for the risk on long-term borrowing to be underestimated. The relatively simple structure of the model also entails limited flexibility to fit the simulated interest rates to forecasts of the future interest-rate development. Consequently, efforts are underway to perform interest-rate simulations in the CaR model on the basis of a linear two-factor model.

[1] Cox, J. C., Ingersoll, J. E. and Ross, S. A., 1985, A Theory of the Term Structure of Interest Rates, *Econometrica*, vol. 53, No. 2, pp. 385-407.

**Management according to strategic benchmarks**

The analysis forms the basis for determining strategic benchmarks for the distribution of borrowing on various maturities, the volume of buy-backs and the portfolio duration over a long horizon. For management purposes the strategic benchmarks are, however, determined for one year at a time, after which an annual update of the risk analysis may lead to a revision of the strategy.

The strategic benchmarks are used as guiding points in the ongoing portfolio management. For 2004 the strategic benchmarks comprise the following:

- Financing of the domestic borrowing requirement via a 40-20-40 per cent distribution on 2-, 5- and 10-year bullet loans, respectively. The 2- and 5-year on-the-run issues are ultimately built up to at least DKK 35 billion, while the 10-year securities are ultimately built up to at least DKK 60 billion.
- Financing of the foreign borrowing requirement via a 5-year euro bullet loan.
- A zero net-financing contribution from the Treasury bill programme.
- A duration target (calculated at a fixed discount rate) within 3 years +/- 0.25 years.
- Guiding points for buy-backs of domestic securities maturing after 2004.

Management according to the strategic benchmarks ensures that the ongoing transactions keep the cost and risk profile of the portfolio on track – also in the longer term. The ex-ante objective is to disperse borrowing and swap transactions over the year to smoothen exposure to day-to-day volatility.

The strategic benchmarks are not used as automatic pilots. The development in interest rates over the year may justify a change in the exposure of the portfolio, and likewise shifts may occur in the relative attractiveness of the various instruments. To enable a response to a given development, a limited scope around the strategic benchmarks is determined, which may be used in the ongoing management. The duration may e.g. be changed within a fixed band, and issues in the various maturities may be larger or smaller within fixed limits. Using this scope does not reflect short-term tactical positioning or an attempt to "beat" the market by exploiting diverging expectations regarding future market developments.

## EXPOSURE AND RISK MEASURES 11.3

### Exposure measures

The duration of the portfolio is used as a strategic benchmark for the interest-rate exposure. In addition, the interest-rate fixing, i.e. the amount in the debt portfolio for which a new interest rate is to be fixed in the following year is compiled.

Duration is a measure of the average fixed-interest period for the portfolio. It is the central exposure target since it contains information on the trade-off between costs and risk. All other things being equal, shorter duration will reduce the average costs, but entail higher interest-rate risk.

As an average measure, the duration contains no information on the dispersion of the portfolio's interest-rate exposure over time. The duration target is therefore supplemented with a measure for interest-rate fixing. The interest-rate fixing at a given time comprises the redemptions due within the coming year, as well as the amount of the floating-rate debt and the swap portfolio, for which a new rate of interest is to be fixed within one year.[1] The interest-rate fixing is thus an ex-ante measure which captures the development in the interest-rate exposure over time for a given strategy. The actual interest-rate exposure in a given year will also depend on the size of the budget balance for the year. The analysis of the central government's future interest-rate risk therefore includes budget estimates as an important element which influences the determination of duration and interest-rate fixing. All other things being equal, it is appropriate to smooth out the exposure from year to year in order to avoid fixing a new rate of interest on a relatively large proportion of the portfolio in a year when interest rates are extraordinarily high.

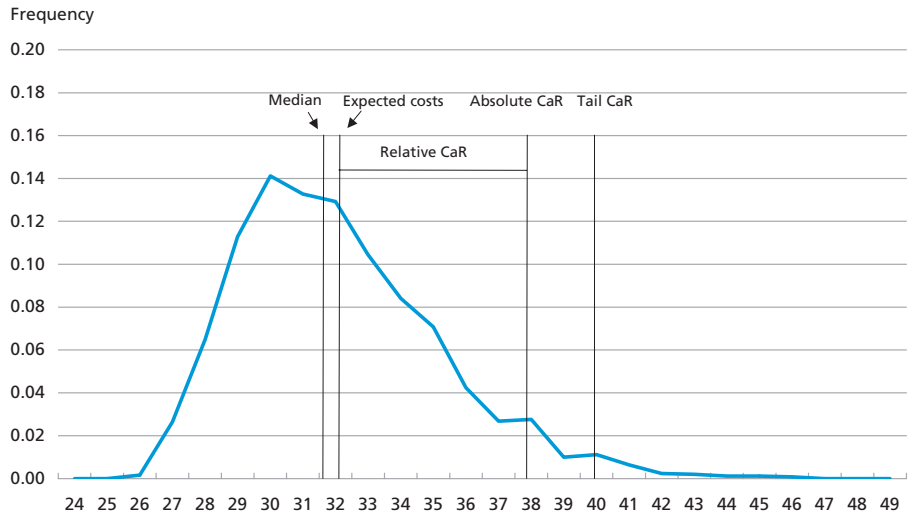
The interest-rate fixing as a percentage of GDP is an indicator of the central government's "real" exposure. Higher GDP can be expected to render the government less sensitive to the development in interest rates, e.g. as a consequence of a larger taxation base. The interest-rate fixing as a percentage of GDP is applied as a supplementary exposure measure.

### Cost and risk measures

Costs and risk for a given strategy are quantified by simulating the distribution of the annual interest costs over a long horizon. On the basis

[1] The interest-rate fixing is a gross measure which only comprises the liabilities of the central-government debt portfolio. In reality the interest-rate exposure is reduced by the portfolio's assets, i.e. the balance of the central government's account with Danmarks Nationalbank, and the part of the portfolio of the Social Pension Fund which is to be reinvested in a given year.

SIMULATED DISTRIBUTION OF INTEREST COSTS FOR 2006, DOMESTIC AND FOREIGN DEBT — Chart 11.3.1

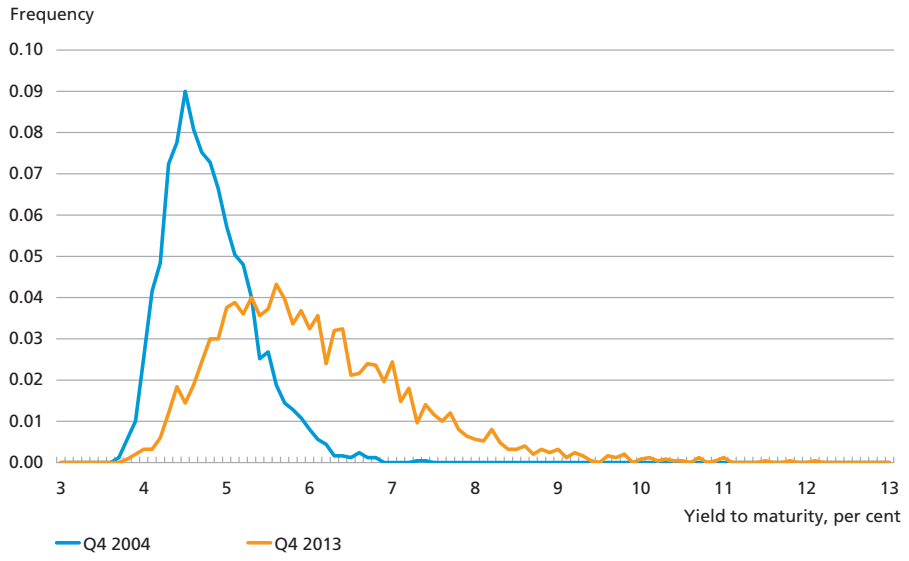



of the distributions, various cost and risk measures are calculated. Chart 11.3.1 shows a simulated distribution of interest costs for 2006 for the central government's domestic and foreign debt and illustrates various cost and risk measures.

The expected costs are calculated as the mean of the distribution, which is DKK 32.6 billion in 2006. The interest costs do not have a normal distribution, so the median is a relevant supplementary cost measure not affected by extreme observations. Absolute CaR is the 95th percentile of the distribution, i.e. the maximum costs in a given year with a probability of 95 per cent. Relative CaR is calculated as the difference between absolute CaR and the mean. Relative CaR is the maximum amount, with a probability of 95 per cent, by which costs in a given year will exceed the expected costs, and thus expresses the uncertainty of the expected costs. In 2006 relative CaR is DKK 5.8 billion. Tail CaR is the mean of the costs, given that costs are higher than absolute CaR. Tail CaR thereby expresses the expected interest costs if costs exceed the 95th percentile.

In the analysis of costs and risk for a given strategy, the annual distributions of interest costs are simulated 10 years ahead. The development in costs and risk over time depends on a number of factors, including the development in the size of the portfolio and its composition. Another key factor is the calculation horizon, since it is more difficult to predict the level of interest rates 10 years ahead than 1 year ahead. This is materialised as a larger spread in the simulated interest rates the wider the

SIMULATED YIELD TO MATURITY FOR 5-YEAR BULLET LOAN Chart 11.3.2



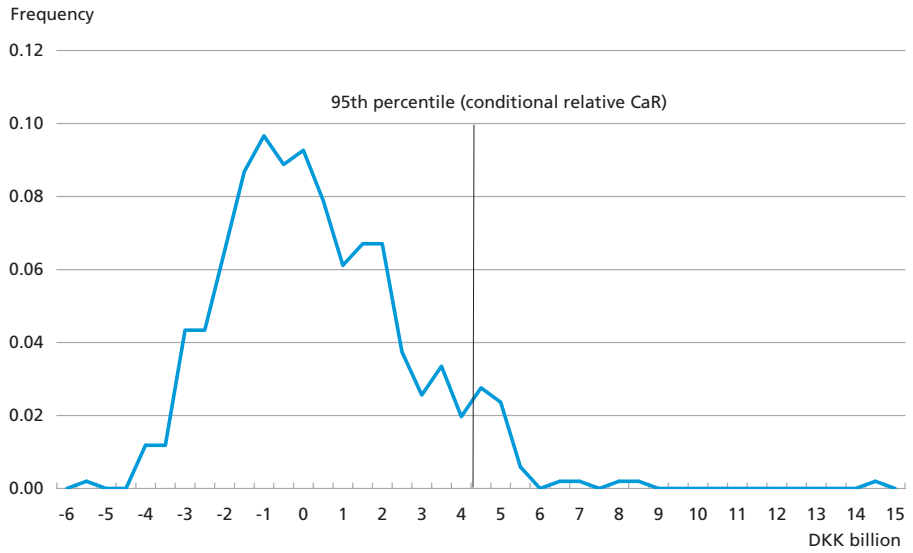

horizon, cf. Chart 11.3.2. The spread of the simulated interest-cost distributions thus also widens.

A new risk measure, conditional CaR (relative and absolute), has been introduced to remove this horizon effect from the risk calculation and supplement the analysis. The aim is an assessment of the central government's interest-rate risk from year to year for different strategies that is not affected by an increasing calculation horizon. Conditional CaR makes it easier to compare the risk development from year to year because the risk is measured over the same horizon.

Relative CaR for 2006 is DKK 5.8 billion, while relative CaR for 2007 increases to DKK 7.5 billion. These figures show the uncertainty of the expected costs in the respective years, seen from the present. Conditional CaR may supplement the analysis by e.g. measuring the risk in 2006 seen from the beginning of 2005 and the risk in 2007 seen from the beginning of 2006. These calculations give an indication of the uncertainty associated with the ongoing interest-rate budgeting in the *Budget Review* from the Ministry of Finance.

Conditional CaR can be calculated in different ways. For example, if we wish to calculate the interest-rate risk in 2006, seen from the beginning of 2005, the portfolio and interest-rate developments may first be projected in accordance with one expected scenario up to the beginning of 2005. On the basis of the expected scenario, a number of stochastic scenarios up to and including 2006 can then be calculated, capturing the risk over this horizon.

DISTRIBUTION OF THE DIFFERENCE BETWEEN SIMULATED INTEREST COSTS IN 2006 AND EXPECTATIONS SEEN FROM THE 1ST QUARTER OF 2005 (CONDITIONAL RELATIVE CaR) Chart 11.3.3




Since the development until the beginning of 2005 is unknown, conditional CaR may alternatively be calculated on the basis of the portfolio and level of interest rates at the beginning of 2005 for various stochastic scenarios until this point in time. Chart 11.3.3 illustrates such a conditional relative CaR calculation for total interest costs for the domestic and foreign debt in 2006. The distribution is based on the calculation of 500 scenarios of the difference between the actual simulated interest costs in 2006 and the costs we would have expected in the 1st quarter of 2005 for each scenario. The expected costs in 2006 seen from the 1st quarter of 2005 are calculated by switching off the stochastics from the development in interest rates after the 1st quarter of 2005 in the scenario calculations.[1]

Conditional relative CaR calculated as the 95th percentile of the distribution is DKK 4.3 billion, i.e. with a probability of 95 per cent interest costs will increase by less than DKK 4.3 billion in 2006 compared to the expectation in the 1st quarter of 2005. Compared with relative CaR for a given year, the risk expressed as conditional relative CaR is reduced, since the calculation horizon is reduced.

[1] Given the rate of interest in the 1st quarter of 2005 for each scenario, the CIR model is applied to determine the expected future development in interest rates, cf. the equation in Box 11.1. Thereby the expected interest costs for the debt can be determined for each scenario.

## SCENARIOS FOR THE CENTRAL GOVERNMENT'S INTEREST-RATE EXPOSURE AND RISK 11.4

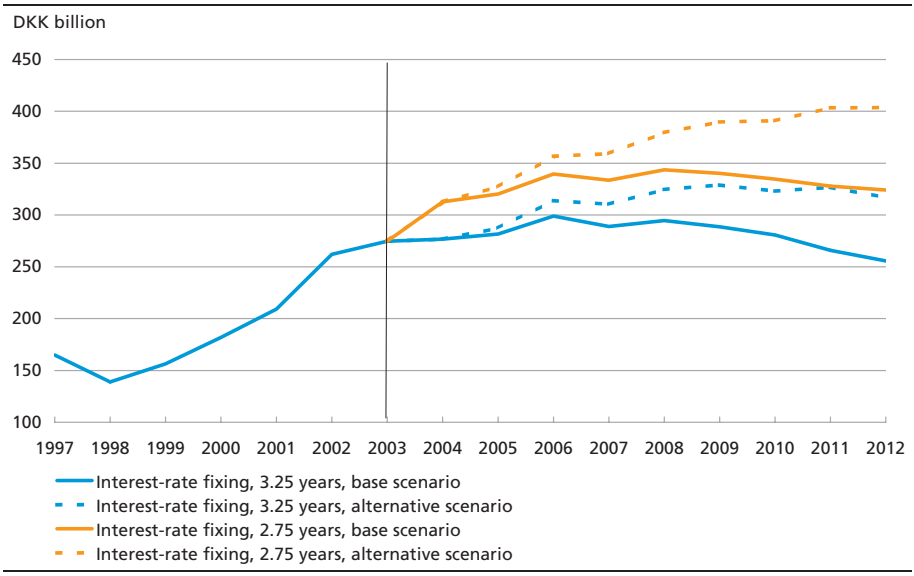
This section illustrates a number of scenarios for the development in the central government's exposure and risk on the domestic and foreign portfolios for selected strategies.

All strategies assume that the domestic borrowing requirement is financed via a 40-20-40 per cent distribution on 2-, 5- and 10-year bullet loans, respectively, and that domestic securities are bought back to smoothen the annual redemptions. The foreign borrowing requirement is financed via 5-year euro bullet loans. The development in the portfolio's exposure target is determined by adapting the interest-rate-swap strategy. Interest-rate swaps from fixed to floating interest rates shorten the duration and increase interest-rate fixing because the rate of interest on the variable leg is refixed every 6 months.

### The development in the interest-rate fixing at constant duration[1]

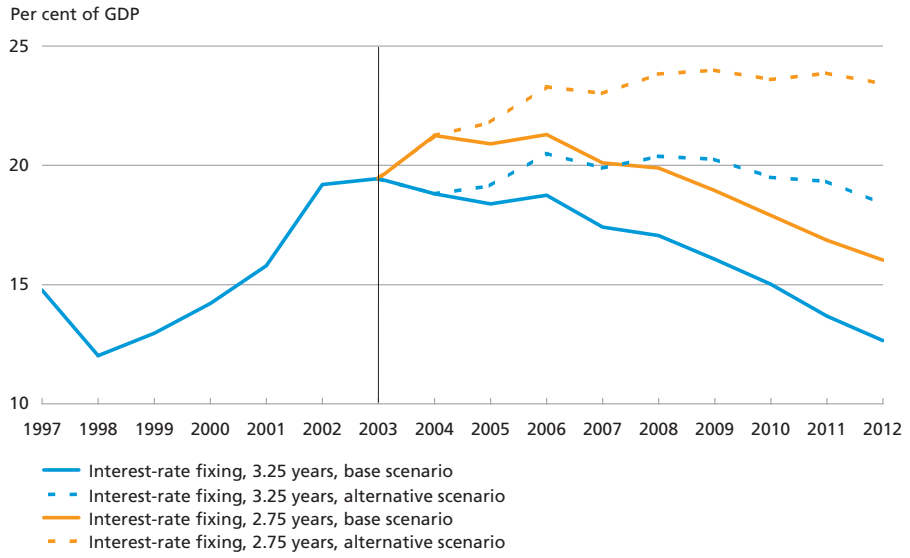
Charts 11.4.1 and 11.4.2 show the development in the interest-rate fixing in absolute figures and as a percentage of GDP. The interest-rate fixing has increased relatively strongly in recent years, and at end-2003 it

INTEREST-RATE FIXING IN ABSOLUTE FIGURES, YEAR-END Chart 11.4.1




[1] As from 2004 a methodological change in the duration calculation has been introduced, cf. Chapter 6. The change implies that duration at end-2003 is reduced by around three months compared to the previous calculation. The new calculation method has not yet been implemented in the CaR model. The durations reported in this section have therefore been calculated using the old method.

INTEREST-RATE FIXING AS A PERCENTAGE OF GDP, YEAR-END Chart 11.4.2



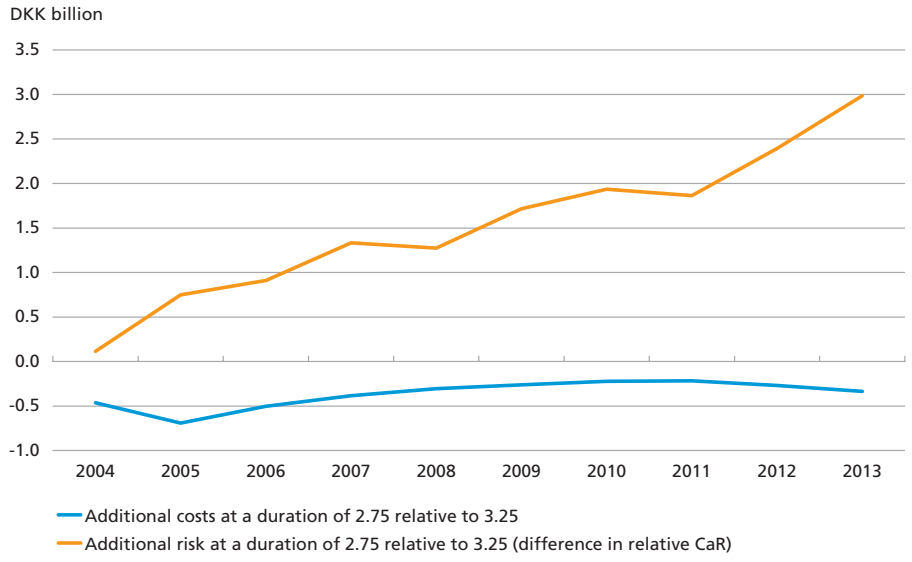

was DKK 275 billion. The increase has taken place concurrently with a duration reduction from 4.4 years at end-1998 to 3.2 years at end-2003. This development should be seen against the background of a decline in central-government debt as a percentage of GDP from 49.4 per cent in 1998 to 37 per cent in 2003. This has led to a strategic decision to reduce the duration.

Charts 11.4.1 and 11.4.2 also show the future development in the interest-rate fixing, assuming two different strategies based on fixed durations of 3.25 and 2.75 years, respectively.

The development in the interest-rate fixing for these strategies is calculated according to different assumptions regarding the development in the central government's budget and GDP. The base scenario is based on medium-term projection of the development in the budget and GDP from the Ministry of Finance. The alternative scenario assumes that the primary budget surplus is reduced by almost DKK 17 billion on average from 2005 onwards, thus increasing the central government's borrowing requirement, and that the rate of GDP growth halves.

A constant duration of 3.25 years gives a fairly stable absolute level of interest-rate fixing for a number of years, assuming that the base scenario is realised. If the duration is reduced to 2.75 years, the interest-rate fixing, in absolute terms and relative to GDP, increases in the short term for both scenarios. The reason is that a duration of 2.75 years requires a relatively large volume of interest-rate swaps from fixed to floating rate. This increases the portfolio amount for which a new rate of interest is to be fixed within a short horizon.

TRADE-OFF BETWEEN COSTS AND RISK FOR TWO STRATEGIES BASED ON DURATIONS OF 3.25 AND 2.75 YEARS, RESPECTIVELY Chart 11.4.3




**Trade-off between costs and risk at durations of 3.25 and 2.75 years, respectively**

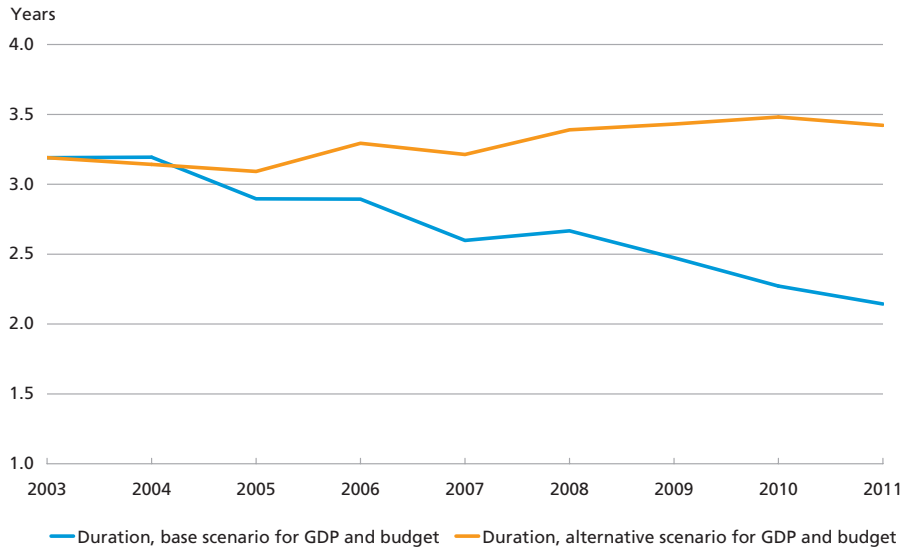
The higher risk at a duration of 2.75 years compared to 3.25 years should be seen in the light of the expected reduction in interest costs. Chart 11.4.3 illustrates quantification of costs and risk for the 2.75 strategy compared to the 3.25 strategy based on the base budget scenario. The difference in relative CaR, i.e. the maximum increase in costs compared to expected costs with a probability of 95 per cent, is widening steadily. On the other hand, the expected interest costs will be almost DKK 0.4 billion lower on average if the duration is reduced from 3.25 years to 2.75 years.

**Duration development at constant "real" exposure**

In the above, the strategies were defined by a constant duration. Alternatively, the strategies may be defined by a certain course for the interest-rate fixing. The interest-rate fixing can be managed by adapting the strategy for interest-rate swaps and buy-backs, whereby the duration is residually determined. As a portfolio measure, the interest-rate fixing, calculated at a given time, summarises the size of the portfolio's interest-rate exposure over the coming year. The actual interest-rate exposure and risk also depend on the central government's current budget surplus or deficit, which respectively reduces or increases the borrowing requirement. The budget scenarios entered in the CaR model will thus

DURATION AT CONSTANT INTEREST-RATE FIXING AS A PERCENTAGE OF GDP, YEAR-END

Chart 11.4.4




affect the levels for the interest-rate fixing and duration determined on the basis of the CaR analysis.

Within government debt it is relevant to measure interest-rate exposure and risk relative to the macroeconomic development. All other things being equal, higher GDP entails a lower debt burden and strengthening of the government's ability to absorb interest-rate risk. The interest-rate fixing as a ratio of GDP gives an intuitive measure of the central government's "real" exposure. A fixed level for the interest-rate fixing as a ratio of GDP means that the interest-rate exposure is increased in step with GDP growth.

Chart 11.4.4 shows two scenarios for the duration development where the swap strategy has been determined with a view to ensuring a constant ratio between the interest-rate fixing calculated at year-end and GDP equivalent to the level of 19 per cent in 2003. The duration is calculated for two different scenarios for development in GDP and the budget, corresponding to the scenarios applied in Chart 11.4.1.

In the base scenario, based on medium-term projection by the Ministry of Finance, there is scope for reducing the duration over time without increasing the "real" exposure from year to year in the form of the interest-rate fixing as a share of GDP. In the alternative scenario a less favourable budget development is assumed, as well as a lower rate of GDP growth. A reduced budget surplus increases the borrowing requirement and increases the interest-rate fixing over time. Together

with the lower rate of GDP growth, this means that there is less scope for transacting interest-rate swaps if the interest-rate fixing as a share of GDP is to be maintained at the current level. In the event that the alternative scenario for GDP and budget is realised, the duration must thus be extended slightly over time to maintain the "real" exposure.

# Appendices

# Information on Government Borrowing and Debt

Government Debt Management focuses on transparency vis-à-vis the general public and the financial markets with regard to the government debt policy and government transactions. Further information on government debt and government debt policy is available at Danmarks Nationalbank's website, www.nationalbanken.dk.

A wide variety of information concerning government borrowing and debt is published on an ongoing basis via the Copenhagen Stock Exchange and DN News[1]. Several news agencies re-transmit the information from DN News, e.g. Reuters. The information is also available at Danmarks Nationalbank's website. It is possible to be notified directly of new information and updates concerning government borrowing and debt by subscribing to Danmarks Nationalbank's electronic news service (see www.nationalbanken.dk under News service).

In addition, information on wholesale trading in Danish government securities is available at the MTS Denmark website, www.mtsdenmark.com.

Enquiries concerning government borrowing and debt should be directed to Danmarks Nationalbank, Government Debt Management, Financial Markets at governmentdebt@nationalbanken.dk.

The following table presents the information on government borrowing and debt that is published on an ongoing basis.

[1] Danmarks Nationalbank's system for transmission of information to connected news agencies.

CURRENT INFORMATION ON GOVERNMENT BORROWING AND DEBT

| | Overall contents | Information at | Publication frequency |
|---|---|---|---|
| Danish Government Debt Management Strategy, June and December | • Borrowing strategy<br>• On-the-run issues<br>• Securities eligible for buy-back<br>• Duration band | • CSE<br>• www.nationalbanken.dk | Semi-annually |
| Opening of new securities | • Coupon<br>• Maturity date<br>• Opening date | • CSE<br>• DN News, screen 55-57<br>• Reuters, DKNA-55-57<br>• www.nationalbanken.dk | Irregularly |
| Treasury bill auction | • Convening of auction<br>• Result of auction | • CSE<br>• DN News, screens 52 and 53<br>• Reuters, DKNA-52 and 53<br>• www.nationalbanken.dk (result of auction) | Monthly |
| Daily buy-backs and sales | • Daily sales by securities<br>• Daily buy-backs by securities | • DN News, screens 51 and 58<br>• Reuters, pages DKNA-51 and DKNA-58<br>• www.nationalbanken.dk | Daily |
| Daily domestic borrowing requirement | • Domestic borrowing requirement, cf. *Budget Review*<br>• Subsequent buy-backs<br>• Subsequent currency swaps (monthly)<br>• Total domestic borrowing requirement | • DN News, screen 54<br>• Reuters, page DKNA-54<br>• www.nationalbanken.dk | Daily |
| Central government's actual financing requirement, etc., 2nd banking day | • Change in the balance of the central government's account<br>• Gross central-government borrowing<br>• Gross central-government financing requirement<br>• Government redemptions and buy-backs | • DN News, screens 31-34<br>• www.nationalbanken.dk | Monthly |
| Day-to-day distribution of government payments, penultimate banking day | • Day-to-day distribution for liquidity impact of central-government payments in coming months | • www.nationalbanken.dk | Monthly |
| *Danish Government Borrowing and Debt*, Danish edition normally in February, and English edition normally in March | • Development in the past year<br>• Detailed statement of debt and transactions<br>• Report on issues of relevance to debt management | • Publication from Danmarks Nationalbank<br>• www.nationalbanken.dk | Annually |
| *Budget Review*, normally in May, August and December | • Gross financing requirement, current and coming years<br>• Domestic and foreign borrowing requirements, current and coming years | • Publication from the Ministry of Finance<br>• www.fm.dk (website of the Ministry of Finance) | Normally 3 times a year |
| Trading in Danish government securities on MTSDk | • Information about prices and turnover in Danish government securities traded on MTSDk | • www.mtsdenmark.com | Currently |

Note: *Budget Review* is published by the Ministry of Finance.
CSE denotes the Copenhagen Stock Exchange. CSE's website is at www.cse.dk.
It is possible to be notified directly of new information on government borrowing and debt by subscribing to Danmarks Nationalbank's electronic news service (see www.nationalbanken.dk, News service).

# Principles for Management of the Credit Risk on Government Swaps

*Counterparty credit standing (rating)*: To limit the credit risk on swap counterparties, swaps are only transacted with counterparties with a very high credit standing. A counterparty must normally be rated minimum Aa3/AA- by at least two well-reputed rating agencies (Moody's, Standard & Poor's or Fitch). For interest-rate swaps in kroner and DKK/EUR swaps, however, counterparties with a rating of minimum A3/A- are permitted.

*Limits for credit-exposure (lines)*: To avoid disproportionately high credit exposures, the credit exposure on a counterparty must be within an authorised line. The size of the lines granted depends on the counterparty's rating and equity, cf. the Table below.

*Counterparty credit exposure*: Counterparties' credit exposure and utilisation of lines are monitored on an ongoing basis. The central government's credit exposure to a given counterparty is compiled as the current positive market value of the portfolio less any pledged collateral, plus a premium, the potential credit exposure, that takes into account that the portfolio can develop additional market value as a consequence of market development.

*Handling of excess credit exposure*: New swaps may only be transacted with a counterparty for as long as the credit exposure is less than 75 per cent of the authorised line. The remaining 25 per cent of the line is a buffer to limit the extent of excess credit exposure.

In the event of excess credit exposure the counterparty relationship is monitored closely. If the excess exposure is considered to be unacceptably high, it is sought to reduce the credit exposure.

*Eligible swaps*: Only plain-vanilla interest-rate swaps and plain-vanilla currency swaps may be transacted. The maturity will normally be 10 years or lower. Dual-currency swaps and zero-coupon swaps are considered to be plain-vanilla swaps. Structured swaps are no longer transacted. The same applies to deals that include option elements, including swaptions, interest-rate caps, etc.

*Legal basis of agreement*: Swaps are only transacted with counterparties with whom an ISDA Master Agreement, which governs the business relationship between the central government and the counterparty, and a collateral agreement, cf. below, have been established.

*Netting*: ISDA Master Agreements contain netting provisions whereby gains and losses on transacted swaps are set off in the event of counterparty default.

Master Agreements are signed only with counterparties domiciled in countries whose legislation is expected to provide for netting.

*Early termination of swaps*: It must be possible to terminate all swaps with a counterparty should the counterparty's rating fall to an unsatisfactory level. All new ISDA Master Agreements therefore contain rating triggers. A rating trigger entails that swaps can be cancelled should a counterparty's rating fall to a given level. In most of the central government's ISDA Master Agreements the rating trigger is BBB+/Baa1 or below[1].

As a subsequent safeguard against credit losses, cross-default clauses are also applied. These allow swaps to be terminated if the counterparty defaults on its payment obligations to a third party.

*Collateralisation*: To limit any losses in the event of counterparty default, swaps may only be transacted with counterparties that have signed a collateral agreement (ISDA Credit Support Annex) to the ISDA Master Agreements that regulate the relationship between the central government and the swap counterparties. The key elements of the agreements are:

- The agreements are unilateral, so that only the central government's counterparties pledge collateral.
- Collateral is not pledged unless the market value in the central government's favour exceeds an agreed amount (the threshold value). This threshold value will depend on the counterparty's rating, cf. Table 1.
- The market value of swaps is compiled on a regular basis and as required. If the market value less the pledged collateral exceeds the agreed threshold, the counterparty is required to pledge collateral.
- Only collateral of DKK 10 million or more is transferred (reversed).
- Permitted collateral will normally be government bonds with a rating of minimum Aa3/AA-. Other bonds can also be accepted, subject to individual assessment, e.g. Danish mortgage-credit bonds. The collateral value of the bonds is calculated as the market value after a haircut. Haircuts will depend on the remaining maturity of the bonds and must take account of the risk of a decrease in the value of the bonds.
- The administration of bonds pledged as collateral to the central government is transferred to the custodian bank with which the securities are deposited. On behalf of the central government the custodian bank will request the counterparty to provide additional collateral,

[1] Some Master Agreements, dating from before the rating trigger requirement was formalised, have none or a lower trigger.

LINES FOR CREDIT EXPOSURE — Table 1

| Counterparty rating | | Lines (max. total credit exposure) | | Threshold value (max. uncollateralised market value) |
|---|---|---|---|---|
| Moody's | Standard & Poor's, Fitch IBCA | DKK million | In per cent of counterparty's equity | DKK million |
| Aaa | AAA | 2,000 | 8.0 | 500 |
| Aa1 | AA+ | 1,500 | 7.0 | 400 |
| Aa2 | AA | 1,000 | 6.0 | 300 |
| Aa3 | AA- | 700 | 5.0 | 200 |
| A1 | A+ | 600 | 5.0 | 150 |
| A2 | A | 400 | 4.5 | 100 |
| A3 | A- | 200 | 4.0 | 50 |

Note: In case of different ratings, the lowest rating is the basis for the granting of line and for determining the threshold value for the maximum uncollateralised market value in the favour of the central government.
If the counterparty has a rating of A1/A+, or below, the authorised line can only be used for interest-rate swaps in Danish kroner or DKK/EUR swaps with a maximum maturity of 10 years.

should the collateral value of the deposited bonds decrease and become insufficient to cover the market value of the transacted swaps after deduction of the threshold. In the event of surplus cover, the custodian bank is equivalently authorised to release bonds to the counterparty.

# Terms for the Central Government's and the Social Pensions Fund's Securities Lending Facilities

**The central government's securities lending facility**

- The lending facility applies to on-the-run government securities and government securities with benchmark status.
- The specific terms for lending in the individual government securities are published in the central government's announcements concerning on-the-run issues.
- For government bonds and treasury notes the lending facility is available for Primary Dealers.
- For T-bills the lending facility is available for eligible participants in the T-bill auctions.
- In normal circumstances the maximum lending in each issue is DKK 4 billion. However, this limit may be raised in the event of abnormal price formation on the market for securities lending.
- The fee is 0.2 per cent per year for securities lending of Treasury notes and government bonds with an outstanding amount below DKK 20 billion. The fee is 0.4 per cent per year for securities lending in securities with an outstanding amount above DKK 20 billion and for all Treasury bills.
- The lending facility is available as buy/sell-back transactions. Participants borrow bonds in one buy/sell-back transaction and lend (provide collateral) in another buy/sell-back transaction.
- The securities may be borrowed for a period from 1 to 5 trading days.
- The lending facility is open for transactions during the day between 9.00 a.m. and 3.30 p.m., but transactions should, to the extent possible, be concluded before 2.00 p.m.
- Lending in securities is granted in the order that requests to Danmarks Nationalbank are received from security dealers on the relevant day. The right to make discretionary allocations is reserved if deemed appropriate.
- Danish government securities (bullet loans) denominated in Danish kroner issued via the Danish Securities Services (VP) in series with an outstanding amount of at least DKK 3 billion are accepted as collateral. Collateral is provided by deducting 5 points from the market price of the securities provided as collateral by the borrower. Settlement

takes place on the following trading day. Transactions are settled as trading transactions in the VP system.
- For bond trading members of the Copenhagen Stock Exchange lending transactions are reported as two or more separate repurchase agreements to Copenhagen Stock Exchange under code 30.
- Government Debt Management may from time to time amend the terms and conditions applicable to the Central Government's Securities Lending Facility to reflect market practice and ensure a well-functioning securities lending facility. Government Debt Management informs Primary Dealers at least one week prior to implementation of any change to the terms of the lending facility.
- Any enquiries concerning securities lending transactions should be made to Danmarks Nationalbank, Market Operations, on tel. +45 3363 6753 or +45 3363 6736.

**The Social Pension Fund's securities lending facility**
- Lending is in all government bonds of the type bullet loans in the Social Pension Fund's portfolio.
- The lending facility is available to Primary Dealers.
- The fee is 0.4 per cent per year.
- The lending facility is available as buy/sell-back transactions. Participants borrow bonds in one buy/sell-back transaction and lend (provide collateral) in another buy/sell-back transaction.
- The securities may be borrowed for a period from 1 to 5 trading days.
- The lending facility is open for transactions during the day between 9.00 a.m. and 3.30 p.m., but transactions should, to the extent possible, be concluded before 2.00 p.m.
- Lending in securities is granted in the order that requests to Danmarks Nationalbank are received from securities dealers on the relevant day. The right to make discretionary allocations is reserved if deemed appropriate.
- Danish government securities (bullet loans) denominated in Danish kroner issued via the Danish Securities Services (VP) in series with an outstanding amount of at least DKK 3 billion are accepted as collateral. Collateral is provided by deducting 5 points from the market price of the securities provided as collateral by the borrower.
- Settlement takes place on the following trading day. Transactions are settled as trading transactions in the VP system.
- For bond trading members of the Copenhagen Stock Exchange transactions are reported as two or more separate repurchase agreements to Copenhagen Stock Exchange under code 30.

- Government Debt Management may from time to time amend the terms and conditions applicable to the Social Pension Fund's Securities Lending Facility to reflect market practice and ensure a well-functioning securities lending facility. Government Debt Management informs Primary Dealers at least one week prior to the implementation of any change to the terms of the Social Pension Fund's Securities Lending Facility.
- Any enquiries concerning securities lending transactions should be made to Danmarks Nationalbank, Market Operations, on tel. +45 3363 6753 or +45 3363 6736.

# Announcements on the Central Government's Borrowing and Debt (Translations)

## DANISH GOVERNMENT DEBT MANAGEMENT STRATEGY 2004, 17 DECEMBER 2003

### Key issues, 2004

In 2004 the fundamental objective and strategic targets (cf. Box 1) are pursued through a strategy consisting of the following elements:

- The *domestic borrowing* requirement for 2004 is DKK 82.4 billion. This will be financed by issuance of fixed-rate bullet loans. It is the intention to finance around 40 per cent in the 2-year, 20 per cent in the 5-year, and 40 per cent in the 10-year maturity segment.
- The current *on-the-run issues* in the 2-, 5- and 10-year segments will be replaced in 2004. On 13 January 2004 the initial sale of a 3 per cent Treasury note maturing in November 2006 will commence. Later in the first quarter, a new 10-year government bond will open for sale, and in the second or third quarter, a new 5-year government bond.
- To promote *liquidity and trading* on electronic platforms, the new 2- and 5-year issues are planned to reach an outstanding amount of at least DKK 35 billion and the new 10-year issue at least DKK 60 billion.
- The new bonds and notes will be issued and traded on MTSDenmark, and liquidity will be supported by market making of primary dealers.
- The net financing contribution from *Treasury bills* is expected to be around zero, depending on auction demand and market conditions.
- The foreign borrowing requirement for 2004 of DKK 16 billion will be financed primarily by issuance of a benchmark size euro loan in the 5-year maturity segment. The issue is expected in the first half of 2004.
- In December 2003, the *duration* of the central government debt is close to 3 years[1]. A *duration target* for 2004 of 3 years +/- 0.5 years brings symmetry around the current duration level.

DEBT MANAGEMENT FRAMEWORK — Box 1

*Fundamental objective:* To cover the central-government financing requirement at the lowest possible long-term borrowing costs, subject to a prudent degree of risk.

*Strategic targets:* Emphasis on liquidity contributes to low funding costs, while diversification into different market segments ensures a dispersed investor base. The objective is also pursued through a duration target based on a balance between costs and risk.

*Funding norm:* Broadly, the central government's gross domestic financing requirement is financed through krone-denominated borrowing, while redemptions on the foreign debt are refinanced by new foreign loans. According to the EU Treaty, the central government may not overdraw its account with Danmarks Nationalbank.

[1] Duration has in 2003 been adjusted by close to 0.2 years as a result of a new calculation method with weights based on market values instead of nominal values. The duration target for 2004 is adjusted accordingly.

**Borrowing requirement**

In *Budget Outlook, December 2003*, by the Ministry of Finance, the central government's gross financing requirement for 2004 is estimated at DKK 106.4 billion and the domestic borrowing requirement at DKK 86.5 billion. Due to subsequent buy-backs in 2003 of securities maturing in 2004 of DKK 4.2 billion, the domestic borrowing requirement is currently (18 December 2003) DKK 82.4 billion.

The gross foreign borrowing requirement in 2004, equal to redemptions on foreign debt, is DKK 16 billion.

In 2004, an estimated DKK 3.9 billion of the gross domestic financing requirement will be covered by reducing the cash balance of the central government's account with Danmarks Nationalbank.

CENTRAL-GOVERNMENT FINANCING REQUIREMENT, 2004 — Table 1

| | DKK billion |
|---|---|
| Gross financing requirement (*Budget Outlook,* December 2003) | 106.4 |
| Drawing on the government's account *(Budget Outlook)* | -3.9 |
| Domestic borrowing requirement (*Budget Outlook*) | 86.5 |
| Subsequent buy-backs of securities maturing in 2004[1] | -4.2 |
| Adjusted domestic borrowing requirement[2] | 82.4 |
| Foreign borrowing requirement | 16.0 |

[1] After the release of *Budget Outlook,* December 2003.
[2] The domestic borrowing requirement will be adjusted with buy-backs in 2003 of securities maturing in 2004.

**Financing**

In 2004, the domestic borrowing requirement is financed through issuance of krone-denominated government bonds and Treasury notes in key maturity segments. As in previous years, it is the intention to finance approximately 40 per cent through issuance in the 2-year segment, 20 per cent in the 5-year segment, and 40 per cent in the 10-year segment.

The three current on-the-run issues will be replaced in 2004. The schedule for opening the new on-the-run issues is the following:

- On 13 January 2004 a new Treasury note will be opened. The interest payment date will be 15 November and the coupon rate 3 per cent (ISIN DK0009921355). The Treasury note will be repaid in full 15 November 2006. The initial sale of 3 per cent Treasury notes 2006 will commence 13 January at 11.00 CET via the sub-segment for initial sale of government securities at MTSDenmark with the primary dealers acting as counterparts. Further details will be released to the primary

dealers 13 January 2004 at 09.00 CET. Sale of 4 per cent Treasury notes 2005 will be discontinued 12 January 2004.

- A new government bond in the 10-year maturity segment will be opened later in the first quarter of 2004.
- A new government bond in the 5-year maturity segment will be opened in the second or third quarter of 2004.

The terms of borrowing in Danish and English for 3 per cent Treasury notes 2006 are available on Danmarks Nationalbank's website (www.nationalbanken.dk) or can be ordered on telephone +45 3363 6105.

Details of the new 5- and 10-year issues will be published two weeks prior to the opening.

DOMESTIC ISSUES ON-THE-RUN, JANUARY 2004 — Table 2

| Series | Maturity segment | Coupon/due date |
|---|---|---|
| *Government bonds* | | |
| 5 per cent bullet loan 2013 | 10-year | 15 November |
| 4 per cent bullet loan 2008 | 5-year | 15 August |
| *Treasury notes* | | |
| 4 per cent Treasury notes 2005 (-12 January) | 2-year | 15 November |
| 3 per cent Treasury notes 2006 (13 January -) | 2-year | 15 November |
| *Treasury bills* | <12 months | |
| Treasury bill 2004 IV | | 1 November |
| Treasury bill 2004 III | | 2 August |
| Treasury bill 2004 II | | 3 May |
| Treasury bill 2004 I | | 2 February |

To support liquidity and promote trading on electronic platforms, the 2- and 5-year on-the-run-issues are planned to reach an outstanding amount of at least DKK 35 billion and the 10-year on-the-run-issue an outstanding amount of at least DKK 60 billion.

The net financing contribution from the Treasury bill programme is planned to be around zero, depending on auction demand and market conditions. New 12-month Treasury bills will be opened at auctions with settlement dates the first banking day of February, May, August and November.

The central government's foreign borrowing requirement is covered primarily by raising benchmark size syndicated euro loans in the 5-year maturity segment. As a supplement to raising larger loans, currency swaps from DKK to euro combined with domestic issuance may be used.

**Other debt management instruments**

As a supplement to the issuance policy, swaps, buy-backs and securities lending are used in the management of central-government debt.

The central government uses *interest-rate swaps* in the management of the duration of the debt. This allows for the separation of the issuance policy from the management of interest-rate risk. Interest-rate swaps are transacted in the domestic and in the euro-swap market, depending on depth and market conditions.

*Buy-backs* of securities maturing in 2004 are applied in the management of the central government's cash balances. Buy-backs of securities maturing after 2004 permit a smoothening of the redemption profile and the maintenance of a liquid on-the-run issue program.

The central government's and the Social Pension Fund's *securities lending facilities* aim at supporting liquidity in on-the-run issues and off-the-run issues respectively. The primary dealers have exclusive access to these facilities for securities traded on MTSDenmark.

SECURITIES SUBJECT TO BUY-BACKS AND SECURITIES LENDING FACILITIES — Table 3

| | Outstanding amount 18 December 2003 (DKK mill.) | Securities subject to buy-backs | Central government's securities lending facility | Social Pension Fund's securities lending facility[1] |
|---|---|---|---|---|
| *All Treasury bills* | 67,347 | | X | |
| *Bullet loans* | | | | |
| 4 per cent Treasury notes 2004 | 43,382 | X | | |
| 7 per cent government bonds 2004 | 44,001 | X | | X |
| 5 per cent government bonds 2005 | 57,511 | X | | X |
| 4 per cent Treasury notes 2005 | 35,150 | | X | |
| 3 per cent Treasury notes 2006[2] | | | X | |
| 8 per cent government bonds 2006 | 56,676 | X | | X |
| 7 per cent government bonds 2007 | 52,069 | X | | X |
| 4 per cent government bonds 2008 | 41,354 | | X | |
| 6 per cent government bonds 2009 | 66,646 | X | | X |
| 6 per cent government bonds 2011 | 60,501 | X | | X |
| 5 per cent government bonds 2013 | 77,945 | | X | |
| 7 per cent government bonds 2024 | 25,001 | | | X |
| *Serial bonds* | | | | |
| 10 per cent S 2004 | 948 | X | | |
| 5 per cent S 2007 | 22 | X | | |
| 4 per cent S 2017 | 74 | X | | |
| *Perpetuals* | | | | |
| 3.5 per cent 1886 perpetual | 45 | X | | |
| 3 per cent 1894 perpetual | 17 | X | | |
| 3.5 per cent 1901 perpetual | 8 | X | | |
| 3.5 per cent 1909 perpetual | 16 | X | | |

[1] All government bonds of the type bullet loans in the Social Pension Fund's portfolio are subject to securities lending.
[2] From 13 January 2004.

**Issuance and trading**

On 4 November 2003, electronic trading and market making in Danish government bonds on the MTS platform were introduced. The wholesale trade in Danish government bonds is organised as a separate division – MTSDenmark – under MTS Associated Markets, where also Finnish and Belgian government bonds are traded.

Primary dealers in Danish government bonds provide liquidity and quote two-way prices in all Danish government bonds of the type bullet loan and with a maturity of more than 13 months, cf. box 2. During the first trading month of MTSDenmark, the average daily turnover in Danish government bonds comprised nearly DKK 4 billion.[1]

Benchmark bonds in the 2-, 5- and 10-year segment are listed in box 2. Changes in benchmarks will be announced by the Government Debt Management Office at Danmarks Nationalbank.

Government bonds and Treasury notes are issued by tap sale in the newly established MTS trading system to primary dealers in Danish government bonds. Initial sale in new issues and buy-backs in government securities with less than 13 months remaining maturity will also be transacted on MTSDenmark with primary dealers acting as counterparties.

On 1 December 2003, market making was introduced on the Copenhagen Stock Exchange's retail market. A group of banks – Amtssparekassen Fyn, Danske Bank, Jyske Bank, Nordea, Nykredit and Sydbank – has entered into an agreement with the Government Debt Management Office to continuously provide two-way prices in Danish government bonds of the type bullet loans with more than 13 months maturity.

MTSDENMARK – PRIMARY DEALERS IN DANISH GOVERNMENT BONDS — Box 2

ABN Amro, Amtssparekassen Fyn, Barclays, Danske Bank, Deutsche Bank, HSH Nordbank, JP Morgan, Morgan Stanley, Nordea, Nykredit Bank, SE Banken, Svenska Handelsbanken and Sydbank.

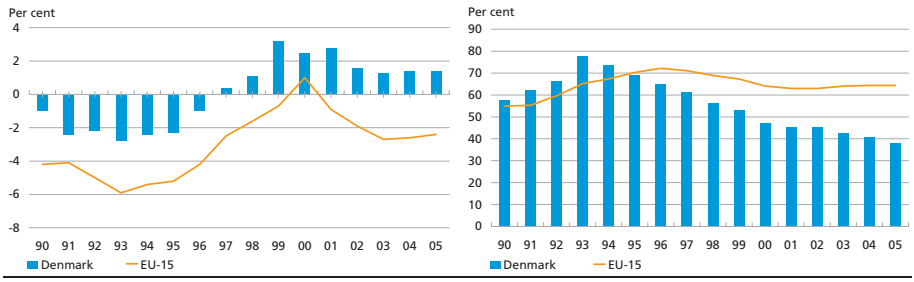
MARKET MAKING IN DANISH GOVERNMENT BONDS

| Benchmark and on-the-run issues: | Other bullet loans: |
|---|---|
| 4 per cent bullet loans 2005[1] | 5 per cent bullet loans 2005 |
| 3 per cent bullet loans 2006 (13 Jan 2004 -) | 8 per cent bullet loans 2006 |
| 4 per cent bullet loans 2008[1] | 7 per cent bullet loans 2007 |
| 5 per cent bullet loans 2013[1] | 6 per cent bullet loans 2009 |
| | 6 per cent bullet loans 2011 |
| | 7 per cent bullet loans 2024 |

[1] Benchmark bonds.

[1] Additional information on trading is available at www.mtsdenmark.com.

GENERAL-GOVERNMENT BUDGET SURPLUS TO GDP AND DEBT TO GDP Chart 1




Note: 2004 and 2005 figures are estimations in *Economic Survey*, December 2003.
Source: Ministry of Finance.

**Credit standing of Danish government securities**

The domestic and foreign central-government debt benefit from the highest rating by Fitch Ratings (AAA), Moody's (Aaa) and Standard & Poor's (AAA).

In April 2003, Standard & Poor's affirmed in the report *Research: Denmark (Kingdom of)* its long term AAA rating and short term A-1+ rating on Danish government bonds with an unchanged stable outlook. The affirmation was made with reference to the "enviable track record of macroeconomic stability, underpinned by prudent fiscal management and structural reforms".

In August 2003, Moody's affirmed Kingdom of Denmark's Aaa rating with a stable outlook in the annual report "Denmark: Global Credit Research". Moody's cited "the stable macroeconomic and political environment, high and evenly distributed incomes, and healthy government balance sheet".

Analytical reports and specific ratings on individual government papers are available at the websites of respectively Fitch Ratings (www.fitchratings.com), Moody's (www.moodys.com), and Standard & Poor's (www.ratingsdirect.com).

**Information**

*Danish Government Debt Management Strategy* is a semi-annual announcement of the Government Debt Management Office at Danmarks Nationalbank that provides information on objectives and strategies for managing the outstanding stock of debt within the context of the fiscal environment. The announcement also gives details on the borrowing requirement, expected funding policy, the list of on-the-run and buy-back issues etc. This announcement was made public on 17 December 2003.

This announcement supplements the annual publication *Danish Government Borrowing and Debt,* which aims to give a more profound un-

derstanding of the Danish government-debt policy. It describes developments during the preceding year and reports on new issues of relevance to debt management. The forthcoming publication will be published in February 2004 with an English translation in March 2004.

Further information on government debt management can be obtained from Danmarks Nationalbank's website: www.nationalbanken.dk under government debt. If you register with Danmarks Nationalbank's News Service, you will receive e-mail notifications of new information and updates concerning government borrowing and debt.

Additional information related to wholesale trading in Danish government bonds is available from the website of MTSDenmark at: www.mtsdenmark.com.

Please direct enquiries concerning this announcement to Danmarks Nationalbank, Financial Markets, Head of Government Debt Management, Ove Sten Jensen, telephone +45 3363 6102 or by e-mail to governmentdebt@nationalbanken.dk.

## ELECTRONIC TRADING AND MARKET-MAKING IN DANISH GOVERNMENT BONDS, 16 OCTOBER 2003

On 4 November 2003 electronic trading and market-making in Danish government bonds are introduced.

MTS, the predominant platform for trading in European bonds, is chosen as electronic trading platform. Wholesale trade in Danish government bonds will take place in a new market segment on MTS Associated Markets which is a Belgian MTS company on which Belgian and Finnish government bonds are already being traded.

All government bonds of the type bullet loan, with a maturity of more than 13 months, will be traded on MTS Associated Markets, i.e. the following government bonds:

- Benchmark and on-the-runs:
  4 per cent bullet loans 2005
  4 per cent bullet loans 2008
  5 per cent bullet loans 2013
- Other bullet loans:
  7 per cent bullet loans 2004
  5 per cent bullet loans 2005
  8 per cent bullet loans 2006
  7 per cent bullet loans 2007
  6 per cent bullet loans 2009
  6 per cent bullet loans 2011
  7 per cent bullet loans 2024

Issuance and buy-back operations of government bonds will take place on MTS Associated Markets.

A modern trading platform, where Danish government bonds are traded in the same way and as efficiently as other countries' government bonds, is a precondition for the government – also in future – to be able to finance its borrowing requirement in a well-functioning market with efficient pricing. Introducing electronic trading is a step forward in developing the Danish market and bringing its facilities in line with standards in other countries with developed financial markets.

The work related to introducing electronic trading and market-making has been carried out by Government Debt Management in cooperation with present and future market makers.

In connection with the introduction of electronic trading and market-making a primary dealer system has been established. Most OECD countries operate primary dealer systems. A group of banks, the so-called primary dealers, enter into agreement with the issuer in order to ensure

a well-functioning market. First of all, the primary dealers commit to currently offer bid and ask prices within fixed spreads and for fixed minimum amounts in the wholesale market. Introduction of electronic trading on the MTS platform has, as intended, made international banks more interested in playing an active role in the market for Danish government bonds. As a result, a number of new international banks have been nominated as primary dealers. The primary dealers are:

*ABN Amro, Amtssparekassen Fyn, Barclays, Danske Bank, Deutsche Bank, HSH Nordbank, JP Morgan, Morgan Stanley, Nordea, Nykredit Bank, SE Banken, Svenska Handelsbanken and Sydbank.*

At the Copenhagen Stock Exchange, an electronic pricing system for the retail market for Danish government bonds will be introduced. The contents of the pricing system have been sent to the Danish Securities Council.

Please direct any questions to the above to Head of Government Debt Management, Ove Sten Jensen, on phone +45 3363 6102.

# Appendix of Tables

CENTRAL-GOVERNMENT DEBT, YEAR-END 1993-2003 Table 1

| DKK million | 1993 | 1994 | 1995 |
|---|---|---|---|
| A. Debt | | | |
| *Domestic debt denominated in DKK*[1] | | | |
| - Fixed-rate bonds | 357,346 | 409,565 | 466,608 |
| - Floating-rate bonds | 41,241 | 30,345 | 20,722 |
| - Lottery bonds | 1,200 | 1,200 | 1,200 |
| - Compulsory savings | - | - | - |
| - Treasury notes | 94,200 | 111,705 | 102,697 |
| - Treasury bills | 58,339 | 56,238 | 58,385 |
| - Currency swaps from DKK to EUR | - | - | - |
| - Government securities held by the central government | - | - | - |
| - Interest-rate swaps, notional amount | | | |
| from fixed rate | - | - | - |
| to floating rate | - | - | - |
| Domestic debt denominated in DKK, total | 552,326 | 609,053 | 649,612 |
| *Domestic debt denominated in EUR*[2 3] | | | |
| - Fixed-rate bonds | 9,824 | 9,697 | 9,244 |
| - Government securities held by the central government | - | -970 | -1,138 |
| Domestic debt, total | 562,150 | 617,781 | 657,719 |
| *Foreign debt* | | | |
| - in USD | 50,889 | 24,913 | 6,425 |
| - in CHF | 20,914 | 18,393 | 13,836 |
| - in JPY | 5,612 | 10,419 | 9,329 |
| - in EUR[3] | 73,621 | 64,887 | 69,975 |
| - in other currencies | 14,575 | 12,954 | 11,599 |
| - Government securities held by the central government[4] | -1,338 | -1,784 | -5,516 |
| Foreign debt, total | 164,274 | 129,782 | 105,647 |
| Domestic and foreign debt, total | 726,424 | 747,563 | 763,366 |
| B. Government deposits with the central bank[5] | -88,781 | -55,266 | -33,677 |
| C. The Social Pension Fund | | | |
| - Government securities | -45,270 | -50,143 | -68,889 |
| - Other securities | -93,105 | -96,689 | -82,517 |
| The Social Pension Fund, nominal value, total[6] | -138,375 | -146,832 | -151,406 |
| Central-government debt, total (A+B+C) | 499,268 | 545,465 | 578,283 |
| Central-government debt, per cent of GDP | 55.5 | 56.5 | 57.3 |

Note: + denotes liabilities, - denotes assets.

[1] Does not include the holdings of the central government under the location-swap facility, cf. *Danish Government Borrowing and Debt 1993*. The facility was established in July 1993 and ended in April 1998.

[2] In connection with the introduction of new accounting principles for the government debt the 8.5 per cent EUR bullet loan 2002 has been reclassified as foreign debt instead of domestic debt as of 1998.

[3] Comprises loans in EUR, currencies of the euro-area member states and XEU.

[4] Recorded at acquisition price. From 1993 exchange-rate-adjusted.

CENTRAL-GOVERNMENT DEBT, YEAR-END 1993-2003 Table 1

| 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 516,812 | 556,874 | 550,989 | 537,289 | 506,992 | 494,875 | 497,938 | 480,874 |
| 16,760 | 9,848 | 4,346 | - | - | - | - | - |
| 1,200 | 1,200 | 1,000 | 900 | 900 | 900 | 400 | 400 |
| - | - | - | - | - | - | - | - |
| 84,499 | 49,140 | 58,830 | 74,040 | 81,257 | 70,788 | 79,371 | 78,532 |
| 51,234 | 50,001 | 41,255 | 36,350 | 36,846 | 49,224 | 63,404 | 67,347 |
| - | - | - | - | - | -4,800 | -16,200 | -16,200 |
| | | | | | | | |
| - | - | - | - | -2,000 | - | - | - |
| | | | | | | | |
| - | - | -500 | -7,950 | -20,950 | -27,400 | -37,300 | -43,600 |
| - | - | 500 | 7,950 | 20,950 | 27,400 | 37,300 | 43,600 |
| 670,505 | 667,063 | 656,420 | 648,579 | 623,995 | 610,987 | 624,913 | 610,953 |
| | | | | | | | |
| 9,597 | 6,634 | - | - | - | - | - | - |
| | | | | | | | - |
| -2,372 | - | - | - | - | - | - | |
| 677,730 | 673,697 | 656,420 | 648,579 | 623,995 | 610,987 | 624,913 | 610,953 |
| | | | | | | | |
| 4,562 | 1,514 | 1,336 | 1,187 | - | - | - | - |
| 6,179 | 3,974 | 1,094 | 3,616 | 3,822 | - | - | - |
| 2,396 | 1,047 | 562 | 2,453 | 1,672 | - | - | - |
| 88,826 | 90,661 | 84,982 | 82,386 | 79,287 | 83,753 | 83,689 | 83,861 |
| 6,519 | 6,418 | 365 | 383 | 428 | 42 | 42 | 42 |
| | | | | | | | |
| -6,986 | - | - | - | - | - | - | - |
| 101,495 | 103,613 | 88,338 | 90,025 | 85,209 | 83,795 | 83,730 | 83,903 |
| 779,225 | 777,310 | 744,758 | 738,604 | 709,204 | 694,782 | 708,644 | 694,856 |
| -31,052 | -29,024 | -30,400 | -35,231 | -31,332 | -39,621 | -45,952 | -40,880 |
| | | | | | | | |
| -83,435 | -92,453 | -100,135 | -105,432 | -106,312 | -109,474 | -113,132 | -118,138 |
| -65,336 | -54,368 | -43,468 | -36,207 | -33,244 | -31,621 | -28,230 | -20,576 |
| -148,772 | -146,821 | -143,603 | -141,640 | -139,556 | -141,095 | -141,362 | -138,714 |
| 599,401 | 601,465 | 570,755 | 561,733 | 538,316 | 514,066 | 521,329 | 515,262 |
| 56.5 | 53.9 | 49.4 | 46.5 | 42.1 | 38.8 | 38.3 | 37.0 |

[5] For 2003 the central government's account is compiled in accordance with the monthly balance sheet of Danmarks Nationalbank.

[6] Index-linked bonds are at indexed value.

DOMESTIC GOVERNMENT SECURITIES ISSUED IN 2003 — Table 2

| | |
|---|---|
| *No. 428, 5 per cent government bonds 2013 (5 pct. stående lån 2013)* | |
| Issued in 2003, DKK million | 32,100 |
| Interest payable | 15 Nov |
| Stock exchange code | 0992089 |
| Issue commenced | 19 Feb 2002 |
| Redemption date | 15 Nov 2013 |
| *No. 424, 4 per cent government bonds 2008 (4 pct. stående lån 2008)* | |
| Issued in 2003, DKK million | 20,400 |
| Interest payable | 15 Aug |
| Stock exchange code | 0992070 |
| Issue commenced | 22 Jan 2002 |
| Redemption date | 15 Aug 2008 |
| *No. 457, 4 per cent Treasury notes 2005 (4 pct. statsgældsbevis 2005)* | |
| Issued in 2003, DKK million | 35,150 |
| Interest payable | 15 Nov |
| Stock exchange code | 0992100 |
| Issue commenced | 21 Jan 2003 |
| Redemption date | 15 Nov 2005 |
| *No. 422, 4 per cent Treasury notes 2004 (4 pct. statsgældsbevis 2004)* | |
| Issued in 2003, DKK million | 700 |
| Interest payable | 15 Nov |
| Stock exchange code | 0992062 |
| Issue commenced | 8 Jan 2002 |
| Redemption date | 15 Nov 2004 |
| *No. 484, Treasury bills 2004 IV (Skatkammerbevis 2004 IV)* | |
| Issued in 2003, DKK million | 10,239 |
| Interest payable | - |
| Stock exchange code | 0981133 |
| Issue commenced | 3 Nov 2003 |
| Redemption date | 1 Nov 2004 |
| *No. 473, Treasury bills 2004 III (Skatkammerbevis 2004 III)* | |
| Issued in 2003, DKK million | 13,866 |
| Interest payable | - |
| Stock exchange code | 0981125 |
| Issue commenced | 1 Aug 2003 |
| Redemption date | 2 Aug 2004 |
| *No. 463, Treasury bills 2004 II (Skatkammerbevis 2004 II)* | |
| Issued in 2003, DKK million | 19,610 |
| Interest payable | - |
| Stock exchange code | 0981117 |
| Issue commenced | 1 May 2003 |
| Redemption date | 3 May 2004 |

| DOMESTIC GOVERNMENT SECURITIES ISSUED IN 2003 | Table 2 |
|---|---|
| *No. 458, Treasury bills 2004 I (Skatkammerbevis 2004 I)* | |
| Issued in 2003, DKK million | 23,632 |
| Interest payable | - |
| Stock exchange code | 0981109 |
| Issue commenced | 3 Feb 2003 |
| Redemption date | 2 Feb 2004 |
| *No. 455, Treasury bills 2003 IV (Skatkammerbevis 2003 IV)* | |
| Issued in 2003, DKK million | 11,392 |
| Interest payable | - |
| Stock exchange code | 0981095 |
| Issue commenced | 1 Nov 2002 |
| Redemption date | 3 Nov 2003 |
| *No. 446, Treasury bills 2003 III (Skatkammerbevis 2003 III)* | |
| Issued in 2003, DKK million | 5,189 |
| Interest payable | - |
| Stock exchange code | 0981087 |
| Issue commenced | 1 Aug 2002 |
| Redemption date | 1 Aug 2003 |
| *No. 435, Treasury bills 2003 II (Skatkammerbevis 2003 II)* | |
| Issued in 2003, DKK million | 379 |
| Interest payable | - |
| Stock exchange code | 0981079 |
| Issue commenced | 1 May 2002 |
| Redemption date | 1 May 2003 |

CENTRAL-GOVERNMENT FOREIGN BORROWING TRANSACTIONS IN 2003[1] Table 3

| Loan no. | Accept-ance date[2] | Issue date[2] | Nominal rate of interest, per cent p.a. | Type of loan[3] | Maturity date[2] | Nominal amount in million | Lead manager/Lender |
|---|---|---|---|---|---|---|---|
| 1000 | 07-05-03 | 14-05-03 | 3.25 | Bond | 14-11-08 | 2,300 EUR | Deutsche/ABN/JPMorgan |
| 298 | 29-04-03 | 02-05-03 | 0 | ECP | 30-05-03 | 20 EUR | Deutsche Bank |

[1] Including swaps, if any, in connection with new issues.
[2] Date format: dd-mm-yy.
[3] Bond is bond issue and ECP is Euro Commercial Paper.

CENTRAL-GOVERNMENT FOREIGN BORROWING TRANSACTIONS IN 2003[1] Table 3

| Issue price | Commissions and expenses, per cent | Counterparty | Notional amount in million | Nominal rate of interest | Amount in DKK million |
|---|---|---|---|---|---|
| 99.449 | 0.1 | | | | 16,982.7 |
| 99.80826 | | | | | 148.2 |

CENTRAL-GOVERNMENT DOMESTIC INTEREST-RATE SWAPS, 2003 Table 4a

| Loan no. | Start date[1] | Termination date[1] | Amount in DKK million |
|---|---|---|---|
| 459 | 28-02-03 | 28-02-13 | 300 |
| 460 | 05-03-03 | 05-03-13 | 300 |
| 461 | 14-03-03 | 14-03-13 | 300 |
| 462 | 07-04-03 | 07-04-08 | 300 |
| 464 | 13-05-03 | 13-05-13 | 300 |
| 465 | 22-05-03 | 22-05-13 | 300 |
| 466 | 28-05-03 | 28-05-13 | 300 |
| 467 | 17-06-03 | 17-06-10 | 200 |
| 468 | 24-06-03 | 24-06-10 | 300 |
| 469 | 26-06-03 | 28-06-10 | 300 |
| 470 | 09-07-03 | 09-07-10 | 300 |
| 471 | 24-07-03 | 24-07-13 | 200 |
| 472 | 28-07-03 | 28-07-13 | 200 |
| 474 | 04-08-03 | 04-08-10 | 300 |
| 475 | 04-08-03 | 04-08-10 | 200 |
| 476 | 06-08-03 | 06-08-13 | 300 |
| 477 | 14-08-03 | 14-08-13 | 500 |
| 478 | 19-08-03 | 19-08-13 | 300 |
| 479 | 21-08-03 | 21-08-13 | 300 |
| 480 | 06-10-03 | 07-10-13 | 200 |
| 481 | 13-10-03 | 14-10-13 | 200 |
| 482 | 22-10-03 | 22-10-13 | 200 |
| 483 | 27-10-03 | 27-10-13 | 200 |
| Total | | | 6,300 |

Note: The Kingdom of Denmark receives fixed interest and pays 6-month Cibor on all domestic interest-rate swaps entered into in 2003.

[1] Date format: dd-mm-yy.

CENTRAL-GOVERNMENT DOMESTIC INTEREST-RATE SWAPS
AS OF 31 DECEMBER 2003 Table 4b

| Termination year | Notional amount in DKK million |
|---|---|
| 2007 | 9,700 |
| 2008 | 800 |
| 2009 | 7,650 |
| 2010 | 14,600 |
| 2011 | 6,450 |
| 2012 | 0 |
| 2013 | 4,400 |
| Total domestic interest-rate swaps | 43,600 |

Note: The Kingdom of Denmark receives fixed interest and pays 6-month Cibor on all domestic interest-rate swaps.

CENTRAL-GOVERNMENT FOREIGN SWAPS UNCONNECTED TO NEW ISSUES, 2003 Table 4c

| Loan no. | Start date[3] | Receiving | | | Paying | | | Termination date[3] | Fee in DKK million |
|---|---|---|---|---|---|---|---|---|---|
| | | Currency | Million | Interest | Currency | Million | Interest | | |
| 1001 | 12-05-03 | EUR | 100.0 | 4.095 | EUR | 100.0 | 6-month Euribor | 12-05-13 | 0.0 |
| 1002 | 14-05-03 | EUR | 100.0 | 4.05875 | EUR | 100.0 | 6-month Euribor | 14-05-13 | 0.0 |
| 1003 | 15-05-03 | EUR | 100.0 | 4.105 | EUR | 100.0 | 6-month Euribor | 15-05-13 | 0.0 |
| 1004 | 29-05-03 | EUR | 60.0 | 3.73875 | EUR | 60.0 | 6-month Euribor | 29-05-13 | 0.0 |
| 1005 | 16-06-03 | EUR | 50.0 | 3.68625 | EUR | 50.0 | 6-month Euribor | 16-06-13 | 0.0 |
| 1006 | 19-06-03 | EUR | 50.0 | 3.6875 | EUR | 50.0 | 6-month Euribor | 19-06-13 | 0.0 |
| 1007 | 20-06-03 | EUR | 50.0 | 3.81 | EUR | 50.0 | 6-month Euribor | 20-06-13 | 0.0 |
| 1008 | 30-06-03 | EUR | 50.0 | 3.85 | EUR | 50.0 | 6-month Euribor | 30-06-13 | 0.0 |
| 1009 | 07-07-03 | EUR | 50.0 | 4.0575 | EUR | 50.0 | 6-month Euribor | 08-07-13 | 0.0 |
| 1010 | 07-07-03 | EUR | 50.0 | 4.0625 | EUR | 50.0 | 6-month Euribor | 07-07-13 | 0.0 |
| 1011 | 15-07-03 | EUR | 50.0 | 3.99875 | EUR | 50.0 | 6-month Euribor | 15-07-13 | 0.0 |
| 1012 | 15-08-03 | EUR | 50.0 | 3.505 | EUR | 50.0 | 6-month Euribor | 15-08-08 | 0.0 |
| 1013 | 20-08-03 | EUR | 50.0 | 4.3325 | EUR | 50.0 | 6-month Euribor | 20-08-13 | 0.0 |
| 1014 | 26-08-03 | EUR | 50.0 | 4.295 | EUR | 50.0 | 6-month Euribor | 26-08-13 | 0.0 |
| 943[1] | 08-09-03 | GBP | 6.2 | 3-month Libor -0.2% | EUR | 8.7 | 6-month Euribor -0.17% | 08-03-04 | -1.7 |
| 941[2] | 15-09-03 | GBP | 40.8 | 3-month Libor -0.2% | EUR | 57.8 | 6-month Euribor -0.17% | 15-03-04 | -1.7 |

[1] Currency swap attached to loan no. 943.
[2] Currency swap attached to loan no. 941.
[3] Date format: dd-mm-yy.

CENTRAL-GOVERNMENT DOMESTIC DEBT AS OF 31 DECEMBER 2003 Table 5

| Serial no. | Coupon, per cent | Name<br>Issue Period[1] | Redemption date | Outstanding amount, DKK million |
|---|---|---|---|---|
| **Government bonds, fixed interest rate** | | | | |
| *Bullet loans* | | | | |
| 257 | 7 | Stående lån 2004<br>25 May 1993-5 Dec 1994 | 15 Dec 2004 | 42,081.0 |
| 264 | 7 | Stående lån 2024<br>6 Apr 1994-31 Dec 2000 | 10 Nov 2024 | 25,001.0 |
| 269 | 8 | Stående lån 2006<br>5 Dec 1994-10 Apr 1996 | 15 Mar 2006 | 56,676.0 |
| 279 | 7 | Stående lån 2007<br>10 Apr 1996-30 Dec 1997 | 15 Nov 2007 | 52,069.0 |
| 286 | 5 | Stående lån 2005<br>14 Jan 1997-21 Jan 2002 | 15 Aug 2005 | 57,511.0 |
| 291 | 6 | Stående lån 2009<br>14 Jan 1998-3 May 2000 | 15 Nov 2009 | 66,646.0 |
| 358 | 6 | Stående lån 2011<br>4 May 2000-18 Feb 2002 | 15 Nov 2011 | 60,501.0 |
| 424 | 4 | Stående lån 2008<br>22 Jan 2002- | 15 Aug 2008 | 41,354.0 |
| 428 | 5 | Stående lån 2013<br>19 Feb 2002- | 15 Nov 2013 | 77,945.0 |
| *Amortised loans* | | | | |
| 14 | 5 | S 2007<br>20 Oct 1953-12 Sep 1958 | 15 Sep 2007[2] | 22.0 |
| 16 | 4 | S 2017<br>29 Nov 1955-12 Sep 1958 | 15 Jun 2017[2] | 73.7 |
| 57 | 10 | S 2004<br>10 May 1983-30 Aug 1985 | 15 Oct 2004 | 948.0 |
| *Perpetuals* | | | | |
| 1 | 3.5 | Dansk Statslån<br>11 Dec 1886 | perpetuals[2] | 45.0 |
| 80 | 5 | Dansk-Islandsk Fond 1918<br>20 May 1919 | perpetuals | 1.0 |
| Government bonds, fixed interest rate, total ..... | | | | 480,873.7 |

CENTRAL-GOVERNMENT DOMESTIC DEBT AS OF 31 DECEMBER 2003 Table 5

| Serial no. | Coupon, per cent | Name<br>Issue Period[1] | Redemption date | Outstanding amount, DKK million |
|---|---|---|---|---|
| **Treasury notes** | | | | |
| *Bullet loans* | | | | |
| 422 | 4 | Statsgældsbevis 2004<br>8 Jan 2002 –20 Jan 2003 | 15 Nov 2004 | 43,382.0 |
| 457 | 4 | Statsgældsbevis 2005<br>21 Jan 2003 –13 Jan 2004 | 15 Nov 2005 | 35,150.0 |
| Treasury notes, total ..... | | | | 78,532.0 |
| **Treasury bills** | | | | |
| *Zero-coupon loans* | | | | |
| 458 | 0 | Skatkammerbevis 2004 I<br>3 Feb 2003-1 Nov 2002 | 2 Feb 2004 | 23,632.0 |
| 463 | 0 | Skatkammerbevis 2004 II<br>1 May 2003-3 Feb 2004 | 3 May 2004 | 19,610.0 |
| 473 | 0 | Skatkammerbevis 2004 III<br>1 Aug 2003- | 2 Aug 2004 | 13,866.0 |
| 484 | 0 | Skatkammerbevis 2004 IV<br>3 Nov 2003- | 1 Nov 2004 | 10,239.0 |
| Treasury bills, total ..... | | | | 67,347.0 |
| **Lottery bonds** | | | | |
| 20 | 7 | Præmieobligationslån af 1965/2010<br>22 Sep 1965 | 22 Sep 2010 | 100.0 |
| 21 | 7 | Præmieobligationslån af 1969/2009<br>1 Oct 1969 | 31 Dec 2009 | 100.0 |
| 39 | 10 | Præmieobligationslån af 1980/2005<br>28 Oct 1980 | 1 Jul 2005 | 200.0 |
| Lottery bonds, total ..... | | | | 400.0 |
| **Domestic government securities, total** ..... | | | | 627,152.7 |
| Swap from DKK to EUR ..... | | | | -16,200.0 |
| **Central-government domestic debt, total** ..... | | | | 610,952.7 |

[1] The issue period refers to the period the series has been open for issue. For Treasury bills the dates refer to settlement date. Series still open for issue are marked with "-" after the first day of issue. Certain securities are only sold on one single date. For these securities only this date is stated.

[2] May be redeemed by the central government at three months' notice.

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount, DKK million (1) | Note |
|---|---|---|---|---|---|
| **AUD loans** | | | | | |
| 838 | 3.46 | 1997/07 AUD(interest on 33.86 million)/JPY (redemption) | 0.0 | 0.0 | |
| - | 3.46 | 1997/07 swap to DEM with floating rate | -0.0 | -0.0 | |
| Total AUD ..... | | | 0.0 | 0.0 | |
| **CHF loans** | | | | | |
| 796 | 2.25 | 1997/04 | 200.0 | 954.8 | |
| - | 2.26688 | 1997/04 swap to DEM with floating rate | -200.0 | -954.8 | |
| Total CHF ..... | | | 0.0 | 0.0 | |
| **DKK loans** | | | | | |
| 1 | 3 | 1894 perpetual | 17.0 | 17.0 | (2) |
| 2 | 3.5 | 1901 perpetual | 8.4 | 8.4 | (2) |
| 3 | 3.5 | 1909 perpetual | 16.3 | 16.3 | (2) |
| Total DKK ..... | | | 41.6 | 41.6 | |
| **EUR** | | | | | |
| **DEM loans** | | | | | |
| 713 | float. | 1996/06 swap from FRF with floating rate | 146.6 | 558.1 | |
| 735 | 6.3875 | 1996/06 swap from floating rate | 146.6 | 558.1 | |
| - | float. | 1996/06 swap to fixed rate | -146.6 | -558.1 | |
| 772 | float. | 1996/06 swap from USD with fixed rate | 29.9 | 114.0 | |
| 790 | 5.925 | 1996/06 swap from floating rate | 29.9 | 114.0 | |
| - | float. | 1996/06 swap to fixed rate | -29.9 | -114.0 | |
| 794 | float. | 1997/07 swap from JPY with structured rate | 13.6 | 51.9 | |
| 796 | float. | 1997/04 swap from CHF with fixed rate | 228.7 | 870.4 | |
| 799 | 5.73 | 1997/07 swap from floating rate | 13.6 | 51.9 | |
| - | float. | 1997/07 swap to fixed rate | -13.6 | -51.9 | |
| 800 | 5.275 | 1997/04 swap from floating rate | 228.7 | 870.4 | |
| - | float. | 1997/04 swap to fixed rate | -228.7 | -870.4 | |
| 835 | float. | 1997/07 swap from JPY with fixed rate | 69.4 | 264.3 | |
| 838 | float. | 1997/07 swap from AUD(interest)/JPY (redemption) with fixed rate | 44.3 | 168.8 | |
| 842 | 5.826 | 1997/07 swap from floating rate | 69.4 | 264.3 | |
| - | float. | 1997/07 swap to fixed rate | -69.4 | -264.3 | |
| 844 | 5.6925 | 1997/07 swap from floating rate | 44.3 | 168.8 | |
| - | float. | 1997/07 swap to fixed rate | -44.3 | -168.8 | |
| 849 | float. | 1997/04 swap from USD with fixed rate | 926.0 | 3,524.7 | |
| 850 | float. | 1997/07 swap from JPY with structured rate | 31.0 | 118.0 | |

[1] All loans are repaid at maturity unless otherwise stated.
The outstanding amount of some loans has been reduced during the term of the loan through buy-backs to which asset swaps often have been connected.
The redemptions are in some cases structured, i.e. they are calculated according to a certain formula and can be bigger or smaller than the outstanding amounts mentioned in the Table.

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **EUR – continued** | | | | | |
| **DEM loans – continued** | | | | | |
| 852 | 5.4675 | 1997/04 swap from floating rate | 926.0 | 3,524.7 | |
| - | float. | 1997/04 swap to fixed rate | -926.0 | -3,524.7 | |
| 853 | float. | 1997/07 swap from JPY with structured rate | 7.6 | 28.8 | |
| 854 | 5.25 | 1997/04 | 1,000.0 | 3,806.4 | |
| 855 | float. | 1997/07 swap from JPY with fixed rate | 49.3 | 187.6 | |
| 862 | float. | 1997/07 swap from USD with fixed rate | 43.5 | 165.7 | |
| 863 | float. | 1997/04 swapped to floating rate | 125.0 | 475.8 | |
| 870 | float. | 1998/05 swap from USD with fixed rate | 908.6 | 3,458.5 | |
| 881 | float. | 1998/07 swap from NOK with fixed rate | 74.3 | 282.8 | |
| 888 | float. | 1998/07 swap from SEK with fixed rate | 102.0 | 388.3 | |
| 890 | float. | 1998/07 swap from SEK with fixed rate | 101.5 | 386.3 | |
| 891 | float. | 1998/06 swap from SEK with fixed rate | 81.9 | 311.7 | |
| Total DEM ..... | | | 3,983.3 | 15,161.9 | |
| **EUR loans** | | | | | (3) |
| 879 | 4.625 | 1998/08 | 475.0 | 3,536.2 | |
| 889 | 3.4 | 1998/04 swapped to floating rate | 89.0 | 662.6 | |
| 895 | float. | 1999/06 swap to USD with fixed rate (Swap concerning buy-back (USD 20 million) of loan no. 772) | -17.1 | -127.1 | |
| 906 | float. | 1999/04 swap from GBP with fixed rate | 231.7 | 1,724.6 | |
| - | float. | 2000/04 swap from GBP with fixed rate | 79.7 | 593.7 | |
| 907 | float. | 1999/05 swap from NOK with fixed rate | 61.7 | 459.5 | |
| 913 | float. | 1999/05 swap from USD with fixed rate | 465.0 | 3,461.7 | |
| - | float. | 2000/05 swap from USD with fixed rate | 35.1 | 261.3 | |
| 914 | 5.125 | 1999/05 swap from floating rate | 100.0 | 744.5 | |
| - | float. | 1999/05 swap to fixed rate | -100.0 | -744.5 | |
| 915 | 5.1625 | 1999/05 swap from floating rate | 100.0 | 744.5 | |
| - | float. | 1999/05 swap to fixed rate | -100.0 | -744.5 | |
| 921 | 3.4 | 2000/04 swap from floating rate | 4.0 | 29.8 | |
| - | float. | 2000/04 swap to fixed rate (Swap concerning buy-back (EUR 4 million) of loan no. 889) | -4.0 | -29.8 | |
| 922 | 3.4 | 2000/04 swap from floating rate | 3.0 | 22.3 | |
| - | float. | 2000/04 swap to fixed rate (Swap concerning buy-back (EUR 3 million) of loan no. 889) | -3.0 | -22.3 | |
| 926 | 3.4 | 2000/04 swap from floating rate | 4.0 | 29.8 | |
| - | float. | 2000/04 swap to fixed rate (Swap concerning buy-back (EUR 4 million) of loan no. 889) | -4.0 | -29.8 | |
| 941 | float. | 2003/04 swap from GBP with floating rate | 57.8 | 430.0 | |
| 943 | float. | 2003/04 swap from GBP with floating rate | 8.7 | 64.8 | |
| 948 | float. | 2001/05 swap from GBP with fixed rate | 40.7 | 302.8 | |
| 949 | float. | 2001/04 swap from USD with fixed rate | 555.2 | 4,133.6 | |
| 950 | float. | 2001/04 swap from USD with fixed rate | 17.0 | 126.7 | |
| 951 | float. | 2001/04 swap from USD with fixed rate | 17.1 | 127.2 | |

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **EUR – continued** | | | | | |
| **EUR loans – continued** | | | | | |
| 952 | float. | 2001/06 swap from USD with fixed rate | 1,129.5 | 8,409.0 | |
| 953 | float. | 2001/11 swap from fixed rate | 75.0 | 558.3 | |
| - | 4.985 | 2001/11 swap to floating rate | -75.0 | -558.3 | |
| 954 | float. | 2001/11 swap from fixed rate | 75.0 | 558.3 | |
| - | 4.985 | 2001/11 swap to floating rate | -75.0 | -558.3 | |
| 10001 | float. | 2001/06 swap from DKK with floating rate | 67.1 | 499.4 | |
| 10002 | float. | 2001/06 swap from DKK with floating rate | 67.2 | 499.9 | |
| 10003 | float. | 2001/06 swap from DKK with floating rate | 134.4 | 1.000.2 | |
| 10004 | float. | 2001/08 swap from DKK with floating rate | 47.1 | 350.5 | |
| 10005 | float. | 2001/08 swap from DKK with floating rate | 47.1 | 350.5 | |
| 10006 | float. | 2001/06 swap from DKK with floating rate | 40.3 | 300.4 | |
| 10007 | float. | 2001/07 swap from DKK with floating rate | 67.2 | 500.0 | |
| 10008 | float. | 2001/08 swap from DKK with floating rate | 53.7 | 399.7 | |
| 10009 | float. | 2001/08 swap from DKK with floating rate | 67.1 | 499.8 | |
| 10010 | float. | 2001/06 swap from DKK with floating rate | 53.7 | 400.0 | |
| 957 | float. | 2002/12 swap from fixed rate | 75.0 | 558.3 | |
| - | 5.0225 | 2002/12 swap to floating rate | -75.0 | -558.3 | |
| 958 | float. | 2002/12 swap from fixed rate | 60.0 | 446.7 | |
| - | 5.076 | 2002/12 swap to floating rate | -60.0 | -446.7 | |
| 959 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.255 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 960 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.3825 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 961 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.455 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 962 | 4.875 | 2002/07 | 1,500.0 | 11,166.9 | |
| 963 | float. | 2002/07 swap from fixed rate | 500.0 | 3,722.3 | |
| - | 5.025 | 2002/07 swap to floating rate | -500.0 | -3,722.3 | |
| 964 | float. | 2002/07 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.02125 | 2002/07 swap to floating rate | -200.0 | -1,488.9 | |
| 966 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.425 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 967 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.434 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 968 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.49 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 969 | float. | 2002/12 swap from fixed rate | 50.0 | 372.2 | |
| - | 5.2125 | 2002/12 swap to floating rate | -50.0 | -372.2 | |
| 970 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.245 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 972 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.17625 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 973 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.205 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 974 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 5.195 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 975 | float. | 2002/12 swap from fixed rate | 150.0 | 1,116.7 | |
| - | 5.17625 | 2002/12 swap to floating rate | -150.0 | -1,116.7 | |
| 976 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **EUR – continued** | | | | | |
| **EUR loans – continued** | | | | | |
| - | 5.2125 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 977 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.2325 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 978 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 5.066 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 980 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 4.7525 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 981 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.85 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 982 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 4.9175 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 984 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.8375 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 987 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.735 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 988 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.76625 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 989 | float. | 2002/12 swap from fixed rate | 200.0 | 1,488.9 | |
| - | 4.6375 | 2002/12 swap to floating rate | -200.0 | -1,488.9 | |
| 990 | float. | 2002/12 swap from fixed rate | 150.0 | 1,116.7 | |
| - | 4.621 | 2002/12 swap to floating rate | -150.0 | -1,116.7 | |
| 991 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.58 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 992 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.5975 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 993 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.6025 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 994 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.635 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 995 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.666 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 996 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.621 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 997 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.645 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 998 | float. | 2002/12 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.721 | 2002/12 swap to floating rate | -100.0 | -744.5 | |
| 999 | float. | 2002/12 swap from fixed rate | 50.0 | 372.2 | |
| - | 4.82375 | 2002/12 swap to floating rate | -50.0 | -372.2 | |
| 10011 | float. | 2002/09 swap from DKK with floating rate | 53.8 | 400.3 | |
| 10012 | float. | 2002/09 swap from DKK with floating rate | 67.2 | 500.6 | |
| 10013 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 501.0 | |
| 10014 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.0 | |
| 10015 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 501.1 | |
| 10016 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 500.9 | |
| 10017 | float. | 2002/09 swap from DKK with floating rate | 40.4 | 300.6 | |
| 10018 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 500.8 | |
| 10019 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 500.8 | |
| 10020 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 500.7 | |

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **EUR – continued** | | | | | |
| **EUR loans – continued** | | | | | |
| 10021 | float. | 2002/09 swap from DKK with floating rate | 67.3 | 500.8 | |
| 10022 | float. | 2002/09 swap from DKK with floating rate | 134.6 | 1,002.2 | |
| 10023 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.2 | |
| 10024 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.0 | |
| 10025 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.2 | |
| 10026 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.2 | |
| 10027 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 501.0 | |
| 10028 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 500.9 | |
| 10029 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 500.9 | |
| 10030 | float. | 2002/07 swap from DKK with floating rate | 67.3 | 500.8 | |
| 10031 | float. | 2002/07 swap from DKK with floating rate | 53.9 | 401.0 | |
| 10032 | float. | 2002/07 swap from DKK with floating rate | 53.9 | 401.0 | |
| 10033 | float. | 2002/07 swap from DKK with floating rate | 53.9 | 401.0 | |
| 1000 | 3.25 | 2003/08 | 2,300.0 | 17,122.6 | |
| 1001 | float. | 2003/13 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.095 | 2003/13 swap to floating rate | -100.0 | -744.5 | |
| 1002 | float. | 2003/13 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.05875 | 2003/13 swap to floating rate | -100.0 | -744.5 | |
| 1003 | float. | 2003/13 swap from fixed rate | 100.0 | 744.5 | |
| - | 4.105 | 2003/13 swap to floating rate | -100.0 | -744.5 | |
| 1004 | float. | 2003/13 swap from fixed rate | 60.0 | 446.7 | |
| - | 3.73875 | 2003/13 swap to floating rate | -60.0 | -446.7 | |
| 1005 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.68625 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1006 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.6875 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1007 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.81 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1008 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.85 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1009 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 4.0575 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1010 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 4.0625 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1011 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.99875 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1012 | float. | 2003/08 swap from fixed rate | 50.0 | 372.2 | |
| - | 3.505 | 2003/08 swap to floating rate | -50.0 | -372.2 | |
| 1013 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 4.3325 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| 1014 | float. | 2003/13 swap from fixed rate | 50.0 | 372.2 | |
| - | 4.295 | 2003/13 swap to floating rate | -50.0 | -372.2 | |
| Total EUR ..... | | | 9,225.2 | 68,678.2 | |
| **FRF loans** | | | | | |
| 713 | float. | 1996/06 | 500.0 | 567.5 | |
| - | float. | 1996/06 swap to DEM with floating rate | -500.0 | -567.5 | |
| Total FRF ..... | | | 0.0 | 0.0 | |

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **EUR – continued** | | | | | |
| **NLG loans** | | | | | |
| 211 | 9.5 | 1984/04 | 6.3 | 21.1 | (4) |
| Total NLG ..... | | | 6.3 | 21.1 | |
| EUR total ..... | | | 11,264.7 | 83,861.3 | |
| **GBP loans** | | | | | |
| 120 | 13 | 1980/05 | 25.5 | 269.7 | |
| 906 | 5.875 | 1999/04 | 200.0 | 2,116.1 | |
| - | 5.875 | 1999/04 swap to EUR with floating rate | -150.0 | -1,587.1 | |
| - | 5.875 | 2000/04 swap to EUR with floating rate | -50.0 | -529.0 | |
| 941 | float. | 2000/09 EIB loan, Danish Higher Education Framework A | 40.8 | 431.7 | |
| - | float. | 2003/04 swap to EUR with floating rate | -40.8 | -431.7 | |
| 943 | float. | 2000/09 EIB loan, Danish Motorways III B | 6.2 | 65.1 | |
| - | float. | 2003/04 swap to EUR with floating rate | -6.2 | -65.1 | |
| 948 | 13 | 2001/05 swap to EUR with floating rate | -25.5 | -269.7 | |
| Total GBP ..... | | | 0.0 | 0.0 | |
| **JPY loans** | | | | | |
| 794 | float. | 1997/07 | 1,000.0 | 55.7 | |
| - | float. | 1997/07 swap to DEM with floating rate | -1,000.0 | -55.7 | |
| 835 | 2.63 | 1997/07 | 5,000.0 | 278.4 | |
| - | 2.63 | 1997/07 swap to DEM with floating rate | -5,000.0 | -278.4 | |
| 838 | 0 | 1997/07 JPY(redemption)/AUD(interest) | 3,000.0 | 167.0 | |
| - | 0 | 1997/07 swap to DEM with floating rate | -3,000.0 | -167.0 | |
| 850 | float. | 1997/07 | 2,000.0 | 111.3 | |
| - | float. | 1997/07 swap to DEM with floating rate | -2,000.0 | -111.3 | |
| 853 | float. | 1997/07 | 500.0 | 27.8 | |
| - | float. | 1997/07 swap to DEM with floating rate | -500.0 | -27.8 | |
| 855 | 2.02 | 1997/07 EIB loan, Danish Road By-passes B | 3,400.0 | 189.3 | |
| - | 2.02 | 1997/07 swap to DEM with floating rate | -3,400.0 | -189.3 | |
| Total JPY ..... | | | 0.0 | 0.0 | |
| **NOK loans** | | | | | |
| 881 | 6.25 | 1998/07 | 330.0 | 291.8 | |
| - | 6.25 | 1998/07 swap to DEM with floating rate | -330.0 | -291.8 | |
| 907 | 5.75 | 1999/05 | 500.0 | 442.1 | |
| - | 5.75 | 1999/05 swap to EUR with floating rate | -500.0 | -442.1 | |
| Total NOK ..... | | | 0.0 | 0.0 | |
| **SEK loans** | | | | | |
| 888 | 5 | 1998/07 | 500.0 | 410.1 | |
| - | 5 | 1998/07 swap to DEM with floating rate | -500.0 | -410.1 | |
| 890 | 5.12 | 1998/07 | 500.0 | 410.1 | |
| - | 5.12 | 1998/07 swap to DEM with floating rate | -500.0 | -410.1 | |
| 891 | 5.065 | 1998/06 | 400.0 | 328.1 | |

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2003[1] Table 6

| Loan no. | Rate of interest, per cent p.a. | Title | Outstanding amount, million of currency | Outstanding amount DKK million (1) | Note |
|---|---|---|---|---|---|
| **SEK loans – continued** | | | | | |
| - | 5.065 | 1998/06 swap to DEM with floating rate | -400.0 | -328.1 | |
| Total SEK ..... | | | 0.0 | 0.0 | |
| **USD loans** | | | | | |
| 772 | 6.065 | 1996/06 swap to DEM with floating rate | -20.0 | -119.2 | |
| 849 | 6.25 | 1997/04 | 500.0 | 2,978.8 | |
| - | 6.25 | 1997/04 swap to DEM with floating rate | -500.0 | -2,978.8 | |
| 862 | 4 | 1997/07 | 30.0 | 178.7 | |
| - | 4 | 1997/07 swap to DEM with floating rate | -30.0 | -178.7 | |
| 870 | 5.75 | 1998/05 | 500.0 | 2,978.8 | |
| - | 5.75 | 1998/05 swap to DEM with floating rate | -500.0 | -2,978.8 | |
| 895 | 6.065 | 1999/06 swap from EUR with floating rate (Swap concerning buy-back (USD 20 million) of loan no. 772) | 20.0 | 119.2 | |
| 913 | 6.625 | 1999/05 | 530.0 | 3,157.5 | |
| - | 6.625 | 1999/05 swap to EUR with floating rate | -500.0 | -2,978.8 | |
| - | 6.625 | 2000/05 swap to EUR with floating rate | -30.0 | -178.7 | |
| 949 | 5 | 2001/04 | 500.0 | 2,978.8 | |
| - | 5 | 2001/04 swap to EUR with floating rate | -500.0 | -2,978.8 | |
| 950 | 0 | 2001/04 | 15.0 | 89.4 | |
| - | 0 | 2001/04 swap to EUR with floating rate | -15.0 | -89.4 | |
| 951 | 0 | 2001/04 | 15.0 | 89.4 | |
| - | 0 | 2001/04 swap to EUR with floating rate | -15.0 | -89.4 | |
| 952 | 5.125 | 2001/06 | 1,000.0 | 5,957.6 | |
| - | 5.125 | 2001/06 swap to EUR with floating rate | -1,000.0 | -5,957.6 | |
| Total USD ..... | | | 0.0 | 0.0 | |
| **Central-government foreign debt, total** ..... | | | | 83,902.9 | |

(1) The outstanding amount as of 31 December 2003 is calculated on the basis of the following exchange rates as of 30 December 2003 expressed as the exchange rate per 100 units: AUD = 444.67, CHF = 477.4, EUR = 744.46, GBP = 1,058.07, JPY = 5.5673, NOK = 88.41, SEK = 82.02, USD = 595.76. The outstanding amount as of 31 December 2003 in the former national currencies in the eurozone is converted into DKK by use of the irrevocable fixed exchange rates vis-à-vis EUR: DEM = 1.95583, FRF = 6.55957, NLG = 2.20371.

(2) Multi-currency loan. The creditor can choose which currency to make payments in, however at a fixed rate of exchange. At present DKK is the most advantageous currency for the creditor. Redeemable by the Kingdom of Denmark at 3 months' notice.

(3) Including XEU loans issued before 1 January 1999.

(4) Redeemable according to the principle of annuities. Semi-annual or annual payments, beginning after a grace period of at least one year.

SERVICE ON CENTRAL-GOVERNMENT DOMESTIC DEBT[1], END-2003 Table 7

| DKK billion | Interest | Redemptions | Total |
|---|---|---|---|
| 2004 | 30.5 | 86.4 | 116.9 |
| 2005 | 25.7 | 92.9 | 118.6 |
| 2006 | 21.4 | 54.0 | 75.4 |
| 2007 | 16.9 | 45.9 | 62.7 |
| 2008 | 13.7 | 39.8 | 53.4 |
| 2009 | 12.1 | 61.1 | 73.1 |
| 2010 | 8.3 | 0.1 | 8.4 |
| 2011 | 8.9 | 60.5 | 69.4 |
| 2012 | 5.6 | 0.0 | 5.6 |
| 2013 | 5.5 | 78.0 | 83.5 |
| 2014 | 1.8 | 0.0 | 1.8 |
| 2015 | 1.8 | 0.0 | 1.8 |
| 2016 | 1.8 | 0.0 | 1.8 |
| 2017 | 1.8 | 0.0 | 1.8 |
| 2018 | 1.8 | 0.0 | 1.8 |
| 2019 | 1.8 | 0.0 | 1.8 |
| 2020 | 1.8 | 0.0 | 1.8 |
| 2021 | 1.8 | 0.0 | 1.8 |
| 2022 | 1.8 | 0.0 | 1.8 |
| 2023 | 1.8 | 0.0 | 1.8 |
| 2024 | 1.8 | 25.0 | 26.8 |
| Total | 167.8 | 543.6 | 711.4 |

[1] Excluding Treasury bills. Including net interest payments on domestic interest-rate swaps. Currency swaps from kroner to euro are included in the redemptions. In the expiry year of the swap the central government receives kroner, which reduces the need for issuing domestic government securities.

SERVICE ON CENTRAL-GOVERNMENT FOREIGN DEBT[1], END-2003 Table 8

| DKK billion | Interest | Redemptions | Total |
|---|---|---|---|
| 2004 | 1.5 | 16.1 | 17.6 |
| 2005 | 0.9 | 7.9 | 8.9 |
| 2006 | 0.7 | 12.0 | 12.7 |
| 2007 | 0.4 | 19.4 | 19.8 |
| 2008 | -0.1 | 22.3 | 22.1 |
| 2009 | -0.9 | 6.2 | 5.3 |
| 2010 | -1.0 | 0.0 | -1.0 |
| 2011 | -1.0 | 0.0 | -1.0 |
| 2012 | -1.1 | 0.0 | -1.1 |
| 2013 | -0.2 | 0.0 | -0.2 |
| Total | -0.8 | 83.9 | 83.0 |

[1] Including net interest payments on swaps.

KINGDOM OF DENMARK'S RATING IN DOMESTIC CURRENCY — Table 9a

| | Moody's | Standard & Poor's |
|---|---|---|
| 1981, Mar | | AAA |
| 1986, Jul | Aa | |
| 1986, Aug | Aa1 | |
| 1986, Nov | Aaa | |
| Current rating | Aaa | AAA |

Note: Moody's Investors Service and Standard & Poor's use the following ratings:
*Moody's:* Aaa, Aa, A, Baa, Ba, B, Caa, Ca and C.
For the categories Aa to Caa are used 1, 2 or 3 to indicate a status slightly better or worse within the category.
*Standard & Poor's:* AAA, AA, A, BBB, BB, B, CCC, CC, C and D.
For the categories AA to CCC are used + or - to indicate a status slightly better or worse within the category.

KINGDOM OF DENMARK'S RATING IN FOREIGN CURRENCY — Table 9b

| | Moody's | Standard & Poor's |
|---|---|---|
| 1981, Mar | | AAA |
| 1983, Jan | | AA+ |
| 1985, Apr | Aa | |
| 1986, Aug | Aa1 | |
| 1987, Mar | | AA |
| 1991, Oct | | AA+ |
| 1999, Aug | Aaa | |
| 2001, Feb | | AAA |
| Current rating | Aaa | AAA |

Note: See the note in Table 9a for ranking of the rating categories.

RATING OF SELECTED COUNTRIES' CENTRAL-GOVERNMENT DEBT — Table 10

| | Moody's | | Standard & Poor's | |
|---|---|---|---|---|
| | Domestic | Foreign | Domestic | Foreign |
| Australia | Aaa | Aaa | AAA | AAA |
| Belgium | Aa1 | Aa1 | AA+ | AA+ |
| Denmark | Aaa | Aaa | AAA | AAA |
| Finland | Aaa | Aaa | AAA | AAA |
| France | Aaa | Aaa | AAA | AAA |
| Greece | A1 | A1 | A+ | A+ |
| Netherlands | Aaa | Aaa | AAA | AAA |
| Ireland | Aaa | Aaa | AAA | AAA |
| Italy | Aa2 | Aa2 | AA | AA |
| Japan | A2 | Aa1 | AA- | AA- |
| New Zealand | Aaa | Aaa | AAA | AA+ |
| Norway | Aaa | Aaa | AAA | AAA |
| Portugal | Aa2 | Aa2 | AA | AA |
| Switzerland | Aaa | Aaa | AAA | AAA |
| Spain | Aaa | Aaa | AA+ | AA+ |
| UK | Aaa | Aaa | AAA | AAA |
| Sweden | Aaa | Aaa | AAA | AA+ |
| South Africa | A2 | Baa2 | A | BBB |
| Czech Republic | A1 | A1 | A+ | A- |
| Germany | Aaa | Aaa | AAA | AAA |
| USA | Aaa | Aaa | AAA | AAA |
| Austria | Aaa | Aaa | AAA | AAA |

Note: As published in January 2004. See the note in Table 9a for ranking of the rating categories.
Source: Moody's Investors Service and Standard & Poor's.

# Glossary

This glossary presents explanations of a number of financial terms that are often used in Danish Government Borrowing and Debt. Terms in *italics* are included elsewhere in the glossary.

**Acceptance date**
The date on which a loan is agreed.

**Accrued interest**
Accrued interest is payment for the interest accruing on a paper since the last interest due date. In the Danish bond market trades are with coupons. The buyer of the paper pays a proportion of the coupon to the seller for the period from the last due date to the settlement date. In return, the buyer receives the whole of the following coupon.

**Auction**
Issuance of government securities via auction is undertaken in large single issues at regular intervals. At an auction, a bond is offered at a given nominal interest rate, maturity and redemption profile. A group of market participants may give bids for a certain volume of bonds at a given price (or interest rate).

When government securities are sold via auction a distinction is often drawn between two different methods of fixing the price paid by the bidders. In the "uniform pricing" method, a cut-off price is fixed on the basis of the bids received, and all bids at the cut-off price or above are met at the cut-off price. If the total volume of bids at the cut-off price and above exceeds the volume that the issuer wishes to sell, allocation can take place on a pro-rata basis. This entails that for bidders who have submitted bids at the actual cut-off price only a part of the bids are honoured. The Danish central government uses auctions with "uniform pricing" on sale of Treasury bills where bids are made for an interest rate rather than a price.

By the "multiple pricing" method a cut-off price is likewise fixed on the basis of the bids received, and all bids at the cut-off price or above are met at the prices offered by the individual bidders. This method is used in the Danish central government's opening auctions for government bonds and Treasury notes.

**Basis points**
1 basis point is 0.01 percentage points. This is applied especially to interest-rate spreads.

**Benchmark bond**
A key issue. Benchmark bonds are used as a reference in the pricing of other bonds and financial products in the market. Changes of the benchmark status of Danish government securities are determined and published by Government Debt Management after discussion in the *Primary Dealer* Committee.

**Bid-ask**
The bid/ask price from the perspective of the market maker. The difference between the ask and bid price is the bid-ask spread.

**Bullet loan**
Loan that is repaid in full on the maturity date.

**Buy-back issues**
The government securities which the central government can buy back before maturity. Buy-backs are e.g. used to smooth redemptions between years.

**Callable bond**
Bond that can be redeemed before maturity by the debtor on terms agreed in advance. The debtor has a call *option* on the bond.

**Capital losses/gains on issuance**
Capital losses and gains on issuance arise when a loan is issued at prices above and below par respectively. Capital losses/gains on issuance are distributed in the government accounts across the maturity of the loan under *Distributed capital losses on issuance.*

**Clearstream**
Clearing/settlement and custody institution for securities.

**Commercial Paper (CP)**
Short-term debt instruments (zero-coupon paper) with maturities of up to one year. The central government has a USCP programme in the US market with a maximum outstanding of USD 6 billion, where the debt certificates are issued in USD with a maturity ranging from 1 to 270 days. The central government also has an ECP programme in the European

market with a maximum outstanding equivalent to USD 6 billion, where the debt certificates can be issued in various currencies with a maturity varying from 7 to 365 days.

**Copenhagen Inter Bank Offered Rate (Cibor)**
The interest rate at which a bank in the Copenhagen interbank market is willing to lend Danish kroner without collateral to another creditworthy bank. Cibor is fixed for loans of maturities of up to 12 months. Cibor is the reference interest rate for a large number of financial contracts. See also *Euribor* and *Libor*.

**Cost-at-Risk (CaR)**
Risk measure developed by Government Debt Management to quantify the risk on the exposure of the central-government debt portfolio to future interest-rate developments.

Absolute CaR for a given year indicates the maximum interest costs for the debt with a probability of 95 per cent. Relative CaR is the difference between absolute CaR and the expected interest costs (mean). Tail CaR is the expected interest costs provided the costs exceed absolute CaR. Conditional CaR quantifies the interest-rate risk in a given future year, conditional on the development towards that year.

**Credit risk**
The risk of a financial loss as a consequence of a counterparty's default on its payment obligations. In connection with the government debt the credit risk occurs in relation to *swaps*.

**Cross default**
Clause in loan or swap agreement that permits cancellation of the agreement should the counterparty default on its payment obligations vis-à-vis a third party.

**Distributed capital losses on issuance**
*Capital losses/gains as a consequence of issuance* are distributed over the maturity of the loan in the government accounts. Losses/gains due to issuance at prices that deviate from par are thus distributed in accordance with the interest costs of the loan.

**Domestic borrowing requirement**
The part of the *gross domestic financing requirement* that is covered by issuing domestic government securities.

**Dual currency bond**
Loan raised and serviced in one currency but repaid in another currency. In reality, the loan is a combination of an annuity loan (interest payments) in one currency and a zero-coupon loan (redemptions) in the other currency. See also *Reverse dual currency bond.*

**Duration**
Duration is a measure of the average fixed-interest period for a portfolio of financial assets or liabilities. Long duration of the government debt implies a low risk, since on average smaller proportions of the interest costs are adjusted to changes in the level of interest rates.

In other contexts duration is also used to express the price sensitivity of the portfolio. The higher the duration, the greater the price sensitivity.

**Euroclear**
Clearing/settlement and custody institution for securities.

**Euro Interbank Offered Rate (Euribor)**
The interest rate at which a bank in the euro-interbank market is willing to grant money-market loans in euro to another creditworthy bank. Used as reference interest rate in numerous financial contracts, e.g. *swaps*.

**Euro Medium Term Notes (EMTN)**
Bonds issued under a loan programme subject to standardised documentation.

**EuroMTS**
Electronic trading platform for the most liquid European benchmark bonds in euro. Today fully owned by MTS S.p.A.

**Final exposure**
Denotes the currency or interest-rate exposure on a loan compiled after a *swap*.

**Floating interest rate**
An interest rate that is agreed to float as, or in step with, another interest rate listed on the market at specific shorter intervals than the maturity of the loan, typically every third or sixth month.

**Floating rate note (FRN)**
Bond loan at a floating interest rate.

**Foreign-exchange reserve**
Danmarks Nationalbank's holdings of net foreign assets.

**Forward contract**
Agreement on delivery and payment of goods, securities or currency on a future date at a price fixed at the time of the agreement.

**Forward price**
The price fixed at the time of agreement in a *forward contract* on future delivery of goods, securities or currency.

**Gross domestic financing requirement**
Compiled as the *gross financing requirement* less redemptions of the foreign government debt.

**Gross financing requirement**
The gross financing requirement is compiled as expenditures by the central government less receipts to the central government, with addition of redemptions on the domestic and foreign debt and the net bond purchases of the Social Pension Fund (SPF). See also *Gross domestic financing requirement* and *domestic borrowing requirement*.

**Haircut**
The deduction made from a paper's market value on determining its collateral value. This gives a prudent estimate of the value of the securities received as collateral for lending or another outstanding. A haircut takes account of the risk of the paper's depreciation from the date of compilation of the collateral value until the possible enforced realisation of the paper, if the pledgor of collateral (the borrower) defaults. The central government uses haircuts for collateral pledged by counterparties in connection with swaps and securities lending of on-the-run government issues.

**Interest-rate fixing**
Portfolio measure comprising the redemptions within one year as well as the size of the floating-rate debt and the swap portfolio on which a new interest rate is to be fixed within one year. Thus, the interest-rate fixing measures the interest-rate exposure of the portfolio in the subsequent year compiled at a given time.

**International Securities Market Association (ISMA)**
International association of financial institutions that trades securities in the *secondary market*.

**International Swaps and Derivatives Association (ISDA)**
International association of financial institutions. ISDA's objective is to achieve standardisation of practice and documentation in relation to *swaps*.

**ISDA Master Agreement**
Framework agreement whereby all swaps with one and the same counterparty are documented.

**ISO currency codes**

| Country | Currency | ISO code |
|---|---|---|
| Australia | Dollar | AUD |
| Canada | Dollar | CAD |
| Czech Republic | Koruna | CZK |
| Denmark | Krone | DKK |
| Euro area | Euro | EUR |
| *Austria* | *Schilling* | *ATS* |
| *Belgium* | *Franc* | *BEF* |
| *Finland* | *Markka* | *FIM* |
| *France* | *Franc* | *FRF* |
| *Germany* | *Deutsche Mark* | *DEM* |
| *Greece* | *Drachma* | *GRD* |
| *Ireland* | *Punt* | *IEP* |
| *Italy* | *Lire* | *ITL* |
| *Luxembourg* | *Franc* | *LUF* |
| *Netherlands* | *Guilder* | *NLG* |
| *Portugal* | *Escudo* | *PTE* |
| *Spain* | *Peseta* | *ESP* |
| Iceland | Krone | ISK |
| Japan | Yen | JPY |
| New Zealand | Dollar | NZD |
| Norway | Krone | NOK |
| South Africa | Rand | ZAR |
| Sweden | Krona | SEK |
| Switzerland | Franc | CHF |
| UK | Pound sterling | GBP |
| USA | Dollar | USD |
| SDR | Special drawing rights | XDR |

**Lead manager**
The bank(s) that arrange(s) a bond loan. Lead manager is responsible for coordination, distribution and documentation of the supply of bonds. Distribution of the bond loan is normally undertaken by a syndicate of banks, cf. also *syndicated bond issue.* Government Debt Management uses syndicated bond issues in its foreign borrowing.

**Liquidity**
Liquidity is an expression of tradability. Liquid bonds are often characterised by a large circulating volume, high turnover and a narrow spread between bid and ask prices. Investors will generally be willing to pay a higher price for a more liquid bond (liquidity premium).

**London Inter Bank Offered Rate (Libor)**
The interest rate at which a bank in the London interbank market is willing to undertake money-market lending in various currencies to another creditworthy bank. Used as a reference interest rate in a large number of financial contracts, e.g. *swaps*.

**Market-maker**
A securities dealer that quotes current binding bid and ask prices in securities.

**Medium Term Note (MTN)**
A bond issued in accordance with standardised loan documentation, e.g. *EMTN.*

**Minimum coupon rate**
The permitted minimum coupon rate for bonds that exempts the capital gains of investors who are liable to pay income tax in Denmark from taxation, cf. the Capital Gains Act (Legislative Order No. 806 of 24 September 2003).

Ordinary fixing of the minimum coupon rate takes place for the six-month periods January-June and July-December. The minimum coupon rate is fixed on the basis of a reference yield calculated on a daily basis by the Copenhagen Stock Exchange. The reference yield is calculated to two decimal places as a simple average of the yields to maturity for open, fixed-yield krone bonds (apart from *callable bonds* quoted above par and index-linked bonds) for the last 20 trading days prior to 15 December and 15 June. The minimum coupon rate is 7/8 of the average yield thus compiled, rounded down to the nearest integer number of percentage points.

The minimum coupon rate can be changed extraordinarily should the reference yield on 10 consecutive trading days be more than 2 percentage points higher, or 1 percentage point lower, than the average which is the basis for the current minimum coupon rate. The new minimum coupon rate is 7/8 of the average of the reference yield for these 10 trading days, rounded down to the nearest integer number of percentage points.

**Monetary-policy counterparties**
Financial institutions with access to the monetary-policy instruments: deposits with Danmarks Nationalbank on a day-to-day basis, purchase of certificates of deposit and loans against securities as collateral. Danish banks and mortgage-credit institutes, as well as a number of branches of foreign credit institutions, comprise the monetary-policy counterparties in Denmark.

**MTS**
Electronic trading platform for wholesale trading of bonds. The predominant system for wholesale trading of European benchmark bonds.

**MTS Associated Markets (MTSAM)**
Belgian *MTS* company with market segments for wholesale trading in Belgian, Danish and Finnish government securities.

**MTS Denmark (MTSDk)**
A market segment under *MTS Associated Markets (MTSAM)* for wholesale trading in Danish government securities. Further information on trading in Danish government securities is available on the website www.mtsdenmark.com.

**Net financing requirement**
The net financing requirement is compiled as expenditure by the central government less receipts to the central government. Corresponds to the net cash balance with sign opposite.

**On-the-run issues**
On-the-run issues are the government securities issued to cover the current domestic borrowing requirement. On-the-run issues are open for current issuance and comprise government securities in the 2-, 5- and 10-year maturity segments, as well as Treasury bills.

**Operational risk**
Primarily the risk of loss on a transaction, the settlement of trades and other portfolio handling.

**Option**
A contract giving the owner (the purchaser) the right, but not the obligation, to buy or sell an underlying asset (goods, a financial instrument or a currency) at an agreed price (strike price) at an agreed future time or for a future period. The seller is obliged to recognise the owner's right.

**Option-adjusted duration**
The *duration* for *callable bonds* where adjustments have been made for the uncertainty of the maturity structure as a consequence of the borrower's right to early redemption of the bond. The option-adjusted duration is lower than if the borrower did not have the possibility of early redemption. In connection with government debt management, option-adjusted duration is used to compile the duration of the Social Pension Fund's portfolio of callable bonds.

**Perpetual**
*Loans* with infinite maturity, i.e. the only payments are the ongoing coupon payments. The Kingdom of Denmark has a few minor perpetuals from the end of the 19th century and beginning of the 20th century.

**Plain vanilla**
Term used for standardised and simple products, e.g. *bullet loans* and simple interest-rate *swaps.* See also *Structured loans.*

**Primary dealer**
Primary dealers are financial institutions that by agreement with the issuer, against special rights, are obliged to provide *liquidity* and turnover in specific government securities. Primary dealers typically have the exclusive right to bid at government securities auctions, and are normally obliged to accept a certain minimum amount. Primary dealers are also typically obliged to e.g. contribute to liquidity in the bond market by quoting current bid and ask prices for bonds vis-à-vis other banks (market-making).

**Primary market**
Market for newly issued bonds. See also *Secondary market.*

**Private placement**
Bond or other loan offered to a small group of buyers and not normally stock-exchange listed. See also *Public issue.*

**Public issue**
Bond loan that is offered to the general public and is stock-exchange listed. See also *Private placement.*

**Rating**
Credit assessment given by rating institutes such as Standard & Poor's and Moody's, cf. Tables 9 and 10 of the Appendix of Tables.

**Re-financing risk**
The risk that the borrower has to refinance redemptions on the debt at a time when interest-rate levels are temporarily high, or in a period where the borrower's specific borrowing terms are particularly unfavourable.

**Re-lending**
Re-lending constitutes central-government loans to first and foremost Ørestadsselskabet I/S, A/S Storebælt and A/S Øresund which together account for the majority of total re-lending by the central government. These loans precisely reflects an existing government issue. Coupon, interest due date and maturity date will thus be identical with an existing government issue. The price of the loans is set on the basis of the current market conditions.

**Re-lending list**
The range of government securities in which the government can grant re-lending is called the re-lending list. The re-lending list is determined by Danmarks Nationalbank, and comprises all fixed-rate government bonds of the type bullet loans in Danish kroner with maturities of between 2 and 10 years. The remaining maturity should thus be at least 2 years whereas the longest accepted maturity equals the maturity of the on-the-run issue in the 10-year segment. The central government finances re-lending to the entities by issue in on-the-run securities.

**Repo**
A repo (Repurchase Agreement) is a transaction whereby the seller/borrower against payment transfers securities to a buyer/lender. When entering into the agreement, the seller/borrower obliges to buy back the securities at a price fixed in advance on expiry of the agreement. For legal and technical reasons repos are defined in the contracts as sale and buy-back of securities, but in reality they are collateralised loans. The counterparty in such a deal transacts a reverse repo, i.e. lends a monetary amount against securities as collateral.

**Reverse dual currency bond**
Loans raised and repaid in one currency, while interest is paid in another. See also *Dual currency* loan.

**Saxess**
Electronic trading system for bonds and shares used on e.g. the Copenhagen Stock Exchange.

**Secondary market**
Market for bond trading after they are issued in the *primary market.*

**Serial loan**
A loan for which the debt is repaid in equal instalments on each interest due date. As the outstanding debt decreases throughout the maturity of the loan, the interest payments, and thereby the overall payments, are lower for each due date.

**Strategic benchmarks**
Guiding points used in the implementation of the government debt strategy. For example, strategic benchmarks are set for the distribution of borrowing on 2-, 5- and 10 year government securities and for the duration of the government debt.

**Structured interest rate**
Coupon rate on a *structured loan*.

**Structured loan**
A loan on special terms, e.g. with special redemption terms or built-in *options,* is characterised as a structured loan, in contrast to a *plain vanilla* loan.

**Swap**
A swap is an agreement between two parties to exchange payments over a fixed period. A swap is a separate financial transaction.

Currency swaps are used to restructure debt among various payment currencies. Payments in one currency are thus swapped to payments in another currency. In a currency swap from kroner to euro, the central government e.g. receives interest in kroner at a floating rate and pays interest in euro at a floating rate. The counterparty pays interest and repays the krone principal, in return for payments on the euro principal. Normally, principals are exchanged both at the start and end of the deal.

Interest-rate swaps are typically used to restructure debt between fixed and floating interest rates. In an interest-rate swap from fixed to floating interest rates in the krone market, the central government e.g. receives interest on the swap at a fixed rate (e.g. 5- or 10-year) and pays interest in kroner at a floating rate. In contrast to a currency swap there is no exchange of principal between the parties in an interest-rate swap. The principal in an interest-rate swap is synthetic and is used only to determine the size of the interest payments at the individual due dates.

The principal in an interest-rate swap is often described as the notional value rather than the nominal value. The central government's interest-rate swaps are typically transacted as portfolio swaps, i.e. not connected to specific loans.

The overall value of a swap is usually zero when the swap is transacted, but the value of the swap can subsequently become positive or negative, depending on market developments in interest and exchange rates.

**Swap assignment**
Term used when a *swap* is assigned to another counterparty. The purpose of the transaction can be to reduce the *credit risk* on the original swap counterparty.

**Swap interest rate**
The swap interest rate is the fixed interest rate paid or received in an interest-rate swap against respectively receipt or payment of floating interest rate (normally *Euribor* for euro interest-rate swaps and *Cibor* for krone interest-rate swaps).

**Swap termination**
When a swap agreement is cancelled before actual expiry, it is said to be terminated. This can be by specific agreement between the parties or because an event has occurred which gives one party the right to terminate the swap. On termination, the swap's market value is compiled and hereafter settled.

**Syndicated bond issue**
Bond issue intermediated by a syndicate of banks, typically comprising 2-4 *lead managers* and 4-6 co-lead managers. The lead managers are responsible for coordinating and distributing the largest share of the issue, while the remaining bonds are sold via co-lead managers. Issuance is often based on bookbuilding whereby *lead managers* and co-lead managers obtain bids from investors. When the "book" of bids has been built up, the issuer determines price and allocation, that subsequently can be accepted by the investors.

**Tap sale**
Ongoing issuance in the same series. In Denmark, the issuance of Treasury notes and government bonds, as well as mortgage-credit bonds, is normally via tap sale. See also *Auction.*

**Value date**
Settlement date, i.e. the date on which e.g. a securities deal is closed by delivery of securities against payment.

**Yield curve**
Relationship between the interest rate and maturity of securities. A rising yield curve – i.e. where interest rates for short-term securities are lower than interest rates for long-term securities – is called normal. If the yield curve is declining, it is described as inverse.

**Yield to maturity**
The fixed discount rate that makes the present value of payments on the bond equivalent to the actual price of the bond. On calculating the yield to maturity all payments are included, irrespective of whether they are interest or redemption payments.

**Zero-coupon bond**
Bond not subject to current interest payments, and where the redemption payment falls due when the loan matures. For a zero-coupon loan the cost of borrowing is solely a result of a *capital loss on issue*.

**Zero-coupon rate**
The *yield to maturity* on a *zero-coupon bond.* The zero-coupon-yield structure indicates the relation between maturity and the zero-coupon rate.