Danmarks Nationalbank

Danish Government Borrowing and Debt

2006

DANISH GOVERNMENT BORROWING AND DEBT 2005
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Danmarks Nationalbank
Havnegade 5
DK-1093 Copenhagen K
Telephone: +45 33 63 63 63
Telefax: +45 33 63 71 15
www.nationalbanken.dk

Please direct any enquiries concerning Danish government borrowing and debt to Danmarks Nationalbank, Financial Markets, Government Debt Management Office, by e-mail: governmentdebt@nationalbanken.dk

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 31 January 2006.

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Cover photo: Polfoto.

Contents

Introduction and Summary

Government debt is often a country's largest financial portfolio and entails considerable costs and risk. Management of central-government debt and development of sound principles in this respect have therefore received increasing international attention. In Denmark, central-government debt has been reduced substantially over a number of years. At the same time, the principles for and approach to management of Danish government debt are being developed on an ongoing basis.

The central-government debt is compiled as the domestic and foreign debt, as well as the assets of three government funds and the balance of the central government's account with Danmarks Nationalbank. Government Debt Management at Danmarks Nationalbank manages the central-government debt on behalf of the Ministry of Finance and manages loan guarantees and re-lending to a number of companies.

Danish Government Borrowing and Debt provides an overall description of principles and methods for the management of the central-government debt and reviews the development within the past year. The publication is divided into four sections. Chapter 1 outlines the main principles of government debt management. Chapters 2-8 report on borrowing in 2005 and describe the strategy for 2006. Chapters 9-11 introduce three topics: issuance of long-term government bonds, interest-rate models for Cost-at-Risk analysis, and government cash management. The Appendices present detailed statistics on central-government borrowing and debt.

Chapter 1: Main principles

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. 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 objective of government debt policy implies an ongoing evaluation of the trade-off between costs and risk and is supported by liquid benchmark series.

Government debt management is based on international best practice for good governance of debt management, including openness, credibility, clearly defined objectives and a clear division of responsibilities.

Chapter 2: Government debt and interest costs
A strong government budget surplus reduced the central-government debt by DKK 77.1 billion in 2005, to DKK 417.8 billion. Interest costs fell by DKK 4.1 billion to DKK 20.7 billion in 2005. A combination of falling debt and low market interest rates has entailed that the government's interest costs as a percentage of GDP have more than halved within a period of 10 years. The decrease in interest costs in recent years is primarily attributable to the lower interest rates.

Chapter 3: Government borrowing in 2005
2005 was characterised by low market interest rates and a low borrowing requirement. Sale of domestic government bonds totalled DKK 40 billion, mainly in the 10-year maturity segment. Furthermore, a 5-year euro loan of EUR 1.8 billion was raised. Issuance of government securities was discontinued in the latter part of the year as a consequence of upward adjustment of government budget estimates. Total sale of government securities exceeded the borrowing requirement by approximately DKK 23 billion. The excess sale covers part of the government's financing requirement in 2006.

Chapter 4: Issuance strategy
The prospect of falling central-government debt in the coming years entails a need to adjust the central government's issuance policy. The challenge lies in ensuring liquid government securities during a period with a declining borrowing requirement. Consequently, government borrowing will be concentrated on fewer securities. The strategy is to focus on issuance in the 10-year maturity segment. If the borrowing requirement is sufficiently large, issuance may also take place in a shorter maturity segment, maturing in years when the central government has only few redemptions or none at all. In 2006, the borrowing requirement as of January 2006 is DKK 12 billion, and the strategy is as follows:

- The central government will concentrate issuance in the newly opened 10-year government bond, 4 per cent bullet loans 2017. This series will reach a final outstanding amount of approximately DKK 50 billion, of which around DKK 25 billion is expected to be issued in 2006.
- Issuance in 4 per cent bullet loans 2010 will continue until the loan has reached a minimum of DKK 35 billion and the 10-year issue, 4 per cent bullet loans 2015, has reached a minimum of DKK 60 billion.
- The central government will not raise any euro loans in 2006.
- The central government may buy back domestic and foreign government securities.

- In the event of unusual market conditions, small supplementary issues in the other government securities are possible.

Chapter 5: Market structure

Danish government bonds are primarily issued by tap sale to a group of primary dealers, currently comprising 13 Danish and international banks. Treasury bills are issued at monthly auctions. The primary dealers have an obligation to quote current bid and ask prices within fixed maximum spreads and for minimum amounts. Market making contributes to a transparent and well-functioning market for Danish government securities. Government Debt Management at Danmarks Nationalbank has agreed with the primary dealers that MTSDenmark is the marketplace for issuance of and market making in Danish government securities.

In 2005, six of the primary dealers in government bonds took up 70 per cent of the bonds sold. The average daily turnover in Danish government securities on MTSDenmark was almost DKK 2 billion in 2005.

The market structure for Treasury bills was modernised in 2005. A new and improved MTS auction system has been implemented, and a primary dealer system has been introduced for Treasury bills, with 12 Danish and international banks as participants.

Chapter 6: The government funds

The assets of the three government funds – the Social Pension Fund (SPF), the High-Technology Foundation and the Financing Fund for increased distributions from the Danish National Research Foundation (the Financing Fund) – are included in the central-government debt and are managed together with the central government's other financial assets and liabilities within government debt management. At the end of 2005, SPF's bond portfolio had a nominal value of DKK 133.2 billion. In 2005, DKK 8.7 billion was transferred from SPF to the Ministry of Social Affairs to cover pension improvement measures. The central government contributed DKK 2.9 billion and DKK 1.0 billion to the High-Technology Foundation and the Financing Fund, respectively. The subsequent build-up of capital and disbursements from the funds are stipulated in the annual Finance Acts.

Chapter 7: Government loan guarantees and re-lending

Government loan guarantees and re-lending derive from the political intention to support the financing of certain projects. Most of the government loan guarantees and re-lending managed by Government Debt Management at Danmarks Nationalbank are issued to government-owned companies involved in large infrastructure projects.

At the end of 2005, government guarantees managed by Government Debt Management totalled DKK 75.4 billion, and re-lending totalled DKK 23.1 billion.

Chapter 8: Risk management of central-government debt

The central-government debt and related interest costs are exposed to the development in interest rates (interest-rate risk) and exchange rates (exchange-rate risk), as well as the counterparties' ability and willingness to honour their payment obligations (credit risk). In addition, there is operational risk. Management of the various risk types reflects the objective of low long-term borrowing costs, subject to a prudent degree of risk.

Interest-rate risk related to central-government debt is managed via a strategic benchmark for the duration of the debt portfolio. The target band for the duration in 2006 remains unchanged at 3.0 years ± 0.5 years. The foreign government debt is primarily denominated in euro. As a result of Denmark's fixed-exchange-rate policy vis-à-vis the euro, the exchange-rate risk is limited.

Credit risk related to the central government's swap portfolio is limited via requirements of the credit ratings of counterparties, as well as unilateral collateral requirements. At end-2005, 98 per cent of the central government's swap portfolio, measured in terms of principal, was covered by unilateral collateral agreements.

Operational risk is limited e.g. via the use of standardised financial instruments, clear procedures and a clear division of functions.

Chapter 9: Issuance of long-term government bonds

During 2005, several government issuers resumed or commenced the issuance of ultra-long fixed-rate nominal or inflation-linked government bonds with maturities of 30 years or more.

Issuance of ultra-long bonds should be viewed against the background of falling interest rates and flattening yield curves in several countries in recent years. Some market participants have indicated that the life insurance sector and pension funds have underpinned the structural demand for ultra-long government bonds, which may have contributed to the flattening of the yield curve.

In view of the very low borrowing requirement, Government Debt Management has no current plans to change its issuance strategy to include more instruments with longer maturities.

Chapter 10: Interest-rate models

In the management of interest-rate risk related to central-government debt, the development in future interest costs is analysed under differ-

ent assumptions regarding the level of interest rates. The analyses are performed using the Cost-at-Risk (CaR) model on the basis of simulations of the interest-rate development in an interest-rate model.

So far, the one-factor Cox-Ingersoll-Ross (CIR) model has been used to generate the interest-rate scenarios in the CaR model. Now the interest-rate model has been extended to include two explanatory factors.

The extension improves the explanatory power of the model and allows for the decoupling of short-term and long-term interest rates that are observed historically for several periods. Simulation of the interest-rate development in the two-factor model indicates that the results are relatively robust to the choice of estimation period.

Chapter 11: Government cash management

The Danish central government holds liquid funds in order to handle current payment flows. The funds are held in the central government's account at Danmarks Nationalbank, and the central government's large receipts and disbursements are settled via this account. The account accrues interest on market terms. The overall management of the liquid funds is handled by Government Debt Management by aiming at a specific balance on the account at year-end, as well as ensuring that the balance is always positive.

In the management of costs and risk, the central government's account is an integral part of the government debt portfolio. This means that the overall duration of the government debt, as well as the issuance and buy-back policies, are subject to coordinated management with the balance of the central government's account.

Main Principles

CHAPTER 1

Main Principles of Government Debt Management

Government Debt Management at Danmarks Nationalbank manages the central-government debt on behalf of the Ministry of Finance. The central-government debt comprises the domestic and foreign central-government debt, the assets of three government funds, and the balance of the central government's account with Danmarks Nationalbank. Government Debt Management also manages loan guarantees and re-lending to a number of companies.

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. 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 objective of government debt policy implies an ongoing evaluation of the trade-off between cost and risk and is supported by liquid benchmark series.

The government debt policy is based on international best practice for good governance of debt management, including openness, credibility, clearly defined objectives and a clear division of responsibilities.

GOVERNMENT DEBT 1.1

Total government debt comprises the domestic and foreign debt, as well as the assets of three government funds and the balance of the central government's account with Danmarks Nationalbank, cf. Table 1.1.1.

The domestic debt is denominated in Danish kroner. Borrowing in kroner finances the budget deficit and redemptions on previously issued domestic government securities.

The foreign debt is denominated in foreign currency. By far the greater share of the foreign debt is raised in order to maintain a foreign-exchange reserve and is exposed in euro. A minor share of the foreign debt is in US dollars, reflecting re-lending in dollars to Danish Ship Finance A/S.

CENTRAL-GOVERNMENT DEBT — Table 1.1.1

DKK billion	End-2004	End-2005
Domestic debt	605	516
Foreign debt	84	91
The Social Pension Fund	-137	-133
The High-Technology Foundation	•	-2
The Financing Fund	•	-1
Central government's account with Danmarks Nationalbank[1]	-57	-53
Total central-government debt	495	418
Central-government debt as a percentage of GDP	34	27

[1] For 2005, the central government's account with Danmarks Nationalbank has been calculated on the basis of Danmarks Nationalbank's monthly balance sheet.

Except for a small portfolio of mortgage-credit and index-linked bonds held by the Social Pension Fund, the assets of the three funds are placed in Danish government bonds.

The central government holds liquid funds in an account with Danmarks Nationalbank. This account accrues interest at the discount rate.

Government Debt Management also manages re-lending facilities, under which mainly government-owned companies can raise loans, and issues loan guarantees to a number of companies on behalf of the central government. The assets related to re-lending are not included in the compilation of the government debt. Re-lending and loan guarantees primarily support the financing of government infrastructure projects.

DIVISION OF RESPONSIBILITIES 1.2

The Minister of Finance holds the overall political responsibility for central-government borrowing and debt, including relations to the Folketing (Parliament). The actual management of the government debt, as well as related tasks, is carried out by Government Debt Management at Danmarks Nationalbank on behalf of the Ministry of Finance.

The government debt management strategy is discussed at quarterly meetings with the Ministry of Finance on the basis of written proposals from Government Debt Management. The Ministry of Finance subsequently authorises Government Debt Management to implement the agreed strategy. At the meeting in December, the overall strategy for the following year is determined. At the subsequent quarterly meetings, any adjustments and further specifications of the overall strategy for the year are adopted. Follow-up takes place in monthly status reports to the Ministry of Finance and in reports at the quarterly meetings.

LEGISLATIVE BASIS AND BASIS OF AGREEMENT Box 1.1

Under the Danish Constitution, loans can be raised by the central government according to law. The statutory basis for central-government borrowing is set out in the *Act on the authority to raise loans on behalf of 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. This amount is thus 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.

Danmarks Nationalbank's management of the central-government debt on behalf of the Ministry of Finance is established in the *Agreement on the division of work in the area of government debt between Danmarks Nationalbank and the Ministry of Finance* of 1999[2]. The agreement establishes the overall allocation of tasks, competence and responsibility between Danmarks Nationalbank and the Ministry of Finance. The overall principle is that final responsibility for the central-government debt rests with the Ministry of Finance, while Danmarks Nationalbank on behalf of the Ministry of Finance undertakes the ongoing management and administration.

The framework for the management of the funds of the Social Pension Fund is laid down in the *Regulations governing the management of the Social Pension Fund*[3] of 1999.

The High-Technology Foundation is managed on the basis of the *Act on the High-Technology Foundation*, which was adopted in December 2004[4]. Pursuant to this act, Danmarks Nationalbank manages the capital of the Foundation subject to agreement with the Minister of Finance. The Financing Fund for increased distributions from the Danish National Research Foundation is established pursuant to the Finance Act. The Ministry of Finance and Danmarks Nationalbank have entered into separate agreements on the framework for the management of the capital of the High-Technology Foundation and the Financing Fund for increased distributions from the Danish National Research Foundation.

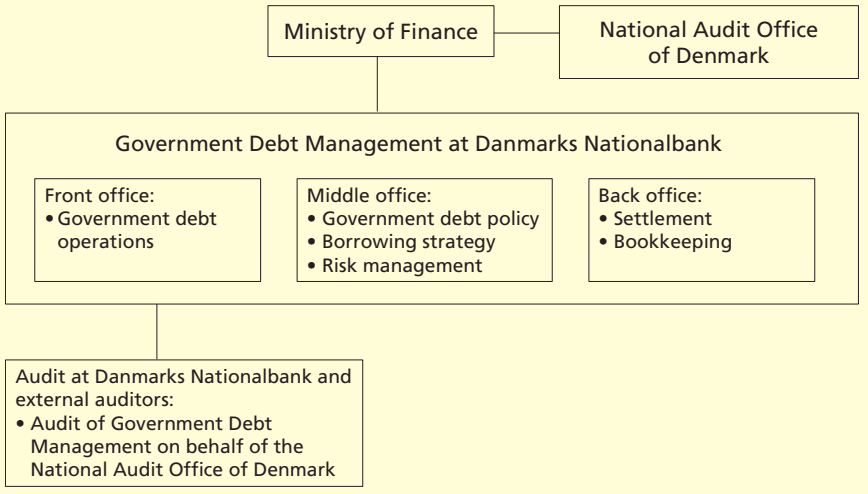
On behalf of the government, Government Debt Management issues guarantees for the borrowing of a number of companies. The companies' access to guarantees and re-lending is defined in an act or legal document. Government Debt Management's tasks in this respect are established in separate agreements.

[1] Act No. 1079 of 22/12/1993 as subsequently amended. The Act is available at www.nationalbanken.dk under Government debt.
[2] The Agreement is available at www.nationalbanken.dk under Government debt.
[3] The Regulations are available at www.nationalbanken.dk under Government debt.
[4] Act No. 1459 of 22/12/2004.

ORGANISATION 1.3

At Danmarks Nationalbank, the government debt is managed by the Government Debt Management Office within Financial Markets together with Market Operations, Accounting, Government Debt Accounting and Audit. Government Debt Management is thus divided into front,

STRUCTURE OF GOVERNMENT DEBT MANAGEMENT Box 1.2



middle and back offices with separate functions. A clear division of functions and clear procedures reduce operational risks and facilitate internal control. A well-defined division of responsibilities helps to ensure that various categories of professional expertise are utilised in the best possible way, and that tasks related to the management of government debt are undertaken independently of other activities at Danmarks Nationalbank. Box 1.2 summarises the structure of Government Debt Management.

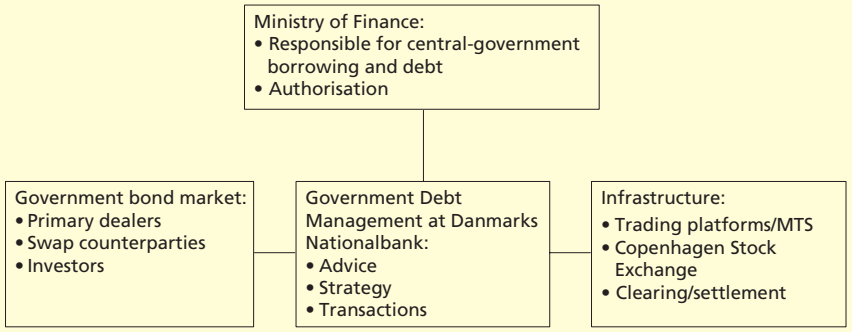
The Government Debt Management Office within Financial Markets is responsible for middle-office functions and formulates the general principles concerning government debt policy, prepares proposals for borrowing strategies and undertakes risk management, etc. The Government Debt Management Office sets out guidelines for Market Operations with regard to sale, buy-backs, swap transactions, etc.

Market Operations is responsible for the front-office functions and thus for the operational parts of the government debt policy, including issuance of government securities, buy-backs, swap transactions, etc.

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

Government Debt Management is audited by the internal audit department at Danmarks Nationalbank and by Danmarks Nationalbank's external auditors on behalf of the National Audit Office of Denmark. The National Audit Office of Denmark is empowered to investigate

FRAMEWORK FOR GOVERNMENT DEBT MANAGEMENT Box 1.3



whether the accounts of government institutions are sound, i.e. to check that they are without significant errors and discrepancies and to assess whether the funds received by government institutions are applied in the best possible way. The National Audit Office of Denmark publishes the results of its investigations on an ongoing basis, e.g. at www.rigsrevisionen.dk.

On a day-to-day basis, Government Debt Management works closely with the Ministry of Finance in many areas. In addition, Government Debt Management is in ongoing dialogue with market participants in the financial markets and seeks to achieve the best possible infrastructure for issuance of and trade in Danish government securities, cf. Box 1.3.

DOMESTIC AND FOREIGN FUNDING RULES 1.4

The central-government funding rules set out the framework for the distribution and scope of the central government's domestic and foreign borrowing. The rules are described in an agreement between the government and Danmarks Nationalbank. Domestic and foreign funding rules have been determined, and together they support the separation of fiscal and monetary policy.

The domestic funding rule stipulates that domestic borrowing covers the central government's gross domestic financing requirement, i.e. the central government's current deficit and redemptions on the domestic debt. This means that, viewed over the full year, the central government's payments in principle have no impact on domestic liquidity.

The foreign funding rule implies that the foreign borrowing is in principle equivalent to the redemptions on the foreign debt raised in order

to maintain the foreign-exchange reserve. Consequently, foreign borrowing does not influence domestic liquidity, but is included directly in the foreign-exchange reserve.

According to Article 101 of the EU Treaty, the central government's account with Danmarks Nationalbank cannot show a deficit. Central-government borrowing is 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 e.g. related to predicting the receipts from various taxes.

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

OBJECTIVES AND STRATEGY 1.5

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.

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

The overall objective for government debt policy is implemented via strategies for issuance and interest-rate risk. The specific objectives are implemented as strategic benchmarks.

Borrowing is based on building up liquid benchmark series in central maturity segments. It is sought to reach a broad investor base.

The issuance strategy is separated from management of the interest-rate risk on the government debt via interest-rate swaps and buy-backs. The strategic benchmark for the interest-rate risk is determined by the duration of the total government debt.

The strategies are assessed on an ongoing basis in order to ensure the best possible compliance with the objectives and that Danish government debt management complies with best practice as formulated by e.g. the World Bank and the IMF.

RISK MANAGEMENT 1.6

Measurement and management of risks on the central-government debt are key aspects in relation to meeting the overall objective. Risk management comprises various types of risk.

Interest-rate risk is managed on the basis of a strategic benchmark for the duration of the total government debt. Duration is a summary measure of the trade-off between interest costs and interest-rate risk. The duration target is established on the basis of quantification of costs and risk in Government Debt Management's Cost-at-Risk model. Duration is managed by using interest-rate swaps that restructure the central government's interest payments between fixed and floating interest rates. Interest-rate swaps from fixed to floating interest rates shorten the duration and normally ensure lower average interest costs, but higher interest-rate risk. In the trade-off, the duration target is supplemented with interest-rate fixing.

Exchange-rate risk is managed by limiting the currency exposure to euro on foreign government debt raised to maintain a foreign-exchange reserve.[1] In view of Denmark's fixed-exchange-rate policy vis-à-vis the euro, this ensures a low exchange-rate risk.

Credit risk is limited by only transacting swaps with counterparties with high credit ratings who have signed a unilateral collateral agreement.

Operational risk is sought to be minimised by separating the various government debt management functions, and via well-defined and clearly documented procedures. Furthermore, operational risk is limited in that only standardised, well-known financial instruments are used. Legal risk is minimised by using standardised contracts.

DANISH GOVERNMENT SECURITIES MARKETS 1.7

Issuance and buy-back of Danish government securities take place on the MTS platform in a special market segment, MTSDenmark, with primary dealers as counterparties. Primary dealers have a market-making obligation, i.e. they quote current bid and ask prices within fixed maximum spreads and for fixed minimum amounts. Market making contributes to a transparent and efficient market for Danish government securities.

[1] A small proportion of the central government's foreign debt is denominated in dollars, reflecting currency swaps between kroner and dollars in connection with re-lending in dollars to Danish Ship Finance A/S. The central government is not exposed to fluctuation in the dollar rate as a result of the re-lending facility since the dollar payments in the currency swaps are set off by dollar payments in connection with re-lending.

Danish government securities are traded on a number of other electronic trading platforms besides MTSDenmark, and on the Copenhagen Stock Exchange.

Danish government bonds are primarily issued on tap. Tap issuance implies that the central government sells securities throughout the year at the best market prices quoted by the primary dealers.

Treasury bills are issued at monthly auctions. 2005 saw the launch of a new auction system at MTSDenmark. At the same time, a new primary dealer system was introduced in the market for Treasury bills.

Central-government euro loans are issued through syndication whereby a group of banks (the syndicate) is selected to arrange the loan.

INFORMATION ON THE CENTRAL-GOVERNMENT DEBT 1.8

An important element in the government debt policy is to give market participants and the public access to information on the central-government borrowing strategies, borrowing requirement, etc., as well as information of a more general nature on the framework for government debt management. A wide range of information is published on a regular basis, cf. Box 1.4.

An overview of the information regularly published on central-government borrowing and debt is presented in the Appendices.

SOURCES OF INFORMATION ON DANISH GOVERNMENT BORROWING AND DEBT Box 1.4

For information on Danish government borrowing and debt, see:

- Danmarks Nationalbank's news service (DN News)
- Danmarks Nationalbank's website, www.nationalbanken.dk under Government debt
- the annual publication *Danish Government Borrowing and Debt*
- the semi-annual announcement *Danish Government Debt Management Strategy*
- The Ministry of Finance's *Budget Review*, www.fm.dk.

For information on the market for Danish government securities, see:

- the MTS website, www.mtsdenmark.com
- the Copenhagen Stock Exchange, www.cse.dk.

Report Section

CHAPTER 2

Government Debt and Interest Costs

In 2005, the central-government debt decreased by DKK 77.1 billon to DKK 417.8 billion as a result of a government budget surplus. Since 1995, government debt as a ratio of GDP has diminished by 50 per cent and stood at 27 per cent at end-2005. The government's interest costs fell by DKK 4.1 billion to DKK 20.7 billion in 2005 due to a significant reduction of the debt and lower market interest rates.

GOVERNMENT DEBT AND INTEREST COSTS 2.1

The central-government debt is compiled as the domestic and foreign debt less the balance of the central government's account with Danmarks Nationalbank and the assets of the Social Pension Fund (SPF), the Financing Fund for increased distributions from the Danish National Research Foundation (the Financing Fund), and the High-Technology Foundation. The debt is compiled at nominal value, cf. Box 2.1.

At end-2005, the central-government debt compiled at nominal value was DKK 417.8 billion, equivalent to around DKK 77,000 per capita. The central-government debt fell by DKK 77.1 billion compared with 2004, cf. Table 2.1.1.

Central-government debt as a ratio of GDP has been declining since 1995 and was 27 per cent at end-2005, cf. Chart 2.1.1.

The central-government debt compiled at market value can provide supplementary information on the debt. The market value of the central-government debt was DKK 446.0 billion at end-2005, equivalent to a decline of DKK 79.0 billion from 2004, cf. Table 2.1.2.

In 2005, interest costs totalled DKK 20.7 billion, cf. Table 2.1.3, down by DKK 4.1 billion from 2004. Interest costs on the central-government debt as a ratio of GDP was 1.3 per cent in 2005, cf. Chart 2.1.1.

The level of interest rates has been falling in recent years, as has the government debt. Both factors contribute to reducing interest costs. Decomposition of the decline in interest costs in to interest rate and debt changes shows that the decrease in interest costs in recent years is primarily attributable to the lower interest rates, cf. Chart 2.1.2.

NET BORROWING AND CHANGES IN THE CENTRAL-GOVERNMENT DEBT, 2002-05 Table 2.1.1

DKK billion	2002	2003	2004	2005
Net borrowing				
Domestic borrowing	8.6	-13.6	-10.4	-89.0
Foreign borrowing[1]	-0.1	0.1	-0.1	6.7
Drawing on the central government's account at Danmarks Nationalbank	-6.3	5.5	-16.3	3.3
Net borrowing at market value	2.2	-8.0	-26.8	-79.0
Capital losses				
Domestic capital losses on issue[2]	5.3	-0.4	4.0	0.9
Foreign capital losses on issue[2]	0.0	0.1	0.1	0.1
Total capital losses	5.4	-0.3	4.1	1.0
Net borrowing at nominal value	7.5	-8.3	-22.7	-78.0
Balance-sheet items, year-end, nominal value				
Domestic debt	624.9	611.0	604.6	516.5
Foreign debt	83.7	83.9	83.9	90.7
Central government's account at Danmarks Nationalbank[3]	-46.0	-40.5	-56.8	-53.5
The Social Pension Fund[4]	-141.4	-138.7	-136.9	-133.2
The High-Technology Foundation[5]	•	•	•	-1.8
The Financing Fund	•	•	•	-0.9
Government debt at nominal value	521.3	515.7	494.9	417.8
Outstanding re-lending[6]	12.5	14.7	19.1	23.1
Government debt adjusted for re-lending	508.8	501.0	475.8	394.7

Source: Central-government accounts 2002, 2003 and 2004. For 2005 provisional figures from central-government accounts.

[1] Including exchange-rate adjustments.

[2] Including capital losses on buy-backs.

[3] For 2005, 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.

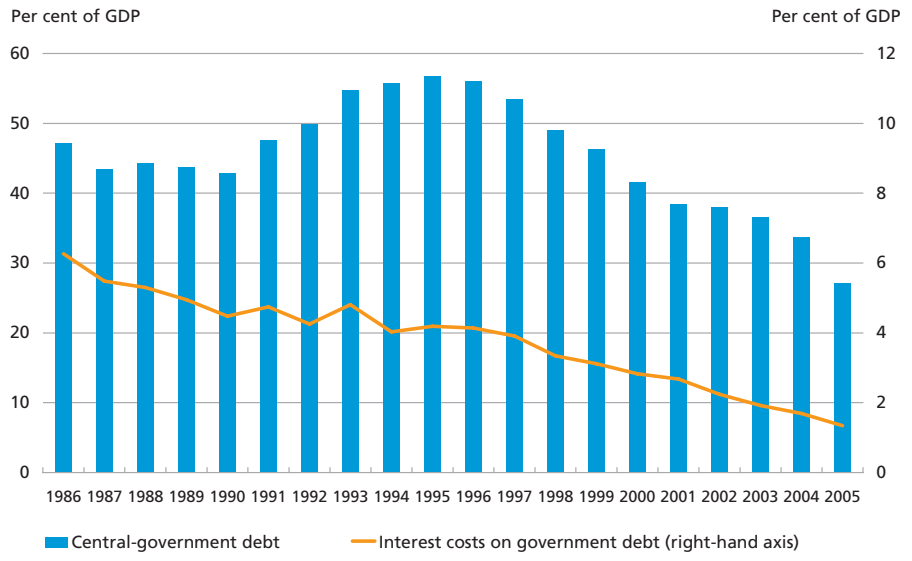
[5] The High-Technology Foundation held an additional DKK 0.9 billion in liquid assets.

[6] Re-lending to Ørestadsselskabet I/S, A/S Storebælt, A/S Øresund and Danish Ship Finance A/S.

CENTRAL-GOVERNMENT DEBT AT MARKET VALUE, 2004-05 Table 2.1.2

DKK billion	2004	2005
Domestic debt	655.0	564.2
Foreign debt	80.9	87.6
Balance of the central government's account	-56.8	-53.5
The Social Pension Fund	-154.0	-149.4
The High-Technology Foundation	-	-2.0
The Financing Fund	-	-1.0
Central-government debt at market value	525.1	446.0
Outstanding re-lending	-21.0	-25.6
Central-government debt adjusted for re-lending	504.1	420.5

GOVERNMENT DEBT AND INTEREST COSTS, 1986-2005 Chart 2.1.1

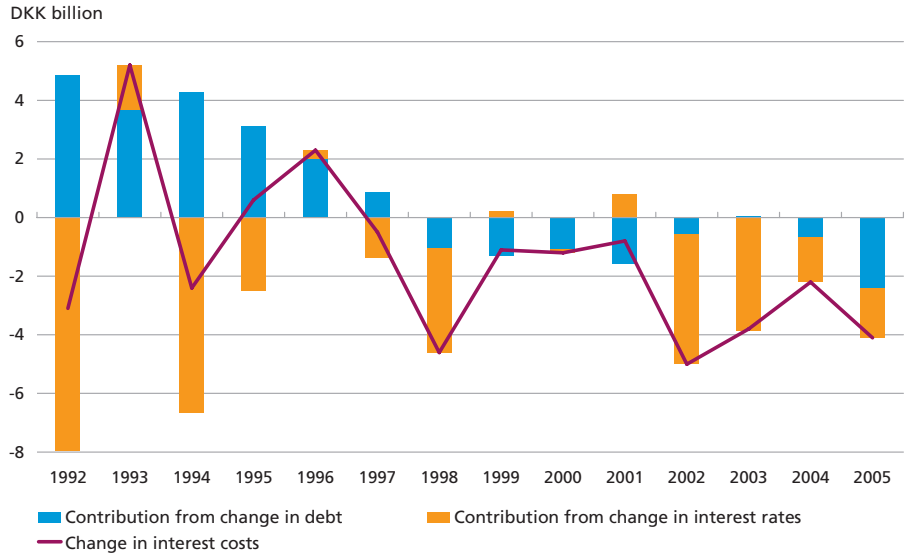


INTEREST COSTS ON THE CENTRAL-GOVERNMENT DEBT, 2002-05 Table 2.1.3

DKK billion	2002	2003	2004	2005
Domestic debt				
Interest	37.4	34.7	32.5	27.4
Distributed capital losses on issue	2.3	1.6	0.6	0.4
Interest costs, total	39.8	36.3	33.2	27.8
Foreign debt				
Interest	3.2	2.0	1.7	1.7
Realised exchange-rate losses on redemptions	-0.7	0.0	-0.1	0.0
Distributed capital losses on issue	-0.0	0.0	0.0	0.1
Interest costs, total	2.6	2.1	1.7	1.7
Interest concerning				
Central government's account at Danmarks Nationalbank	-1.9	-1.7	-1.7	-1.1
The Social Pension Fund	-9.6	-9.6	-8.3	-7.6
The High-Technology Foundation	-	-	-	-0.0
The Financing Fund	-	-	-	-0.0
Total	30.8	27.0	24.8	20.7

Note: Interest income from re-lending is not included in the compilation of interest costs.
Source: Central-government accounts 2002, 2003 and 2004. For 2005, provisional figures from the central-government accounts.

DECOMPOSITON OF ANNUAL CHANGE IN INTEREST COSTS, 1992-2005 Chart 2.1.2



Note: Decomposition takes place by calculating the yearly average government debt and the yearly average interest rate on the government debt. The contribution from the change in the debt is the change in the yearly average debt multiplied by the average interest rate on the government debt in the previous year. The contribution from the change in interest rates is the residual.

THE GROSS GENERAL-GOVERNMENT DEBT (EMU DEBT) 2.2

The gross general-government debt comprises the EMU debt of the central and local governments. The central government's EMU debt accounts for most of the debt.

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) is deducted from the debt. SPF's portfolio of non-government bonds and the balance of the central government's account with Danmarks Nationalbank cannot be deducted.

The European Commission and the Ecofin Council monitor the development in the budgetary situation of the member states in order to 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. A central obligation of the Stability and Growth Pact is that the member

COMPILATION OF CENTRAL-GOVERNMENT DEBT AND INTEREST COSTS Box 2.1

The central-government debt is compiled as the nominal value of domestic and foreign debt less the balance of the central government's account with Danmarks Nationalbank and the assets of the Social Pension Fund (SPF), the Financing Fund for increased distributions from the Danish National Research Foundation (the Financing Fund), and the High-Technology Foundation. The distribution of domestic and foreign borrowing is based on currency. Domestic debt is exposed in kroner, while foreign debt is exposed in foreign exchange.

The compilation of 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 companies that receive re-lending are not included.

The change in the central-government debt corresponds to the net borrowing at nominal value minus the change in the assets of SPF, the Financing Fund and the High-Technology Foundation. Net borrowing at nominal value consists of net borrowing at market value with addition of value adjustments in connection with issuance and buy-backs.

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.

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 booked for the year, equivalent to the number of interest days in that year. The capital loss on issue is the difference between the nominal value and the market value on issue, and is distributed linearly over the term to maturity of the loan.

states must aim at budgetary positions "close to balance or in surplus" in the medium term.

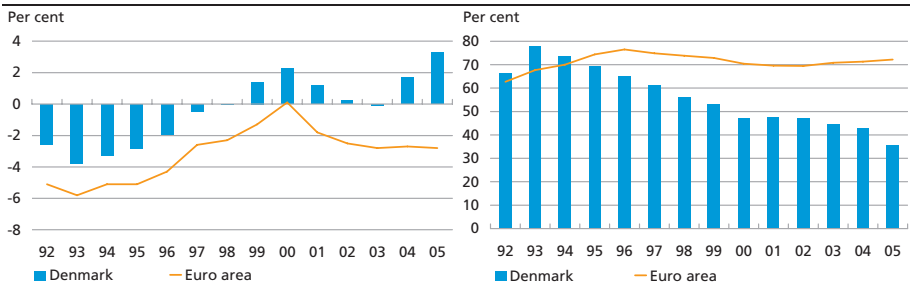
At end-2005, the gross general-government debt is estimated at approximately DKK 550 billion or 36 per cent of GDP, cf. Table 2.2.1.

GENERAL-GOVERNMENT BUDGET BALANCE AND DEBT, 2002-05 Table 2.2.1

	2002	2003	2004	2005
General-government balance in DKK billion	3.2	-1.0	24.8	51.3
General-government balance as a percentage of GDP	0.2	-0.1	1.7	3.3
Gross debt in DKK billion	642.9	625.1	624.7	550.7
Gross debt as a percentage of GDP	47.2	44.6	42.8	35.7

Source: *Economic Survey*, December 2005, Ministry of Finance.

GENERAL-GOVERNMENT SURPLUS AND EMU DEBT AS A RATIO OF GDP, 1992-2005 Chart 2.2.1



Source: *Economic Survey*, December 2005, Ministry of Finance.

Denmark has had general-government surpluses virtually every year since 1997 and has seen positive development compared with the euro area. The general-government surpluses have contributed to reducing Danish EMU debt to 36 per cent of GDP, while EMU debt in the euro area has been stable at around 70 per cent, cf. Chart 2.2.1.

CHAPTER 3

Borrowing in 2005

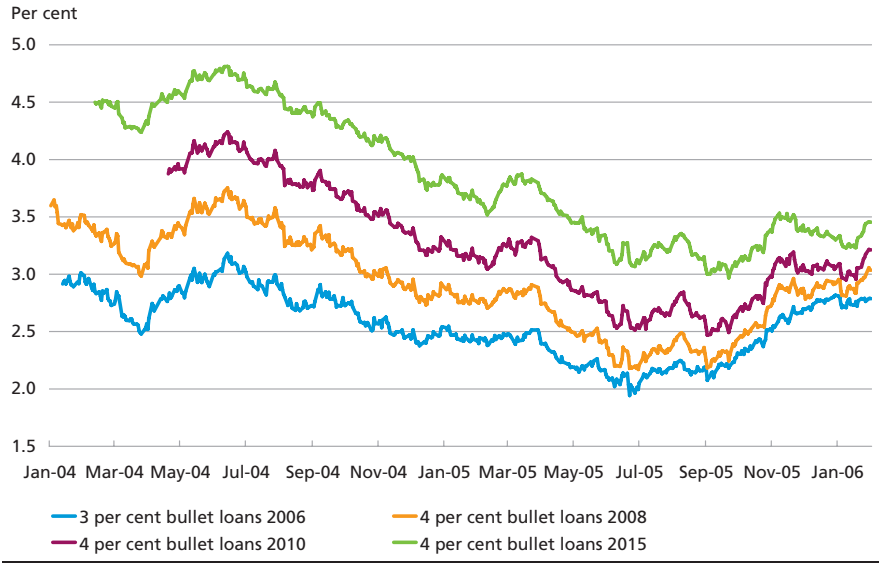
Central-government borrowing in 2005 was characterised by low market interest rates and a low borrowing requirement. Sale of domestic government securities totalled DKK 30.1 billion, mainly in the 10-year maturity segment. In addition, a euro loan of EUR 1.8 billion was raised.

The low sale reflects an extraordinarily high government surplus. In August, the sale of government securities was discontinued as a consequence of the improvement in government finances. Total sale of government securities exceeded the borrowing requirement by just over DKK 23 billion. The borrowing requirement in 2006 has been reduced by the same amount.

DEVELOPMENT IN INTEREST RATES 3.1

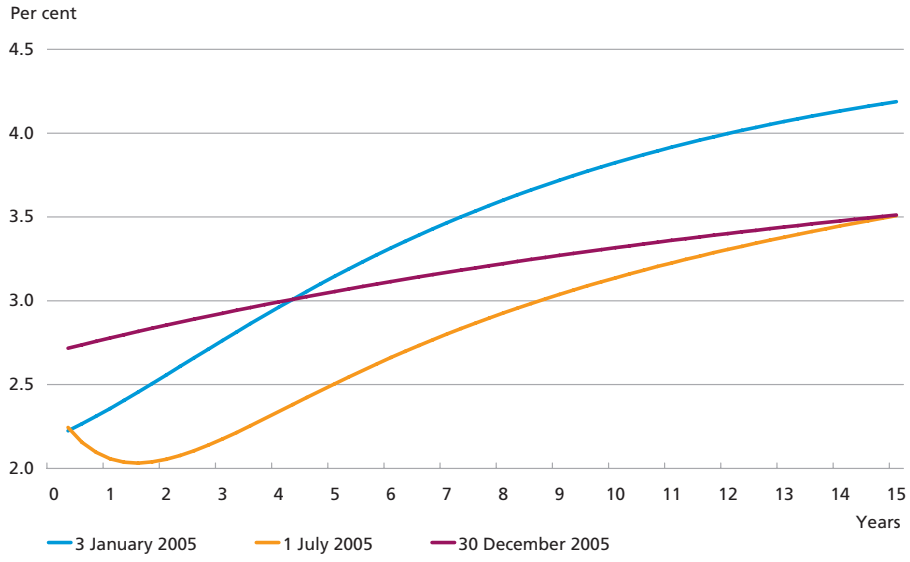
The decline in interest rates seen in 2004 continued until September 2005, cf. Chart 3.1.1. At year-end, short interest rates were slightly higher than at the beginning of the year, while long interest rates were approximately 50 basis points lower, implying a flatter yield curve, cf. Chart 3.1.2.

YIELDS TO MATURITY FOR ON-THE-RUN ISSUES, 2004-06 Chart 3.1.1



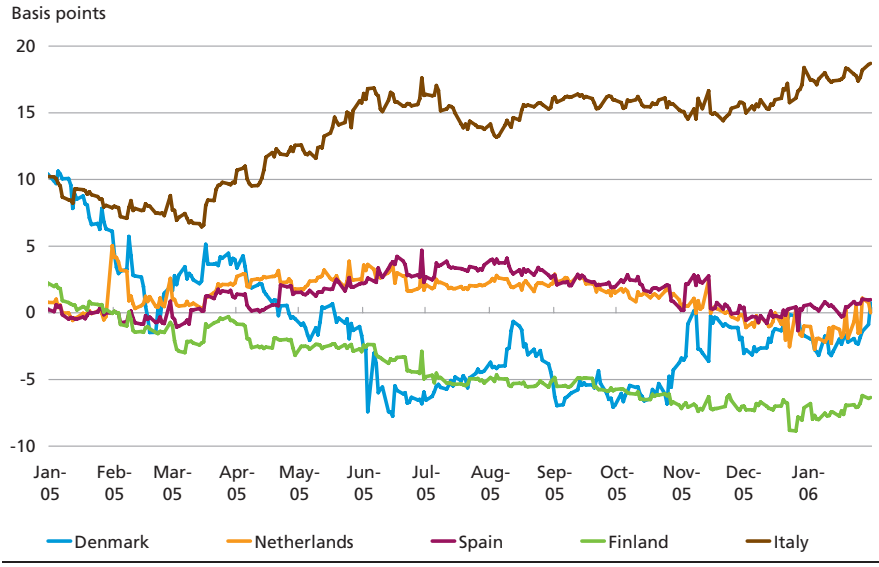
Note: On 2 May 2005, 3 per cent bullet loans 2006 was replaced by 4 per cent bullet loans 2008 in the government's on-the-run issues and as the 2-year benchmark bond.

ZERO-COUPON YIELD STRUCTURE IN 2005 Chart 3.1.2



The falling interest rates until September were e.g. attributable to a general increase in uncertainty concerning the future economic growth in the euro area. Towards the end of the year, the indications of economic growth became more apparent and the risk of inflationary pressure more pronounced. This led to an increase in short interest rates in particular.

10-YEAR YIELD SPREADS TO GERMANY, 2005-06 Chart 3.1.3



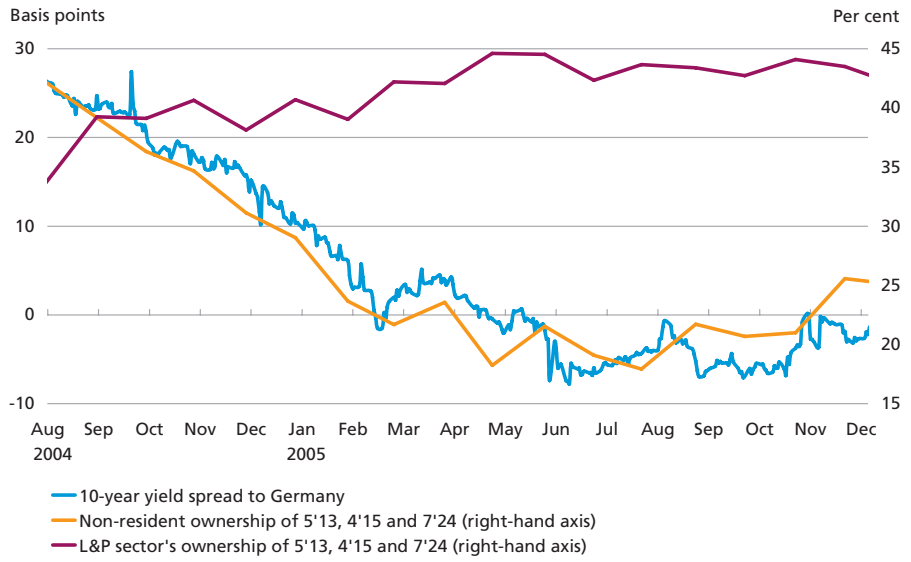
Note: Yield spreads adjusted for differences in maturities.
Source: Bloomberg.

The decline in the 10-year interest rate in Denmark was stronger than in the euro area, and the 10-year yield spread to Germany became negative in the early summer of 2005, cf. Chart 3.1.3. Towards the end of the year, the 10-year yield spread stabilised just below zero.

The negative yield spread to the euro area among other things reflects supply and demand factors in Denmark. The high government surplus entailed a low supply of government bonds in 2005. On the demand side, life insurance and pension companies (L&P) in Denmark continued to purchase long-term government bonds, cf. Chart 3.1.4. Regulatory requirements pertaining to investment risk, capital base and liabilities in this sector imply that these companies have invested in bonds with long durations, cf. Chapter 9. Due to falling interest rates, the duration of the L&P companies' callable mortgage-credit bonds is decreasing. This can be countered by purchasing long-term government bonds.

During the last 18 months, non-residents sold long-term Danish government securities and purchased Danish government securities with shorter maturities. At the end of 2005, the total non-resident ownership share of Danish government securities was unchanged compared to the situation at end- 2004, cf. Table 3.1.1.

NON-RESIDENT OWNERSHIP OF LONG-TERM DANISH GOVERNMENT SECURITIES, AND 10-YEAR YIELD SPREAD TO GERMANY, 2004-05 Chart 3.1.4



Note: 5'13, 4'15 and 7'24 are, respectively, 5 per cent bullet loans 2013, 4 per cent bullet loans 2015 and 7 per cent bullet loans 2024. Ownership is adjusted for SPF's portfolio of government bonds. L&P's ownership excludes ATP. The 10-year yield spread is adjusted for differences in maturities.
Source: Bloomberg and Danmarks Nationalbank, *Securities statistics*.

OWNERSHIP DISTRIBUTION OF DOMESTIC GOVERNMENT SECURITIES, END OF PERIOD — Table 3.1.1

Per cent of nominal outstanding volume	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05
Non-financial enterprises	3	3	3	3	3
Financial institutions, including Danmarks Nationalbank	21	27	26	21	20
Life insurance companies and pension funds	20	22	24	25	24
General government[1]	25	21	21	22	25
Households, etc.	2	2	2	1	1
Non-residents	27	24	24	25	26
Not stated	3	1	1	1	1
Total	100	100	100	100	100

Source: Danmarks Nationalbank, *Securities statistics.*
[1] On 1 January 2005, ATP was reclassified from general government to the life insurance and pension sector.

BORROWING REQUIREMENT 3.2

In 2005, Danish government finances showed an extraordinarily high surplus, resulting in a net financing requirement of DKK -79.4 billion. The government borrowing requirement for 2005 was DKK 20 billion, and sales of government securities totalled DKK 43.4 billion, cf. Table 3.2.1. The excess sale of government securities was thus DKK 23.5 billion. This correspondingly reduces the borrowing requirement in 2006, cf. Chapter 4.

The 2005 government budget surplus was adjusted upwards during the year reflecting higher estimates of economic growth in Denmark. There was also considerable revenue from pension-fund tax and North

CENTRAL-GOVERNMENT BORROWING REQUIREMENT IN 2005 — Table 3.2.1

DKK billion	Domestic	Foreign	Total
Net financing requirement[1]	-81.5	2.2	-79.4
Redemptions on debt[2]	117.7	8.5	126.2
Payments from the central government in currency swaps	2.2	0.8	3.0
Net bond purchases by government funds	1.2	-	1.2
Gross financing requirement	39.6	11.4	51.0
Excess sale in 2004 carried forward to 2005[3]	-28.0	0.0	-28.0
Payments to the central government in currency swaps	-0.8	-2.2	-3.0
Borrowing requirement	10.8	9.2	20.0
Sale of government securities	30.1	13.3	43.4
Excess sale (sale of government securities less financing requirement)	19.4	4.1	23.5

[1] Based on Danmarks Nationalbank's data at year-end. These figures may deviate from the figures in the accounts. The net foreign financing requirement solely comprises net re-lending in dollars to Danish Ship Finance A/S.
[2] Including buy-backs in securities maturing in subsequent years.
[3] Planned reduction of the central government's account from DKK 58.0 billion at end-2004 to DKK 30.0 billion at end-2005.

STRATEGIC BENCHMARKS FOR 2005 Box 3.1

Interest-rate exposure:

- Macauley duration of 3 years ± 0.5 years.
- Day-to-day management of duration is based on a duration measure calculated at a fixed discount rate and a balance of the central government's account of DKK 30 billion. The target band for this duration measure is 3 years ± 0.25 years.

Liquidity:

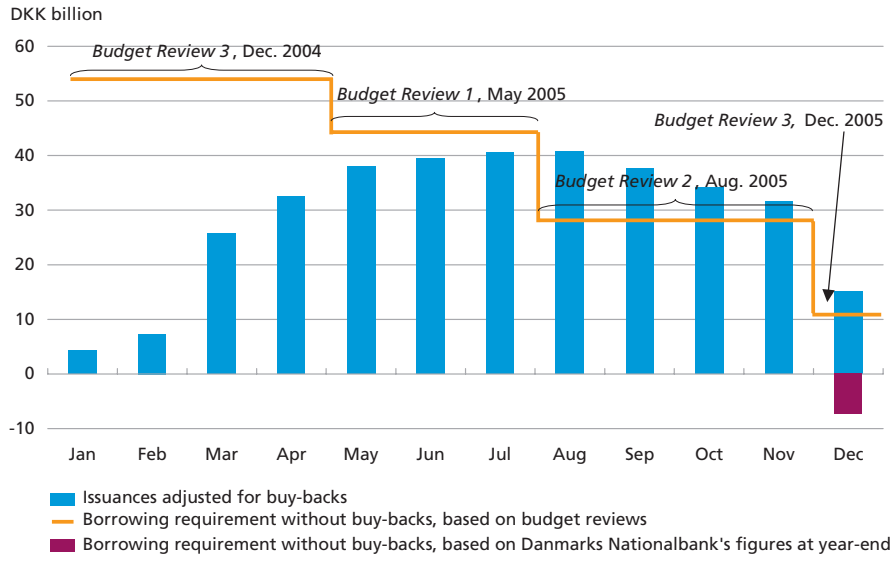
- In the 2-year maturity segment, at least DKK 20 billion is issued.[1]
- The final outstanding volume in 4 per cent bullet loans 2010 is built up to a minimum of DKK 35 billion.
- The final outstanding volume in 4 per cent bullet loans 2015 is built up to a minimum of DKK 60 billion.
- Net financing contribution of zero from the Treasury bill programme.
- Foreign borrowing takes place via a 5-year euro loan of EUR 1.5-2 billion.

[1] In mid-2005 the strategy was changed so that less than DKK 20 billion would be issued, cf. the strategy announcement, *Danish government debt management strategy, 2nd half 2005.*

Sea activities as a consequence of the development in financial markets and the high oil prices. These items are difficult to predict. The government's borrowing requirement before buy-backs was approximately DKK 60 billion lower than the estimate in *Budget Review 3*, December 2004.

The issuance strategy was adjusted as the borrowing requirement changed. This led in early summer to a modification of the benchmark strategy to lower sales in the 2-year maturity segment, cf. Box 3.1.

DEVELOPMENT IN NET SALES AND BORROWING REQUIREMENT WITHOUT BUY-BACKS, 2005 Chart 3.2.1.



The development over the year is summarised in Chart 3.2.1. After *Budget Review 1* in May, issuance was reduced, and after *Budget Review 2* in August, sale of government bonds was discontinued and buy-back was intensified.

BORROWING 3.3

Domestic government bonds

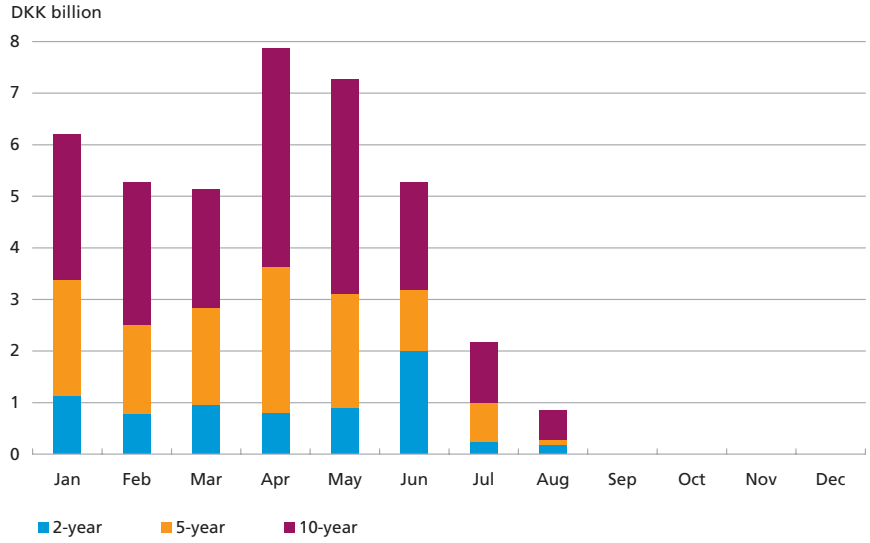
The central-government borrowing requirement is financed mainly by issuing domestic government bonds. In 2005, sales of government bonds totalled DKK 40 billion (market value), cf. Table 3.3.1. Half the sales during the course of the year were in the 10-year maturity segment, while approximately 30 per cent were in the 5-year and 20 per cent in the 2-year maturity segments. This distribution reflects the focus on building up the 5- and 10-year benchmark securities at the beginning of the year. In the 2-year segment, 3 per cent bullet loans 2006 was replaced by 4 per cent bullet loans 2008 in the government's on-the-run issues in May. At the same time, the latter series became the new 2-year benchmark.

Most of the government securities were sold in the 1st half of the year, cf. Chart 3.3.1.

DOMESTIC GOVERNMENT ISSUES IN 2005 Table 3.3.1

DKK million	Issuance			Nominal outstanding volume, end-2005
	Nominal	Market value	Capital loss	
4 per cent bullet loans 2015	19,330	20,096	-766	56,910
4 per cent bullet loans 2010	12,280	12,893	-613	28,040
4 per cent bullet loans 2008	3,180	3,339	-159	47,274
3 per cent bullet loans 2006	3,660	3,694	-34	33.980
Total bullet loans	38,450	40,021	-1,571	
Treasury bills 2006 IV	6,760	6,592	168	6,760
Treasury bills 2006 III	14,340	14,049	291	14,340
Treasury bills 2006 II	15,615	15,318	297	15,615
Treasury bills 2006 I	23,377	22,943	434	23,377
Treasury bills 2005 IV	8,875	8,744	131	
Treasury bills 2005 III	3,971	3,927	44	
Treasury bills 2005 II	2,101	2,089	12	
Total Treasury bills	75,039	73,662	1,377	
Redemptions	-83,549	-83,549		
Treasury bills, net	-8,510	-9,887	1,377	
Domestic sales of government securities, total	29,940	30,135	-195	

SALES OF ON-THE-RUN ISSUES, 2005 Chart 3.3.1



Treasury bills

Issuance of Treasury bills in 2005 totalled DKK 73.7 billion (market value), while redemptions totalled DKK 83.5 billion, cf. Table 3.3.1. The net financing contribution from the Treasury bill programme was thus DKK -9.9 billion. The reduction was partly a response to lower demand at the last Treasury bill auctions of the year.

Treasury bills are issued at monthly auctions. For a more detailed description of the Treasury bill auctions, see Chapter 5.

Foreign borrowing

At the end of February, a syndicated euro loan of EUR 1.8 billion (DKK 13.3 billion) was raised, cf. Box 3.2. This loan covered foreign redemptions of just over DKK 9 billion. The surplus proceeds were carried forward to 2006.

The loan was priced on the German government yield curve, equivalent to a yield to maturity of 3.2 per cent, which was below the yield for other highly rated issuers. A good geographical distribution of investors was achieved, cf. Chart 3.3.2.

The CP programmes

The Danish government has two Commercial Paper (CP) programmes for short-term borrowing for up to one year in the international money markets. The two programmes are aimed at, respectively, the European market (ECP programme) and the US market (USCP programme). Under

5-YEAR EURO LOAN IN 2005 Box 3.2

Characteristics of Kingdom of Denmark, euro loan 3.125 per cent 2010:

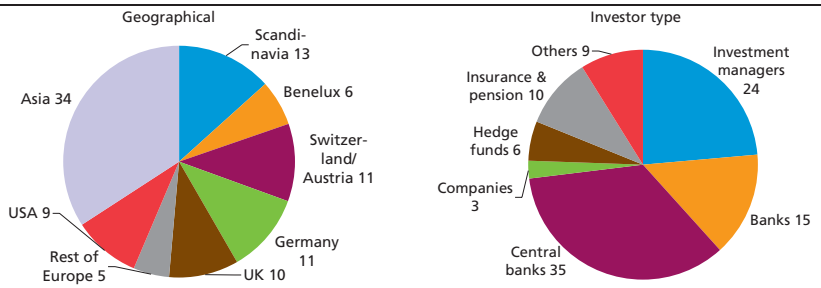
- Date of issue: 23 February 2005
- Maturity date: 15 October 2010
- Size: EUR 1.8 billion (DKK 13.3 billion)
- Bids received: EUR 2.5 billion
- Rating: AAA/Aaa
- Fee: 0.10 per cent
- Governing law and jurisdiction: Danish
- Listing: Copenhagen Stock Exchange
- Registration: VP Securities Centre
- Lead managers: Barclays, Danske Bank and JP Morgan
- Senior co-lead manager: Nordea
- Co-lead managers: ABN Amro, Deutsche Bank, Dresdner Bank, HSH Nordbank, Nykredit Bank and Svenska Handelsbanken.

the USCP programme, all issuances are in dollars, while it is possible to issue in a number of currencies, including dollars and euro, under the ECP programme. The maximum outstanding amount in each programme is USD 6 billion.

The objective of the CP programmes is to ensure a liquidity contingency for rapid adjustment of the level of the foreign-exchange reserve over a short horizon, e.g. in connection with intervention. In addition, the programmes can be used when the balance of the central-government account is low.

The programmes were used in November 2005 to cover a short-term financing requirement on the maturity of 4 per cent bullet loans 2005. Issuances, primarily under the USCP programme, totalled approximately DKK 17 billion. The exchange-rate risk related to borrowing in dollars was converted to euro via forward contracts. The loans were raised in October and November, and matured in 2005.

ALLOCATION OF EURO LOAN RAISED IN 2005, PER CENT Chart 3.3.2



CENTRAL-GOVERNMENT BUY-BACKS, 2001-05 Table 3.4.1

DKK billion, market value	2001	2002	2003	2004	2005
Maturing within the year	19.5	11.4	14.7	21.0	27.4
Maturing in subsequent years	20.1	27.5	26.4	15.8	28.3
Total buy-backs	39.7	38.9	41.1	36.7	55.8

BUY-BACKS 3.4

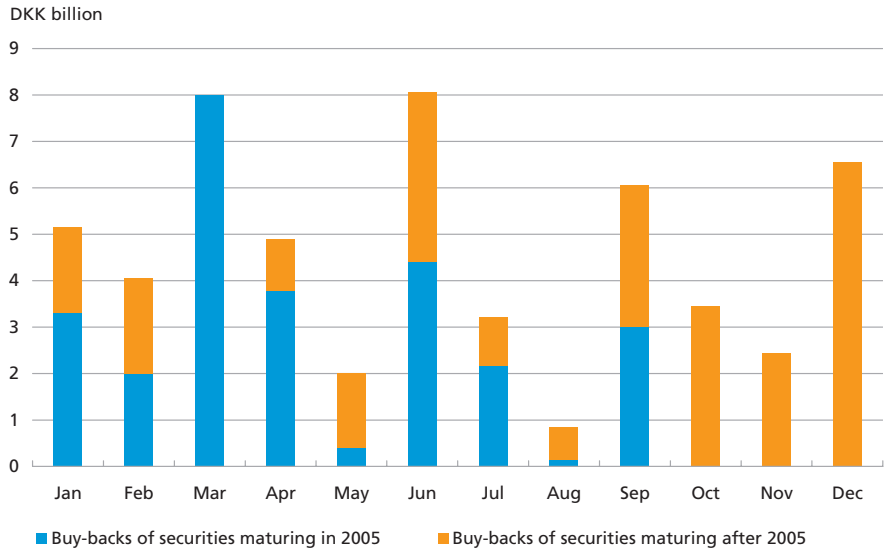
The central government buys back government securities in the secondary market. Securities that have been bought back are normally cancelled immediately after the transaction. Buy-back only takes place if it is assessed to be advantageous on the basis of an overall evaluation of government debt policy.

Buy-backs of securities maturing within the year do not affect the year's borrowing requirement. These buy-backs are aimed at smoothing the balance of the central-government account over the year.

Buy-backs of securities maturing in subsequent years are primarily used to maintain liquid on-the-run issues and to smooth the central government's redemption profile. These buy-backs increase the borrowing requirement in the current year, but reduce the borrowing requirement in the year of maturity.

Buy-backs in 2005 exceeded the volume in previous years, cf. Table 3.4.1. In particular, the buy-backs within the year were higher, among

BUY-BACKS OF GOVERNMENT SECURITIES IN 2005 Chart 3.4.1



BUY-BACKS OF DOMESTIC GOVERNMENT SECURITIES IN 2005 Table 3.4.2

DKK million, market value	Central govern-ment	SPF[1]	Financing Fund	High-Technology Foundation	Total buy-backs from the market
4 per cent bullet loans 2005	12,495	-	312	543	13,350
5 per cent bullet loans 2005	14,946	-3,080	-	-	11,866
Buy-backs maturing in 2005, total	27,441	-3,080	312	543	25,216
8 per cent bullet loans 2006	21,112	-18,772	-	-	2,340
3 per cent bullet loans 2006	6,247	3,513	329	506	10,594
5 per cent serial loans 2007	0	-	-	-	0
7 per cent bullet loans 2007	987	1,357	-	-	2,344
6 per cent bullet loans 2009	-	2,362	275	824	3,461
6 per cent bullet loans 2011	-	1,961	-	-	1,961
5 per cent bullet loans 2013	-	17,623	279	485	18,387
4 per cent serial loans 2017	3	-	-	-	3
7 per cent bullet loans 2024	-	29	-	-	29
3.5 per cent perpetuals 1886	4	-	-	-	4
Buy-backs maturing after 2005, total	28,352	8,072	882	1,815	39,122
Buy-backs of domestic government securities, total	55,794	4,993	1,194	2,359	64,339

[1] Negative sign indicates that SPF sold to the central government.

other things reflecting a large balance on the central-government account in the 1st half of 2005.

Most of the buy-backs in securities maturing in subsequent years were transacted towards the end of 2005, cf. Chart 3.4.1. This should be viewed in relation to the upward adjustment of government finances. These buy-backs mainly comprised 8 per cent bullet loans 2006 (DKK 21.1 billion) and were primarily purchased from the Social Pension Fund (SPF). SPF reinvested in securities with longer maturities, primarily 5 per cent bullet loans 2013, cf. Table 3.4.2. Overall, approximately 1/3 of the buy-backs by the central government and the government funds were in securities maturing in 2006, and almost half in securities maturing in 2013, while the rest of the buy-backs were distributed mainly on securities maturing in 2007, 2009 and 2011.

INTEREST-RATE SWAPS 3.5

Interest-rate swaps are used to separate the issuance strategy from the management of the central government's interest-rate risk, so that the issuance strategy can focus on building up liquid series.

By e.g. transacting interest-rate swaps from fixed to floating interest rates, the interest-rate risk is increased since a larger proportion of the debt is subject to current fixing of the interest rate.

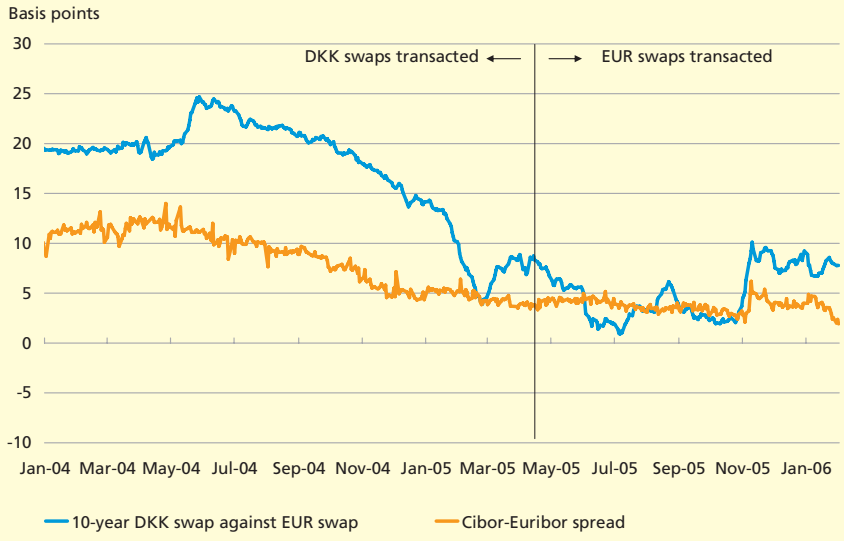
Interest-rate swaps are transacted in both kroner and euro, which was also the case in 2005. The choice of market for transaction of interest-rate swaps is based on an assessment of the relative advantages of swaps in kroner and euro, cf. Box 3.3. If central-government transactions are deemed to have a potential impact on price formation in the Danish swap market, the transactions are conducted in the euro market.

CONSIDERATIONS ON TRANSACTING INTEREST-RATE SWAPS IN KRONER OR EURO — Box 3.3

The relative advantages of transacting interest-rate swaps in kroner or euro can be analysed by assessing the difference between the krone and euro swap rates today compared to the difference between 6-month Cibor and 6-month Euribor over the entire term to maturity of the swap. For instance, if the 10-year krone swap rate is 3.74 per cent and the euro swap rate 3.66 per cent, 8 basis points can be gained by receiving a fixed krone interest rate rather than a fixed euro interest rate. On the other hand, Cibor, not Euribor, is payable every six months. If Cibor on average proves to be more than 8 basis points higher than Euribor over the maturity of the interest-rate swap, the interest-rate swap in kroner will not be advantageous.

In the 2nd half of 2004 and early 2005, the spread between the 10-year krone swap rate and euro swap rate narrowed by approximately 15 basis points, while the Cibor-Euribor spread fell by approximately 5 basis points. All other things being equal, it became more attractive to transact interest-rate swaps in euro.

RELATIVE PRICE CONSIDERATIONS, INTEREST-RATE SWAPS IN KRONER AND EURO, 2004-06



Note: All interest rates are adjusted for differences in maturities and shown as 5-day moving averages.
Source: Bloomberg and own calculations.

CENTRAL GOVERNMENT'S TRANSACTION OF INTEREST-RATE SWAPS FROM FIXED TO FLOATING RATES, 2005 Table 3.5.1

DKK billion	5-year	10-year	Total
1st quarter	1.3	3.3	4.6
2nd quarter	-	4.1	4.1
3rd quarter	-	5.6	5.6
4th quarter	-	-	-
Interest-rate swaps, total	1.3	13.0	14.3

Note: The Table indicates the notional principals of the interest-rate swaps transacted.

Interest-rate swaps transacted in 2005 totalled DKK 14.3 billion, cf. Table 3.5.1. In January, the central government entered into 10-year contracts for DKK 1.8 billion in the Danish swap market, while all subsequent contracts were in euro.

CHAPTER 4

Issuance Strategy

The prospect of falling central-government debt in the coming years entails a need to adjust the central government's issuance policy. The strategy will be to concentrate issues in fewer government securities with focus on the 10-year maturity segment. If the borrowing requirement is sufficiently large, issuance may also take place in a shorter maturity segment in order to fill out the gaps in the central government's redemption profile.

In 2006, the central government will concentrate issuance in the newly opened 10-year government series, 4 per cent bullet loans 2017. In addition, the existing benchmark securities will be built up to the minimum volumes announced. The central government will not raise any euro loans in 2006. To support the borrowing requirement in 2006, the central government may buy back domestic and foreign government securities.

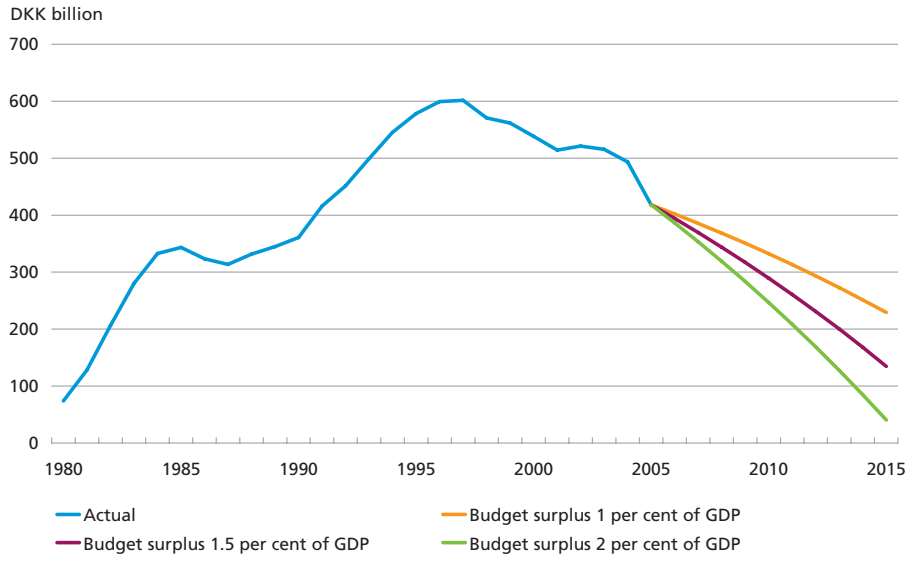
ISSUANCE STRATEGY 4.1

Since 1997, Denmark has by and large had a government budget surplus, and the central-government debt has decreased from DKK 600 billion to just over DKK 400 billion, cf. Chart 4.1.1. The Chart also shows debt projections for different levels of budget surpluses in the coming years.

In recent years, the issuance policy has been adjusted on an ongoing basis to ensure liquid on-the-run issues. Primarily the outstanding volume of domestic securities has been adjusted following the reduction of the debt. For example, the number of on-the-run Treasury notes was reduced from two to one in 1998, and in 2001 issuance in 7 per cent bullet loans 2024 was discontinued in order to concentrate issuance in the 10-year maturity segment. Most recently, in 2005, 4 per cent bullet loans 2008 was used as the 2-year on-the-run issue instead of opening a new issue.

The prospect of sustained government budget surpluses in the coming years further reduces the need to sell government securities. It is therefore no longer expedient to build up new liquid securities in all three maturity segments (2, 5 and 10 years), cf. Chart 4.1.2.

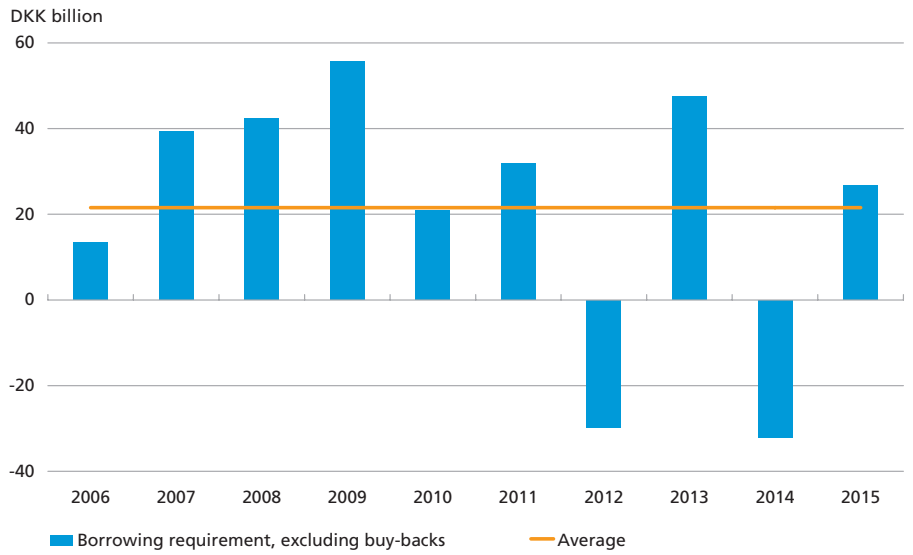
CENTRAL-GOVERNMENT DEBT, ACTUAL AND PROJECTIONS, 1980-2015 Chart 4.1.1



Note: The central-government debt comprises domestic and foreign debt less the balance of the central government's account and assets of SPF, the High-Technology Foundation and the Financing Fund. In the projections, GDP is assumed to grow by 3.8 per cent annually in current prices.

Issuance will take place in fewer securities in order to ensure that government securities will continue to reach an outstanding volume that provides for the reduction of borrowing costs via a liquidity premium.

CENTRAL-GOVERNMENT BORROWING REQUIREMENT BASED ON A BUDGET SURPLUS OF 1.5 PER CENT OF GDP, 2006-15 Chart 4.1.2



Note: The borrowing requirement is calculated as the central government's redemptions on domestic and foreign government securities less the government budget surplus of 1.5 per cent of GDP. Future buy-backs have not been included, and nor have Treasury bills.

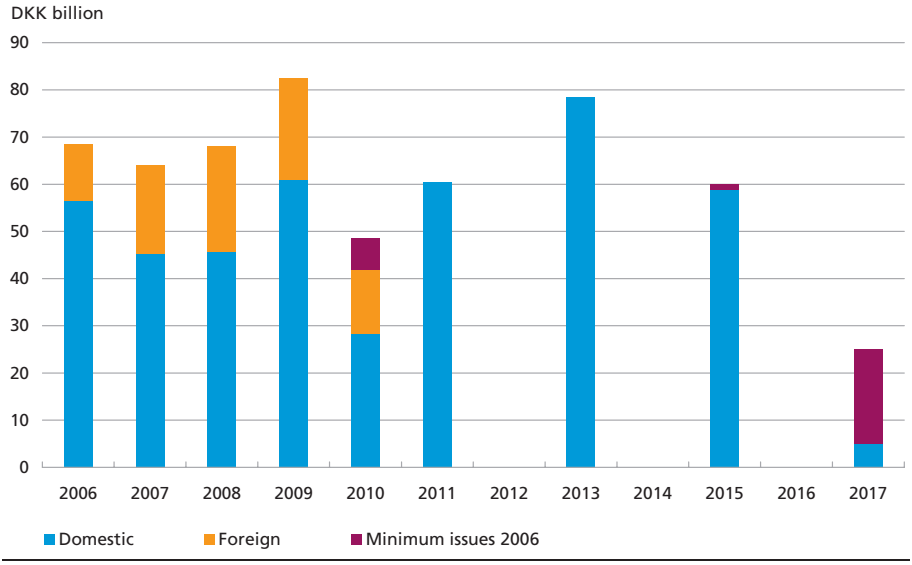
The issuance strategy will focus on:

- building up securities in the 10-year maturity segment to a final outstanding volume of around DKK 50 billion,
- building up securities with a shorter maturity, aimed at filling out the gaps in the central government's redemption profile,
- small issues, in the event of unusual market conditions, in other government securities.

In future, most government issues will be concentrated in 10-year government bonds, with an expected final outstanding volume of around DKK 50 billion. The central government normally has a comparative advantage in the long segment owing to its high credit rating. Moreover, the 10-year maturity segment is considered a key point on the government yield curve, both in Denmark and internationally. Furthermore, market participants have expressed a wish for a liquid 10-year point on the government yield curve, rather than shorter issues for which there are several substitutes such as uncallable short-term mortgage-credit bonds.

If the borrowing requirement is sufficient, the intention is to merge the previous 2- and 5-year issues into one issue aimed at filling out the gaps in the central government's redemption profile. For instance, government securities maturing in 2012, 2014 and 2016 might be issued, cf. Chart 4.1.3. This will help to smooth the government's borrowing re-

CENTRAL-GOVERNMENT REDEMPTION PROFILE, 2006-17 Chart 4.1.3



Note: Redemption profile excluding re-lending to Danish Ship Finance A/S. There are also domestic redemptions of DKK 25 billion in 2024.

quirement and thus underpin a stable issuance policy. Issuance in shorter maturity segments can also contribute to diversification of the investor base.

An active buy-back policy will still be pursued in order to support the building up of new government securities. Buy-backs in recent years have taken place on MTSDenmark. In 2006, further initiatives are planned in connection with buy-backs, including the use of buy-back auctions on MTSDenmark, cf. Chapter 5.

STRATEGY AND BORROWING REQUIREMENT IN 2006 4.2

Budget and financing requirement 2006

At the end of January, the central-government borrowing requirement in 2006 was calculated at DKK 12.2 billion, cf. Table 4.2.1. The low borrowing requirement reflects expectations of a government budget surplus in 2006, and also that the surplus sale of government securities in 2005 was carried forward to 2006. At the same time, redemptions on the domestic and foreign debt are relatively small. In view of the low borrowing requirement, the central government will not issue any euro loans in 2006. In 2006, the central government will support the building up of the new 10-year issue via buy-backs. Buy-backs are possible in all domestic and foreign government securities in 2006, except the benchmark issues and 4 per cent bullet loans 2017. In January 2006, buy-backs of government securities maturing after 2006 totalled DKK 1.1 billion. The borrowing requirement is updated on an ongoing basis at www.nationalbanken.dk under Government debt.

CENTRAL-GOVERNMENT BORROWING REQUIREMENT IN 2006 Table 4.2.1

DKK billion	Domestic	Foreign	Total
Net financing requirement, cf. *Budget Review 3*, 2005	-40.6	3.1	-37.6
Redemptions on debt[1]	59.9	9.4	69.3
Payments by the central government in currency swaps[2]	11.4	3.0	14.3
Net bond purchases by government funds	2.9		2.9
Gross financing requirement	33.5	15.4	49.0
Excess sale in 2005 carried forward to 2006	-19.4	-4.1	-23.5
Payments to the central government in currency swaps[2]	-3.0	-11.4	-14.3
Buy-backs in 2006 in securities maturing after 2006, market value[3]	1.1	-	1.1
Borrowing requirement[3]	12.2	0.0	12.2

1 Including additional buy-backs in 2005 of government securities maturing in 2006 compared to *Budget Review 3*, 2005.
2 Currency swaps totalling DKK 3.0 billion will mature, of which DKK 0.3 billion relates to Danish Ship Finance A/S. Kroner-to-euro currency swaps for DKK 11.4 billion are expected to be transacted.
3 Up to and including the value date 31 January.

STRATEGIC BENCHMARKS FOR 2006 Box 4.1

Interest-rate exposure:

- Macauley duration of 3 years ± 0.5 years.
- Day-to-day management of the duration is based on a duration measure calculated with a fixed discount rate and a balance of the central government's account of DKK 30 billion. The target band for this duration measure is 3 years ± 0.25 years.

Liquidity:

- The final outstanding volume in 4 per cent bullet loans 2010 will reach a minimum of DKK 35 billion.
- The final outstanding volume in 4 per cent bullet loans 2015 will reach a minimum of DKK 60 billion.
- The final outstanding volume in 4 per cent bullet loans 2017 will reach approximately DKK 50 billion, of which around DKK 25 billion is expected to be issued in 2006.
- In the event of unusual market conditions, the central government may issue in government securities maturing after 2006 for small amounts.
- Net financing contribution of zero from the Treasury bill programme.

Sales and opening of a new issue

On 26 January, a new 10-year issue, 4 per cent bullet loans 2017, was opened. On the opening day, the maximum amount offered of DKK 5 billion was sold at an average yield to maturity of approximately 3.5 per cent. The outstanding amount of DKK 5 billion ensured market making. This issue is expected to reach a final outstanding amount of around DKK 50 billion, of which approximately DKK 25 billion is expected to be issued in 2006, cf. the benchmark strategy in Box 4.1.

The 5-year issue, 4 per cent bullet loans 2010, is expected to reach a minimum of DKK 35 billion during 2006, and the 10-year issue, 4 per cent bullet loans 2015, a minimum of DKK 60 billion. In the event of unusual market conditions, small supplementary issues in the other government securities maturing after 2006 are possible.

In 2006, the net financing requirement from the Treasury bill programme is expected to be zero. Liquidity in Treasury bills may be supported if a new exchange facility is introduced in 2006, whereby government bonds maturing within a year may be exchanged for Treasury bills, cf. Chapter 5.

The interest-rate risk on the central-government debt portfolio will continue to be governed by the Macauley duration of 3 years ± 0.5 years in 2006. The duration is managed by means of interest-rate swaps. In day-to-day risk management, a target band of 3 years ± 0.25 years is applied to a duration based on a fixed rate of interest and a balance of the central government's account of DKK 30 billion, cf. Chapter 8.

CHAPTER 5

Issuance of and Trading in Danish Government Securities

Danish government securities are issued to primary dealers in, respectively, Treasury bills and government bonds. The primary dealers have an ongoing obligation to be market makers in Danish government securities, i.e. to quote current bid and ask prices within fixed maximum spreads and for minimum amounts. Market making helps to ensure a transparent and well-functioning market for Danish government securities.

Government Debt Management at Danmarks Nationalbank has agreed with the primary dealers that MTSDenmark is the market place for issuance of and market making in Danish government securities.

Government bonds are primarily issued by tap sale in the secondary market. In 2005, six of the primary dealers in government bonds took up 70 per cent of the bonds sold. The average daily turnover in Danish government securities on MTSDenmark was almost DKK 2 billion in 2005, of which around 60 per cent pertained to benchmark securities.

The market structure for Treasury bills was modernised in 2005. In the primary market, a new and improved MTS auction system has been implemented. This has reduced the response time from approximately 30 minutes to a maximum of 15 minutes. In addition, a primary dealer system has been introduced for Treasury bills, with 12 Danish and international banks as participants.

PRIMARY DEALER SYSTEMS FOR DANISH GOVERNMENT SECURITIES 5.1

Danish government securities are issued to and bought back from banks that have concluded primary dealer contracts. Primary dealer status is awarded on the expectation that the banks in question will enter into long-term partnership with the issuer on trading and distributing Danish government securities to a broad range of investors. The most important right of primary dealers is to buy government securities on issue and to be counterparties in buy-back transactions. The main obligation of primary dealers is market making in government securities. Thus, the primary dealers must quote current bid and ask prices within fixed maximum spreads and for minimum amounts, cf. Box 5.1.

PRIMARY DEALER CONTRACTS Box 5.1

Government Debt Management has entered into primary dealer contracts for, respectively, government bonds and Treasury bills. The rights and obligations of the primary dealers are specified in the primary dealer contract, which can be found at the Government Debt Management website (see www.nationalbanken.dk under Government debt). In principle, the primary dealer contract for Danish government securities contains the same elements as equivalent contracts in other EU member states.

The principal rights of primary dealers are:

- use of the title Primary Dealer in Danish government bonds/Treasury bills
- to be a counterparty to the central government's issuance and buy-back transactions
- use of the securities lending facilities of the central government and the Social Pension Fund.

The principal obligations of primary dealers are:

- current quotation of prices for at least 5 hours per day in government bonds that are bullet loans and/or Treasury bills within fixed maximum spreads and for minimum amounts, cf. the Table below
- to be an active counterparty to the central government's issuance and buy-back transactions
- promotion of Danish government securities
- to support a well-functioning market for Danish government securities.

MARKET-MAKING OBLIGATIONS IN VARIOUS TERM-TO-MATURITY BRACKETS

	MTSDKT[1]	MTSDKB [2]			MTSDKL [3]		
Maturity segment[4] ...	< 1yr	2 yrs	5 yrs	10 yrs	2 yrs	5 yrs	10 yrs
Maximum spread	4 bp	3 ticks	5 ticks	7 ticks	5 ticks	8 ticks	10 ticks
Minimum amount, DKK million	100	80	40	40	60	20	20

Note: Primary dealers in Treasury bills must quote prices for all Treasury bills (MTSDKT) with a remaining term to maturity of more than 1 month. Primary dealers in government bonds must quote prices in the central-government benchmark and primary on-the-run issues (MTSDKB). Market making in other government bonds (MTSDKL) rotates between the primary dealers in government bonds so that there are always at least five market makers in each series. In practice, most primary dealers are market makers in all government bonds comprised by the primary dealer system.

[1] MTSDKT is the segment on MTSDenmark where Treasury bills are listed. Treasury bills are quoted by yields, so that the maximum spread is stated in basis points (bp).

[2] MTSDKB is the segment on MTSDenmark where benchmark government bonds and primary on-the-run issues are listed. Government bonds are quoted in prices, and the spread between the bid and ask prices is stated in ticks. A tick is one hundredth of a percentage point.

[3] MTSDKL is the segment on MTSDenmark where other government bonds that are bullet loans are listed. 7 per cent bullet loans 2024 are also comprised by market making in this category. The maximum spread is 20 ticks, and the minimum amount is DKK 10 million.

[4] <1 year comprises maturities from 1 month to 12 months; 2 years is the segment from 13 months to 3.5 years; 5 years is the segment from 3.5 to 6.5 years; 10 years is the segment from 6,5 to 13.5 years. Each segment may comprise several government securities.

Government Debt Management has concluded primary dealer contracts for, respectively, government bonds and Treasury bills. The primary dealer contract for government bonds was concluded in connection with

OVERVIEW OF PRIMARY DEALERS IN DANISH GOVERNMENT SECURITIES Table 5.1.1

Primary dealers in government bonds	Primary dealers in Treasury bills	Market takers in government bonds[1]
ABN Amro	Arbejdernes Landsbank	Citibank
Barclays	Danske Bank	BNP Paribas
Danske Bank	Dredsner Bank	Fortis
Deutsche Bank	Fionia Bank	Merrill Lynch
Dresdner Bank	HSH Nordbank	Svenska Handelsbanken
Fionia Bank	JP Morgan	
HSH Nordbank	Jyske Bank	
JP Morgan	Nordea	
Morgan Stanley	Nykredit	
Nordea	SE-Banken	
Nykredit	Svenska Handelsbanken	
SE-Banken	Sydbank	
Sydbank		

[1] Market takers can trade at prices quoted by the primary dealers, but cannot themselves quote prices in the system.

the introduction of MTS in the Danish bond market in 2003. As of 1 January 2006, the system comprises 13 Danish and international banks, cf. Table 5.1.1.

In 2005, a primary dealer system was also established for Treasury bills, with 12 Danish and international participants, cf. Table 5.1.1. The system was set up in connection with the introduction of a new auction facility for issuance of Danish Treasury bills on MTSDenmark, and the introduction of market making on MTSDenmark.

In addition, some primary dealers have entered into voluntary agreements relating to market making in the central government's euro loans.

MTSDenmark

According to the primary dealer contract, and after consultation with the primary dealers, it has been agreed that issuance and electronic market making takes place in a dedicated market segment – MTSDenmark. Besides the primary dealers, market takers can also be connected to MTSDenmark. A market taker can trade at prices quoted by primary dealers, but cannot itself quote prices. As of 1 January 2006, five banks were connected to MTSDenmark as market takers, cf. Table 5.1.1.

MTSDenmark is a market segment on MTSAM, a company registered in Belgium. MTSAM also has Belgian and Finnish market segments. Administration of MTSDenmark takes place independently of MTSAM, and governance is undertaken by the primary dealer committee comprising Government Debt Management, the primary dealers and MTS S.p.A., cf. Box 5.2.

THE MTS SYSTEM STRUCTURE Box 5.2

MTS is an abbreviation of Mercato dei Titoli di Stato, i.e. market for government bonds. MTS is a system for electronic trading in government securities that is based on the electronic trading platform Telematico. Today MTS is the dominant system for wholesale trading in European government bonds.

MTS S.p.A. is the company that manages Telematico. It was founded in 1988 with a view to increasing transparency in the Italian market for government securities. In 1997 the company was privatised and sold to a group of large international financial institutions. In 1999, MTS S.p.A. established EuroMTS, where e.g. the largest European benchmark securities are traded. MTS S.p.A. also holds ownership interests in the local MTS platforms that use the MTS trading platform, Telematico. These platforms have been established to enhance the transparency and efficiency of trading in the government securities issued, including those without benchmark status.

[1] For more information on MTS, see www.mtsspa.it.

In July 2005, the controlling interest in MTS S.p.A. was sold to a consortium comprising EuroNext and Borsa Italiana, which hereby have increased their European bond trading activities. The change of ownership of MTS S.p.A. may lead to adjustments of the ownership structure of the local MTS markets, but is not expected to have any impact on the market participants' activities on MTSDenmark.

A key element of the MTSDenmark infrastructure is clearing and settlement. In 2005, the settlement facilities were enhanced, when the market participants were given the choice of VP Securities Services (VP), Euroclear and Clearstream as their preferred clearing house for straight-through processing of transactions concluded on MTSDenmark. The new set-up reduces the entry barriers to MTSDenmark since new market participants can join MTSDenmark without having to adjust their internal settlement processes.

Securities lending facility

Primary dealers have access to the securities lending facilities of the central government and the Social Pension Fund (SPF). The former comprises benchmark securities and key on-the-run issues. Securities lending in other government securities that are bullet loans is part of SPF's securities lending facility. The securities lending facilities support secondary trading in government securities and thereby liquidity in government securities. This makes it easier for primary dealers to conduct market marking, while also reducing the risk of distorting price formation.

As from 1 January 2006, the fees for using the government and SPF securities lending facilities have been lowered. The fee for borrowing in the government bonds comprised by the facilities is now 0.2 per cent

SECURITIES LENDING BY THE CENTRAL GOVERNMENT AND SPF IN 2005	Table 5.1.2
DKK billion	
The central government's securities lending facility	
3 per cent bullet loans 2006	2.4
4 per cent bullet loans 2008	0.2
4 per cent bullet loans 2010	8.5
4 per cent bullet loans 2015	5.0
Total	16.2
SPF's securities lending facility	
7 per cent bullet loans 2007	5.8
6 per cent bullet loans 2009	1.9
6 per cent bullet loans 2011	10.2
5 per cent bullet loans 2013	2.8
7 per cent bullet loans 2024	0.5
Total	21.2

p.a., while the fee for borrowing in Treasury bills remains unchanged at 0.15 per cent p.a. If price changes lead to significant changes in the use of the securities lending facilities, Government Debt Management can adjust the fees. The terms and conditions for use of the facilities remain unchanged and are presented in the Appendices.

In 2005, the lending volume under the central government's securities lending facility was DKK 16.2 billion, cf. Table 5.1.2. Lending under SPF's securities lending facility amounted to DKK 21.2 billion. Lending mainly took place in January, when there was a shortage in the private market for securities lending.

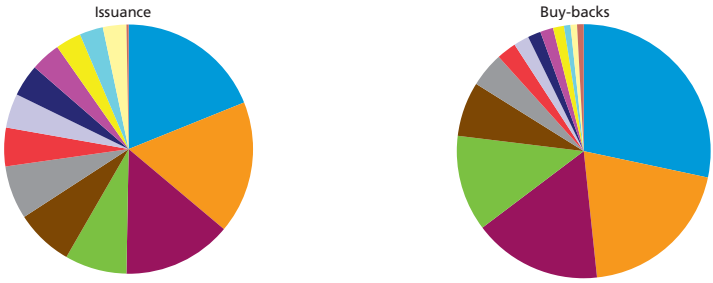
GOVERNMENT BONDS 5.2

Issuance and buy-backs

Danish government bonds are issued on MTSDenmark, primarily by tap sale, to primary dealers in Danish government bonds. Tap sale means that issuances are distributed over the year. Sale takes place directly in the secondary market at market prices that are quoted by the primary dealers. In connection with the issuance, Government Debt Management has a market-taker status, i.e. sales are effected at the best bid price.

All primary dealers have equal opportunities to buy newly issued government bonds from the issuer. To avoid influencing the market, sale generally only takes place when there is considerable underlying interest, i.e. a small bid/ask spread, substantial depth and a narrow yield spread to the euro benchmark curve. In 2005, three banks accounted for

ISSUANCE AND BUY-BACKS, BY PRIMARY DEALERS Chart 5.2.1



Note: Primary dealers have been anonymised.
Source: MTSDenmark.

around 50 per cent of total sales, while the six largest participants acquired approximately 70 per cent of the issues, cf. Chart 5.2.1. This is by and large equivalent to the level in the preceding year.

Buy-backs also take place on MTSDenmark with the primary dealers as counterparties. Buy-backs in securities with a remaining term to maturity of more than 13 months take place on the MTSDKL segment, cf. Box 5.1, where government securities are purchased at the current market price (best ask price) on an ongoing basis. For government securities maturing in less than 13 months, buy-backs are transacted in a specific buy-back segment since these securities are not subject to market making. As the Chart shows, buy-backs are concentrated on fewer primary dealers than issuance as six primary dealers are counterparties to around 90 per cent of the buy-backs.

Additional measures are planned in 2006 with a view to increasing the number of instruments available for issuance and buy-back. For example, it is the intention to introduce an MTS buy-back facility, and increasingly to conduct simultaneous issuance and buy-back via an exchange facility. The latter facility is initially considered for exchanging government bonds with a remaining term to maturity of less than 12 months for Treasury bills.

Electronic trading and market making on MTSDenmark

A key element of the primary dealer contract is the ongoing market-making obligation for government bonds. Market making by primary dealers gives market participants access to current prices, so that they can see the price at which the market is willing to buy or sell a given government bond before making a transaction. This transparency is important in a well-functioning market and helps to improve liquidity in the market.

TRANSPARENCY, BID-ASK SPREAD AND DEPTH IN GOVERNMENT BONDS, 2005 Table 5.2.1

MTSDKB	2-year	5-year	10-year
Average order coverage, per cent	97	97	97
Average spread between bid and ask price, ticks	2.0	3.3	4.3
Average depth in best price, DKK million	213	133	95

Note: The average daily order coverage is calculated as the part of the trading day (9.00 a.m. to 4.30 p.m.) during which current prices are available. The average spread between bid and ask prices is calculated as a weighted average of the daily intraday observations between the best bid and ask prices. The average depth is calculated as the average of the daily intraday observations for the average depth in the best bid and ask prices.
Source: MTSDenmark.

Table 5.2.1 presents key figures for liquidity and transparency in the benchmark government securities. It is seen that the average order coverage, defined as the part of the trading day when bid and ask prices are available, is almost 100 per cent. Market participants omit to quote prices for brief periods only, e.g. in connection with the announcement of key ratios, publications, etc.

The average spreads between bid and ask prices in the 2-, 5- and 10-year securities are, respectively, 2, 3 and 4 ticks[1], cf. Table 5.2.1. The difference between the best bid and ask prices is the cost of buying a government bond and selling it at the same time. The narrower the spread, the more efficient the market. Among other factors, the price difference is determined by competition intensity and trading costs. The difference between the bid and ask prices is comparable with similar wholesale markets for government bonds in the EU.

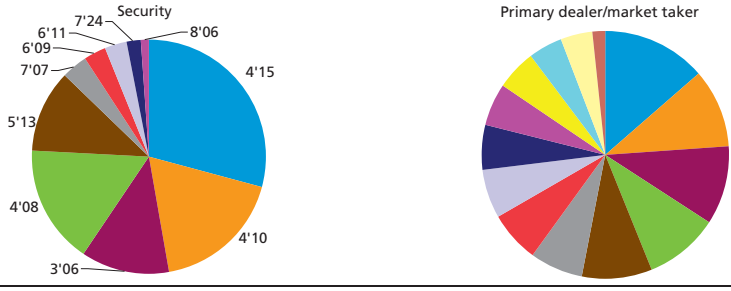
The market depth reflects the volume that can be traded at the best price, and thereby the volume of Danish government securities that can be traded without affecting the price. Each primary dealer has an obligation to quote bid and ask prices for benchmark securities in volumes of at least DKK 80 million, DKK 40 million and DKK 40 million in, respectively, the 2-, 5- and 10-year maturity segments.

The average daily turnover on MTSDenmark was close to DKK 2 billion in 2005. Trading was concentrated in the benchmark securities since around 60 per cent of the turnover related to the 2-, 5- and 10-year benchmark securities, cf. Chart 5.2.2. Trading was more or less equally distributed among primary dealers in Danish government securities. Six of the primary dealers in Danish government bonds accounted for around 60 per cent of all trading, while in 2004, six primary dealers accounted for 65 per cent of the traded volume.

[1] One hundredth of a percentage point.

TURNOVER IN GOVERNMENT BONDS, BY SECURITIES AND PRIMARY DEALERS/MARKET TAKERS

Chart 5.2.2



Note: Primary dealers and market takers have been anonymised.
Source: MTSDenmark.

TREASURY BILLS 5.3

A primary dealer system for Treasury bills was established in 2005. Under the contract, primary dealers have a market-making obligation in relation to Danish Treasury bills. Moreover, a new auction system developed on MTSDenmark was introduced in the primary market. At the same time, the duration of the auctions was reduced from approximately 30 minutes to a maximum of 15 minutes, which lowered the participants' market risk. These measures were aimed at improving the market structure for issuance of and trading in Treasury bills.

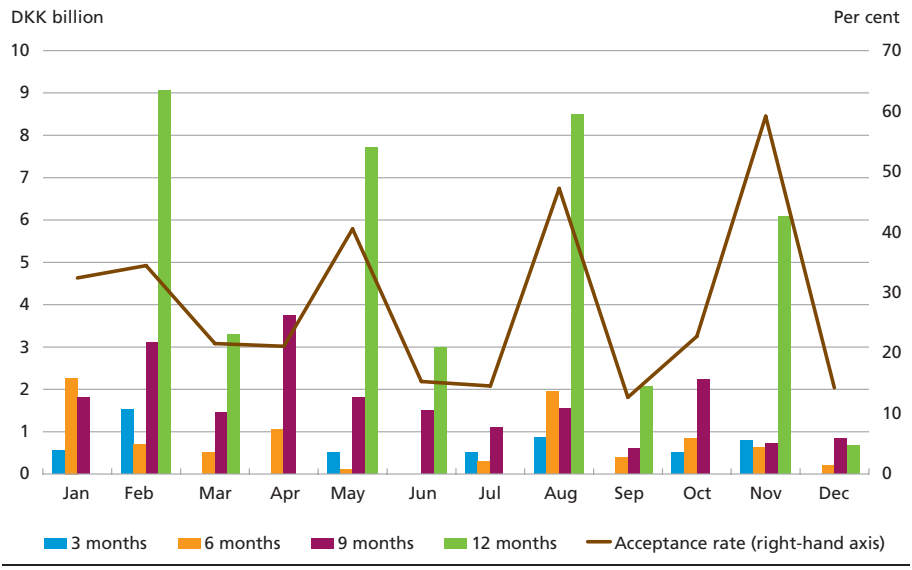
Issuance of Treasury bills

Treasury bills are sold at monthly auctions. In the 1st half of 2005, Treasury bills were issued via the existing auction facility with the existing counterparties, in practice eight active banks. In connection with the Treasury bill auction in July, a new MTS auction facility was introduced, and the group of counterparties was expanded to 12 primary dealers.

The bid volume in the auctions was greatest at the beginning of the year, cf. Chart 5.3.1. The acceptance rate was around 30 per cent in the 12 auctions in 2005. The acceptance rate was generally higher in the four auctions in which new Treasury bills were opened. The average acceptance rate was slightly lower than in 2004, when the level was around 40 per cent.

The distribution of the total issues by auction on market participants is more concentrated than for government bond auctions. The three largest market participants have a market share of around 70 per cent of the total volume issued. However, smaller bidders have acquired a larger share than previously. In 2003, an analysis showed that the allocation to

BID VOLUME AND ACCEPTANCE RATE, 2005 Chart 5.3.1



Note: 3 months includes securities with remaining term to maturity of 3 and 4 months; 6 months includes securities with remaining term to maturity of 5, 6 and 7 months; 9 months includes securities with remaining term to maturity of 8, 9 and 10 months; and 12 months includes securities with remaining term to maturity of 11 and 12 months.
Source: Danmarks Nationalbank and MTSDenmark.

small bidders was around 15-20 per cent.[1] The change is attributable to the increase in the number of participants in connection with the introduction of the primary dealer system.

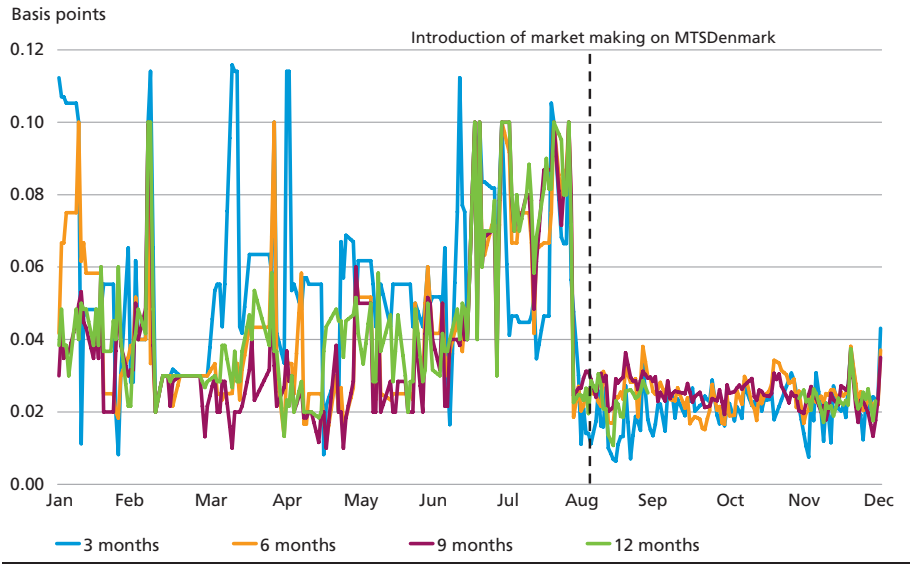
Secondary trading and market making on MTSDenmark

The introduction of the primary dealer system has increased transparency in the market for Treasury bills. Participants have current access to pre-trade data, which improves their opportunities to monitor price developments. The order coverage shows that bid and ask prices are displayed in the system throughout most of the trading day. In this connection, it should be noted that during a transitional phase, market making was only available for the Treasury bill with the longest maturity. Since 1 November, all Treasury bills have been subject to market making.

At the same time, the market-making obligation within a maximum spread of 4 basis points and for a minimum amount of DKK 100 million has made it possible to trade intraday within a narrow spread and in a certain volume without affecting the price. In practice, primary dealers quote sharper prices. Combined with competition between primary dealers, this entails that the spread between the best bid and ask prices is typically less than the maximum spread, cf. Chart 5.3.2.

[1] *Danish Government Borrowing and Debt 2003*, Chapter 8.

BID-ASK SPREAD FOR TREASURY BILLS IN THE INTERDEALER MARKET, 2005 Chart 5.3.2



Note: Bid-ask spread adjusted for maturity.
Source: DN Basen (money-market broker) and MTSDenmark.

It is seen that the spread in the interdealer market after the introduction of the primary dealer system has become both narrower and more stable[1]. Prior to the introduction, the average spread in the four Treasury bills was around 5 basis points; this has narrowed to around 2.5 basis points.

Modernisation of the Treasury bill market and introduction of electronic trading and market making on MTSDenmark have made the market for Treasury bills more transparent, making it easier for investors to trade.

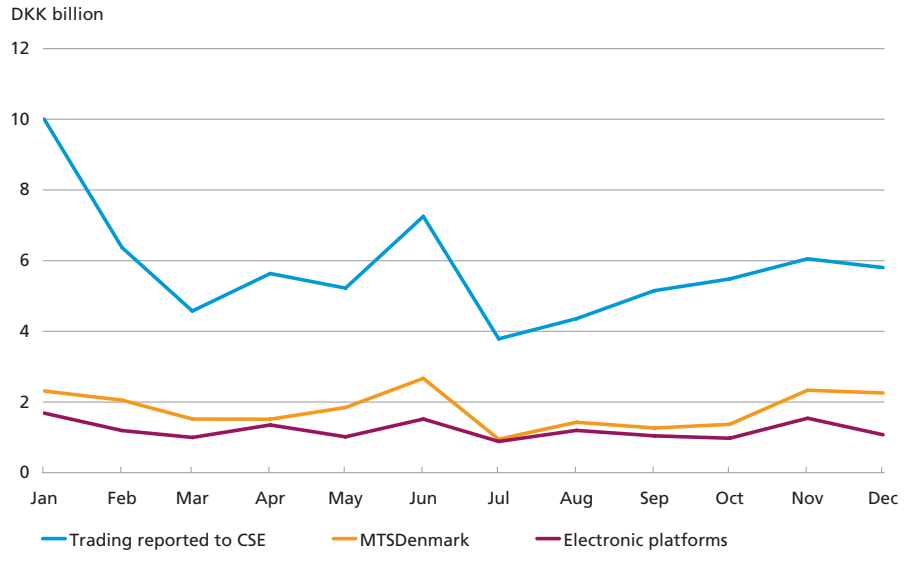
Notwithstanding the new measures, trading in Treasury bills on MTSDenmark was not expected to be substantial, since Treasury bills are generally buy-and-hold instruments, i.e. they are typically bought when issued and held by the final investors until maturity. In the first few months of trading on MTSDenmark, the average daily turnover was slightly above DKK 100 million.

TURNOVER IN DANISH GOVERNMENT SECURITIES 5.4

Besides electronic trading in the wholesale market on MTSDenmark, Danish government securities are traded on a number of other electronic platforms such as TradeWeb, BondVision and BloombergBond-

[1] For the period 1 January-28 July prices from a money-market broker are applied; for the rest of the period data from MTSDenmark.

TURNOVER IN DANISH GOVERNMENT SECURITIES, 2005 Chart 5.4.1



Note: Trading reported to the Copenhagen Stock Exchange (CSE) comprises data for all trading, irrespective of origin, to be reported by members of the Copenhagen Stock Exchange. Trading on MTSDenmark comprises data for the trading volume on MTS. Trading on the electronic platforms includes trading on TradeWeb, BondVision, ICAP/BrokerTec.
Source: MTSDenmark, TradeWeb, BondVision, ICAP/BrokerTec and Copenhagen Stock Exchange.

trader. These platforms tend to focus on resale in the segment between banks and their customers and are therefore typically referred to as dealer-to-customer systems. In addition, Government Debt Management has established a price-quoting system on the Copenhagen Stock Exchange. Finally, considerable volumes of Danish government securities are traded on electronic single-dealer platforms and in the OTC market.[1]

Electronic trading in Danish government securities

Most of the electronic trading in Danish government securities in the interdealer market takes place via MTSDenmark. In 2005, the average turnover on MTSDenmark was almost DKK 2 billion, cf. Chart 5.4.1. The turnover on MTSDenmark fell compared to 2004. This has been the general tendency in several MTS markets.

Besides the interdealer market, trading in Danish government securities takes place on electronic trading platforms in dealer-to-customer systems. These systems typically operate with quote-on-request agreements, i.e. the market dealers quote a price on the basis of a specific inquiry from a customer wishing to buy or sell government securities. Since several dealers operate on these platforms, price formation is usu-

[1] Single-dealer platforms are established via e.g. Bloomberg as dedicated trading systems between a market participant and its customers.

ally efficient because the dealers compete for customers. The turnover on the electronic dealer-to-customer platforms was on the level of MTSDenmark in 2005.

Since the introduction of electronic platforms in the Danish market towards the end of 2003, electronic trading has grown considerably. Previously, by far the greater share of trading in both the interdealer and dealer-to-customer markets took place OTC, which generally entails less transparency because market participants have less access to pre-trade information.

According to two reports, the electronic share of aggregate European government-bond trading is assessed to constitute more than half of the total turnover[1]. In a Danish context, it is difficult to assess the percentage of trading that takes place electronically since Danish government securities are traded via many different channels and by participants that have no obligation to report and publish transactions. However, electronic trading is not assumed to account for a smaller share of total trading in government bonds in Denmark than in other EU member states. This is also indicated by the fact that trading on MTSDenmark and electronic dealer-to-customer platforms accounts for approximately 50 per cent of the turnover in Danish government securities reported to the Copenhagen Stock Exchange, cf. Chart 5.4.1.

Price-quoting system on the Copenhagen Stock Exchange

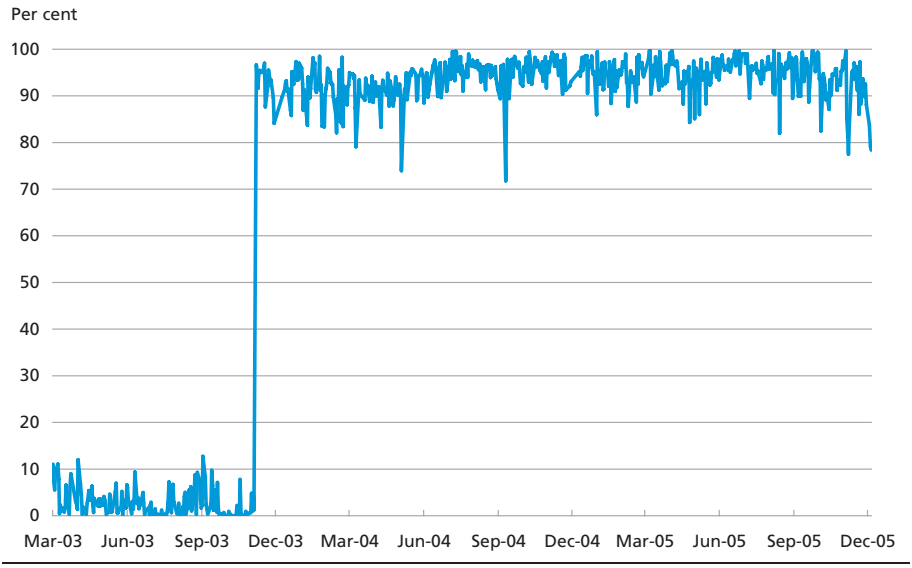
Parallel with the introduction of the wholesale market MTSDenmark, Government Debt Management also introduced a price-quoting system on the Copenhagen Stock Exchange. Six banks (Danske Bank, Fionia Bank, Jyske Bank, Nordea, Nykredit and Sydbank) have an obligation to quote current prices in Danish government bonds on the Copenhagen Stock Exchange. The aim is to ensure that small investors have access to a transparent and efficient market for trading in government bonds.

The six banks are obliged to quote prices for all government bonds that are bullet loans with a remaining term to maturity of more than 13 months. Current price quotation implies that participants must quote bid and ask prices within fixed spreads and for fixed amounts during 95 per cent of the interval from 9.00 a.m. to 4.30 p.m.

Members of the Copenhagen Stock Exchange bond sub-segment can trade at the quoted prices. They can also place their own orders in the system. Finally, other investors can place trading orders via their bank-

[1] Bearing Point (2005): *The Electronic Bond Market* and Celent (2004): *Electronic Trading in European Fixed Income Markets.*

ORDER COVERAGE ON THE COPENHAGEN STOCK EXCHANGE, 2003-05 Chart 5.4.2



Note: Order coverage calculated as the percentage of the trading day during which two-way prices are available.
Source: Copenhagen Stock Exchange.

ers. The trading rules are designed for any order exceeding DKK 1,000 to influence prices in the trading system.

The price-quoting system means that investors have current access to prices in the system. The average daily order coverage, i.e. the part of the day with access to pre-trade information, has been around 95 per cent since the system was introduced in December 2003, cf. Chart 5.4.2. Combined with the option to place their own orders via a banker, this gives small investors good opportunities to trade in an efficient market.

CHAPTER 6

The Social Pension Fund, the High-Technology Foundation and the Financing Fund

On behalf of the Ministry of Finance, Government Debt Management at Danmarks Nationalbank manages the assets of the Social Pension Fund (SPF), the High-Technology Foundation and the Financing Fund for increased distributions from the Danish National Research Foundation (the Financing Fund). The assets of the funds are included in the central-government debt and are managed together with the central government's other financial assets and liabilities within government debt management.

Payments to SPF were made in the period 1970-81 and the proceeds invested in bonds. At the end of 2005, SPF held bonds for DKK 133.2 billion. In 2005, DKK 8.7 billion was transferred from SPF to the Ministry of Social Affairs to cover pension improvement measures.

The establishment of the High-Technology Foundation was adopted in December 2004 with the objective of supporting Denmark's further development as a high-technology society. The Financing Fund was established in 2005 in order to give further support to basic research. In 2005, the central government contributed respectively DKK 2.9 billion and DKK 1.0 billion to the funds. The subsequent build-up of capital and disbursements from the funds are stipulated in the annual Finance Acts.

THE SOCIAL PENSION FUND 6.1

The Social Pension Fund (SPF) was established by law in 1970, when a special national retirement pension contribution was introduced. The proceeds were allocated to SPF and invested in bonds. With effect from 1 January 1982, the Act was amended, and the payments to SPF ceased. SPF became an asset portfolio of the central government. 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 invested in listed bonds, primarily government bonds. However, SPF does not invest in key on-the-run securities. The principles for the management of SPF's capital are described in Box 6.1.

MANAGEMENT OF THE SOCIAL PENSION FUND — Box 6.1

The Social Pension Fund (SPF) is part of the remit of the Ministry of Social Affairs and the Ministry of Finance. The governance of SPF is handled by a committee with representatives from the Ministry of Finance, the Ministry of Social Affairs and Danmarks Nationalbank. Government Debt Management at Danmarks Nationalbank handles the management of the assets of SPF.

The principles for the management of SPF's capital are set out in a regulation[1] which 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. Efforts are made to ensure that the natural price relations in the market are not significantly affected.

The income from 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.

The 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 pension improvement measures.

[1] The regulation is available at www.nationalbanken.dk under Government debt.

In 2005, SPF's interest income was DKK 7.6 billion, cf. Table 6.1.1. DKK 8.7 billion was transferred from SPF to the Ministry of Social Affairs to cover pension improvement measures, while SPF's pension-fund tax amounted to DKK 1.1 billion.

In 2005, a total of DKK 28.6 billion at market value were drawn or sold from SPF's portfolio, of which sale of 8 per cent bullet loans 2006 and 5 per cent bullet loans 2005 to the central government accounted for respectively DKK 18.8 and 3.1 billion. SPF's purchases of government securities in 2005 totalled DKK 26.8 billion at market value, of which DKK 17.6 billion was invested in 5 per cent bullet loans 2013.

SPF'S REVENUE AND EXPENDITURE, 2003-05 — Table 6.1.1

DKK billion	2003	2004	2005
Revenue			
Interest, etc.	9.6	8.3	7.6
Expenditure			
Transfer to the Ministry of Social Affairs	8.1	8.4	8.7
Pension-fund tax	1.3	1.5	1.1
Net	0.1	-1.5	-2.2

Note: Figures for 2003 and 2004 are taken from the central-government accounts, while figures for 2005 are provisional figures from the central-government accounts.

SPF'S ASSET PORTFOLIO, 2000-05 Table 6.1.2

DKK billion	2000	2001	2002	2003	2004	2005
Bonds, nominal value	139.6	141.1	141.4	138.7	136.9	133.2
Total assets, market value	153.0	154.3	158.0	155.1	154.8	151.4

Note: The portfolios are calculated as of year-end. The figures for nominal value include index-linked bonds at indexed value. The market value of SPF's total asset portfolio is calculated on the basis of the official prices including accrued interest and liquid funds held by SPF.

At end-2005, SPF's bond portfolio totalled DKK 133.2 billion, cf. Table 6.1.2. In addition to the bond portfolio, SPF held liquid assets of DKK 2.1 billion[1]. SPF's assets totalled DKK 151.4 billion at market value at the end of 2005.

Fee income from SPF's securities lending facility totalled DKK 0.5 million in 2005. SPF's securities lending facility is described in Chapter 5.

Most of SPF's capital is placed in government bonds, and SPF owns a relatively large share of the total outstanding in several government securities, cf. Table 6.1.3. The remainder of SPF's portfolio mainly comprises mortgage-credit bonds and index-linked bonds.

The total government securities holdings of SPF, the High-Technology Foundation and the Financing Fund, distributed on individual securities

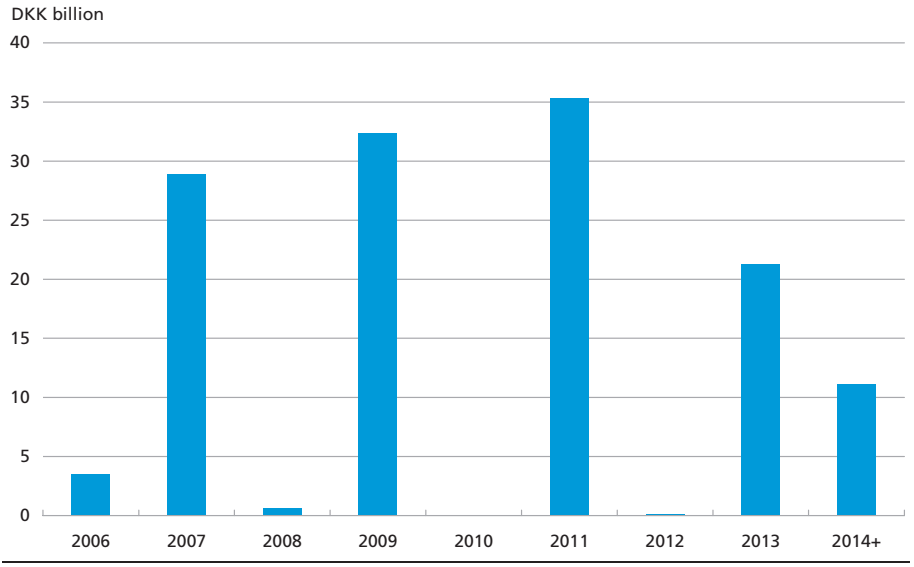
THE FUNDS' BOND PORTFOLIOS BY BOND TYPES, END-2005 Table 6.1.3

Nominal value, DKK billion	SPF	High-Technology Foundation	Financing Fund	The funds' share of the total outstanding volume of the bond, per cent
3 per cent bullet loans 2006	3.5	0.5	0.3	12.8
8 per cent bullet loans 2006	0.0			0.0
7 per cent bullet loans 2007	28.9			56.4
4 per cent bullet loans 2008	0.6			1.3
6 per cent bullet loans 2009	32.2	0.8	0.3	50.3
6 per cent bullet loans 2011	35.1			58.0
5 per cent bullet loans 2013	21.2	0.5	0.3	27.7
7 per cent bullet loans 2024	0.5			1.9
Government bonds, total	121.9	1.8	0.9	
Mortgage-credit bonds, etc.[1]	4.2			
Index-linked bonds[2]	7.1			
Total	133.2	1.8	0.9	

[1] Mortgage-credit bonds, etc. comprise mortgage-credit bonds as well as municipal and Fisheries Bank bonds other than index-linked bonds.
[2] Indexed value.

[1] In principle bonds must be purchased within 90 days.

SPF'S BOND PORTFOLIO BY YEAR OF MATURITY, END-2005, NOMINAL VALUE — Chart 6.1.1



as of month-end, are published on the 1st banking day of the following month on Danmarks Nationalbank's website, www.nationalbanken.dk under Government debt.

The ongoing management of SPF's capital is aimed at smoothing the investment requirement. Sale in even years of the relatively large holdings maturing in odd years can help to smooth the placement requirement, cf. Chart 6.1.1.

The duration of SPF's bond portfolio was 4.4 years at the close of 2005, cf. Table 6.1.4. The duration of SPF's bond portfolio is part of the management of the overall duration of the central-government debt.

DURATION OF SPF'S BOND PORTFOLIO — Table 6.1.4

Years	End-2003	End-2004	End-2005
Government bonds	4.2	4.0	4.2
Mortgage-credit bonds, etc.	1.1	0.2	0.6
Index-linked bonds	10.0	10.2	10.5
Total portfolio	4.2	4.1	4.4

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

THE HIGH-TECHNOLOGY FOUNDATION AND THE FINANCING FUND 6.2

In addition to SPF, Government Debt Management also manages the assets of the High-Technology Foundation and the Financing Fund. The High-Technology Foundation Act[1] was adopted in December 2004. The objective of the High-Technology Foundation is to strengthen growth and employment by supporting Denmark's further development as a high-technology society. The Financing Fund was established under the 2005 Finance Act to support basic research in Denmark.

The accumulation of the funds' capital is stipulated in the annual Finance Acts. The explanatory notes to the High-Technology Foundation Act state that the aim is for the Foundation's core capital to be increased to at least DKK 16 billion during the period up to 2012. In 2005, DKK 2.9 billion was transferred to the High-Technology Foundation and DKK 1.0 billion to the Financing Fund. Each year, the amount stipulated in the annual Finance Act is transferred from the High-Technology Foundation and the Financing Fund to the Ministry of Science, Technology and Innovation. In 2005, respectively DKK 100 and 40 million were transferred.

The capital of the funds is invested in Danish government bonds. On investing the capital of the funds, the aim is to achieve a high return, while keeping risk at a reasonable level.

At the end of 2005, the bond holdings of the High-Technology Foundation and the Financing Fund were respectively DKK 1.8 and 0.9 billion at nominal value, distributed on 3 per cent bullet loans 2006, 6 per cent bullet loans 2009 and 5 per cent bullet loans 2013, cf. Table 6.1.3.[2] The revenue of the funds was respectively DKK 30.5 and 16.9 million in 2005.

The duration of the funds' portfolios is part of the management of the overall duration of the central-government debt.

1 Act no. 1459 of 22 December 2004.

2 In addition to a bond portfolio, the High-Technology Foundation held liquid assets of DKK 0.9 billion at the end of 2005. Most of the liquid assets were placed in government bonds at the beginning of 2006.

CHAPTER 7

Government Loan Guarantees and Re-Lending

Government loan guarantees and re-lending derive from the political intention to support the financing of certain projects. Most of the government loan guarantees and re-lending managed by Government Debt Management at Danmarks Nationalbank are issued to government-owned companies involved in large infrastructure projects.

At the end of 2005, government guarantees managed by Government Debt Management totalled DKK 75 billion, and re-lending totalled DKK 23 billion.

FRAMEWORK FOR GOVERNMENT LOAN GUARANTEES AND RE-LENDING 7.1

A number of government-owned companies may raise government-guaranteed loans or raise loans directly from the central government via re-lending. These are typically companies whose tasks and borrowing frameworks are defined in an act or legal document. In addition, Danish Ship Finance A/S has access to a re-lending facility, cf. *Danish Government Borrowing and Debt 2003*, Chapter 10.

By issuing a loan guarantee, the government ensures that the loans raised by the company in the private market will be repaid. The guarantee thus reduces the private lender's risk on the loan, in turn reducing the borrowing costs of the government-guaranteed company. The central government establishes the general guidelines for the activities of the government-guaranteed companies in the loan markets. For example, the companies' currency exposure should normally be limited to euro.

Re-lending means that loans are raised directly from the central government. Most of the central government's re-lending reflects loans in existing government securities, meaning that coupon rates, interest-payment dates and redemption dates correspond to the characteristics of underlying government securities. Government Debt Management determines a list of acceptable loan types (the re-lending list). Re-

lending is usually possible in all government bonds that are bullet loans in maturity segments between 2 and 10 years.

The central government's exposure to a potential loss in the event that the company defaults on its loans is the same for government guarantees and re-lending. Therefore the risk implications of loan guarantees and re-lending are in principle equal, cf. *Danish Government Borrowing and Debt 2004*, Chapter 9.

LOAN GUARANTEES 7.2

Government Debt Management manages loan guarantees to A/S Storebælt (the Great Belt Bridge), A/S Øresund (Øresund Landworks), Danmarks Radio (the Danish Broadcasting Corporation), DSB (the Danish State Railways), Hypotekbanken (the Mortgage Bank of the Kingdom of Denmark) and Øresundsbron (the Øresund Bridge). The guidelines for borrowing by the companies are described in Box 7.1. The Danish central government, in cooperation with its Swedish counterpart, guarantees the debt, etc. of Øresundsbron. Borrowing by Øresundsbron is subject to

GUIDELINES FOR BORROWING BY THE COMPANIES Box 7.1

The guidelines apply to A/S Storebælt (the Great Belt Bridge), A/S Øresund (Øresund Landworks), Ørestadsselskabet I/S (the Ørestad Development Corporation), 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 will also apply to Energinet.dk and Nordsøfonden (the Danish North Sea Fund) when they gain access to re-lending facilities. The guidelines for borrowing by the companies are stated in a set of agreements comprising three elements: an agreement between the ministry in question and Danmarks Nationalbank; an agreement between the ministry and the individual company; and finally a list of acceptable loan types. This list is drawn up and maintained by Government Debt Management. As far as Øresundsbron is concerned, a tripartite agreement has also been concluded between Øresundsbron, Riksgäldskontoret (the Swedish National Debt Office) and Government Debt Management.

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.
- It is emphasised that the management of the credit risk should be founded on a rating-based limit system.
- Collateral Security Agreements (CSA) are concluded to minimise the credit risk at all times.
- The currency exposure of the loan portfolio should as a general rule be limited to euro (or Swedish kronor in the case of Øresundsbron).

GOVERNMENT LOAN GUARANTEES — Table 7.2.1

DKK billion	End-2005
A/S Storebælt	34.2
A/S Øresund	5.7
Danmarks Radio	2.5
DSB and DSB S-tog A/S	11.4
Hypotekbanken	0.6
Sund & Bælt	0.1
Øresundsbron	21.0
Total	75.4

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

guidelines laid down by the Swedish and Danish governments. These guidelines are equivalent to those for the other government-guaranteed companies. At the end of 2005, the companies in question had issued government-guaranteed debt totalling DKK 75.4 billion, cf. Table 7.2.1. In addition to the government guarantees managed by Government Debt Management, the central-government has provided guarantees of approximately DKK 100 billion, e.g. in connection with subsidised housing, export credits and international institutions.

RE-LENDING 7.3

In 2005, the government granted re-lending of DKK 5 billion, cf. Table 7.3.1, of which DKK 1 billion is related to refinancing of redemptions on previous re-lending. At the end of 2005, outstanding re-lending totalled DK 23.1 billion.

Re-lending to A/S Storebælt, A/S Øresund and Ørestadsselskabet I/S (the Ørestad Development Corporation) amounted to DKK 2.8 billion, primarily in long-term government bonds. In addition, Danish Ship Finance A/S obtained re-lending of USD 358 million, equivalent to DKK 2.2 billion. Re-lending to Danish Ship Finance A/S in 2005 comprised fixed-rate serial loans to be serviced biannually until they mature in 2017. In

RE-LENDING, NOMINAL VALUE — Table 7.3.1

DKK billion	Issued in 2005	Portfolio 2005
A/S Storebælt	0.5	1.5
A/S Øresund	0.8	4.7
Danish Ship Finance A/S	2.2	2.8
Ørestadsselskabet I/S[1]	1.5	14.1
Total	5.0	23.1

[1] Ørestadsselskabet I/S is a general partnership of which the central government is a co-owner. It may borrow directly in the central government's name.

connection with the re-lending to Danish Ship Finance A/S, the central government transacted currency swaps between kroner and dollars. The dollar payments in the swap match the dollar payments on the re-lending, whereby the central government does not have any net foreign-exchange exposure in connection with re-lending in dollars.

In 2005, Danmarks Radio gained access to the re-lending facility. Energinet.dk and Nordsøfonden (the Danish North Sea Fund) are expected to gain access to re-lending in 2006.

Total re-lending in 2006 to A/S Storebælt, A/S Øresund and Ørestadsselskabet I/S is expected to be almost DKK 7 billion, of which DKK 5 billion is refinancing of existing re-lending. Re-lending to Danish Ship Finance A/S is estimated at DKK 3 billion. To this should be added any re-lending to the new companies.

CHAPTER 8

Risk Management of Central-Government Debt

Interest-rate risk related to central-government debt is managed via a strategic benchmark for the duration of the debt portfolio. The target band for the duration in 2006 remains unchanged at 3.0 years ± 0.5 years.

The foreign government debt is primarily denominated in euro. As a result of Denmark's fixed-exchange-rate policy vis-à-vis the euro, the exchange-rate risk is limited.

Credit risk related to the central government's swap portfolio is limited via requirements of the credit ratings of counterparties, as well as unilateral collateral requirements. At end-2005, 98 per cent of the central government's swap portfolio, measured in terms of principal, was covered by unilateral collateral agreements.

Operational risk is limited via the use of standardised financial instruments, clear and unambiguous procedures and a clear division of functions in Government Debt Management.

INTEREST-RATE RISK 8.1

Interest-rate risk is the risk of higher interest costs on the central-government debt as a result of the development in interest rates. Interest-rate risk on the debt is managed on a consolidated basis, cf. Box 8.1.

The key strategic benchmark for the central government's interest-rate risk is the duration of the debt portfolio, cf. Box 8.2. Duration is an expression of the average fixed-interest period on the debt portfolio and thus a summary measure of the trade-off between costs and risk. The longer the duration, the lower the interest-rate risk on the central-government debt. On the other hand, long duration will typically be associated with higher expected interest costs as the level of interest rates normally increases with the term to maturity.

Interest-rate risk, and thus duration, is affected by the issuance and buy-back strategy, as well as by interest-rate swaps. The issuance and buy-back strategy is primarily aimed at building up liquid government bonds by issuing new securities and buying back older series.

CONSOLIDATED RISK MANAGEMENT AND ASSET LIABILITY MANAGEMENT Box 8.1

Risk management of central-government debt is based on an *Asset Liability Management (ALM)* principle. This entails that assets and liabilities in the government debt portfolio are treated on a consolidated basis in the statement of interest-rate and exchange-rate risk.

The liabilities of the central-government debt comprise domestic and foreign government debt, while the assets in this context comprise the central government's account with Danmarks Nationalbank, the portfolios of the Social Pension Fund, the High-Technology Foundation and the Financing Fund, as well as re-lending to government-guaranteed companies and Danish Ship Finance A/S.

For example, re-lending to a government-guaranteed company is financed by issuing government securities. On a consolidated basis, this issuance does not lead to an increase in the central government's interest-rate risk since the increased interest costs are set off by interest income from the government-guaranteed company. Likewise, the central government grants re-lending in dollars to Danish Ship Finance A/S that is financed by domestic issuance combined with currency swaps from kroner to dollars. On a consolidated basis, the central government is not exposed to fluctuations in the dollar since losses or gains on the dollar leg of the currency swap (the central government's liability) are set off by losses or gains on re-lending (the central government's asset).

The issuance strategy is separated from the management of the interest-rate risk by means of interest-rate swaps and by targeting buy-back of certain bonds.

Interest-rate swaps are used to transfer interest-rate exposure from one maturity segment to another. Buy-backs typically take place in securities maturing within the next few years, so that the interest-rate fixing is reduced in these years and increased in later years. The interest-rate fixing is the amount for which a new, unknown rate of interest is to be fixed within one year, cf. Box 8.2. The procedure contributes to reducing the central government's exposure to fluctuations in the level of interest rates.

Every year, the duration level of the government debt in the subsequent year is determined. The decision is taken on the basis of a long-term analysis of the development in the interest-rate fixing of the central-government debt, as well as simulations using the Cost-at-Risk (CaR) model. The CaR model is used to quantify expected interest costs and risks subject to various assumptions of the duration and the interest-rate fixing. The analysis of the interest-rate fixing indicates the development in the duration, while the CaR analysis illustrates the cost and risk profile for various strategies.

In 2005, the strategic benchmark for the Macauley duration was 3 years ± 0.5 years, and 3 years ± 0.25 years for the duration measure calculated with a fixed discount rate and a fixed balance of the central-

DURATION AND INTEREST-RATE FIXING Box 8.2

The duration of the debt is calculated as a Macauley duration (V_{Mac}):

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

where s is the time of calculation i_s is the discount rate, and t (u) is the time of the future payment, C_t (C_u). For the Social Pension Fund's portfolio of callable mortgage-credit bonds, an option-adjusted duration is applied. Callable bonds have a shorter duration than equivalent non-callable securities, due to the probability of early redemption.

Average fixed-interest period: in Danish government debt management, duration is applied as a measure of 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 of time. 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 a 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 affect the timing of the actual payments, nor the risk profile of the portfolio. Calculating the duration on the basis of a fixed discount rate eliminates the fluctuations in duration that exclusively result from interest-rate changes. When duration is calculated with a fixed discount rate, both the duration of the individual securities and their weighting in the duration of the total government debt are calculated on the basis of the fixed discount rate. The fixed discount factor is updated at year-end on the basis of an average yield to maturity for, primarily, Danish government bonds.

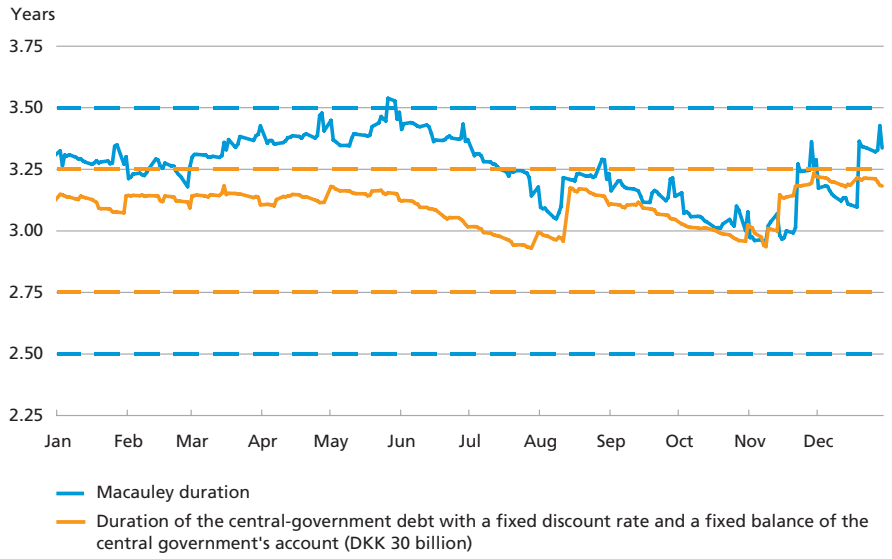
Fixed balance of the central government's account: in the day-to-day risk management, a duration band for the duration of the central-government debt calculated with a fixed discount rate, and a fixed balance of the central government's account, is applied. The fixed balance ensures that management is not based on day-to-day fluctuations in the account.

The interest-rate fixing, calculated at a given point in time, is the amount for which a new interest rate is to be fixed within one year. The portfolio at a given time affects the interest-rate fixing via the redemptions within the next 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. Analyses of the interest-rate fixing take account of the expectations of the Ministry of Finance of future budget surpluses or deficits that respectively reduce or increase the interest-rate fixing, as well as new swaps and buy-backs.

Interest-rate swaps from fixed to floating interest rates increase the interest-rate fixing and shorten the duration. This reduces the expected interest costs, but entails higher interest-rate risk.

government account, cf. Chart 8.1.1. In view of the low level of interest rates, it was decided to keep the duration in the upper half of the band in 2005, reducing the need for interest-rate swaps.

DURATION BAND AND DEVELOPMENT IN DURATION, 2005 Chart 8.1.1



Note: The duration briefly exceeded the band's upper limit of 3.5 years in connection with an extraordinarily high balance of the central government's account at the end of May. It was decided not to counter the increase in the duration via interest-rate swaps.

Analysis of the interest-rate fixing for the debt portfolio, 2006-12

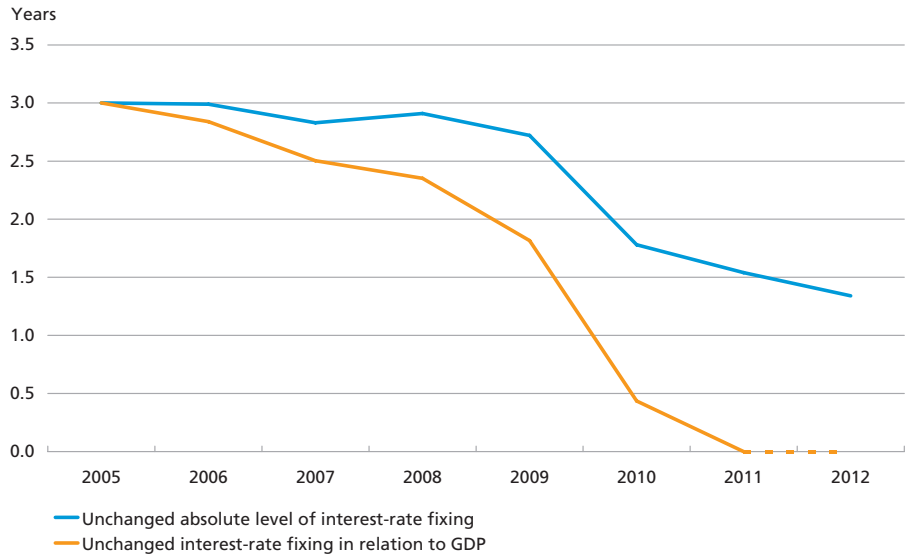
The interest-rate fixing in a given year is an expression of the central government's exposure to fluctuations in interest rates. All other things being equal, a general increase in the level of interest rates by 1 percentage point will increase the interest costs in that year by 1 per cent of the interest-rate fixing.

The duration of the debt portfolio does not include any information on the absolute interest-rate exposure or its dispersion over time. Consequently, an analysis of the development in the interest-rate fixing of the debt portfolio is used to support the choice of duration.

In 2005, the interest-rate fixing was around DKK 260 billion, of which approximately DKK 190 billion comprised Treasury bills and interest-rate swaps. Maintaining this level will reduce the central government's interest-rate exposure relative to GDP over the coming years. The interest-rate fixing relative to GDP expresses the central government's real exposure. In 2005, the interest-rate fixing was 17 per cent of GDP. Alternatively, the real exposure can be maintained by increasing the interest-rate fixing with GDP growth.

The basis for the analysis of the development in the interest-rate fixing is a technical projection by the Ministry of Finance that shows sustained budget surpluses. If the interest-rate fixing is maintained at the current level, or increased with GDP, a larger share of the debt portfolio will be

PROJECTION OF THE DURATION OF THE DEBT PORTFOLIO FOR DIFFERENT INTEREST-RATE FIXING SCENARIOS, 2005-12 Chart 8.1.2



Note: For 2005, the mean value of the target band for the duration of 3.0 years ± 0.5 years has been applied. In the projection on the basis of an unchanged interest-rate fixing in relation to GDP, the duration is zero in 2011 and 2012. The reason is that in this scenario the entire debt portfolio has been converted to short-term, variable interest rate. Consequently, the interest-rate fixing does not increase further after 2011.

converted to floating interest rates. This results in ongoing reduction of the duration, cf. Chart 8.1.2.

In summary, the analysis of the development in the interest-rate fixing indicates that the duration of the central-government debt can be gradually reduced over the coming years without any increase in the central government's interest-rate exposure. Assuming an alternative course for the debt reduction and GDP, the conclusion of the analysis may change.

Cost-at-Risk analysis of the duration target for 2006

The CaR model is used to illustrate the trade-off between interest costs and interest-rate risk on the central-government debt. In the CaR model, the interest costs on the government debt are simulated 10 years ahead on the basis of 2,500 scenarios for the development in the level of interest rates. Based on these scenarios, expected interest costs and various risk measures are calculated, cf. Box 8.3.

The simulation is based on the existing debt portfolio, technical budget projections by the Ministry of Finance, a strategy for future borrowing, and a strategy for the use of interest-rate swaps. By varying the swap strategy in the model, it is possible to analyse various courses of the duration and interest-rate fixing of the debt portfolio.

COST AND RISK MEASURES IN THE CaR MODEL — Box 8.3

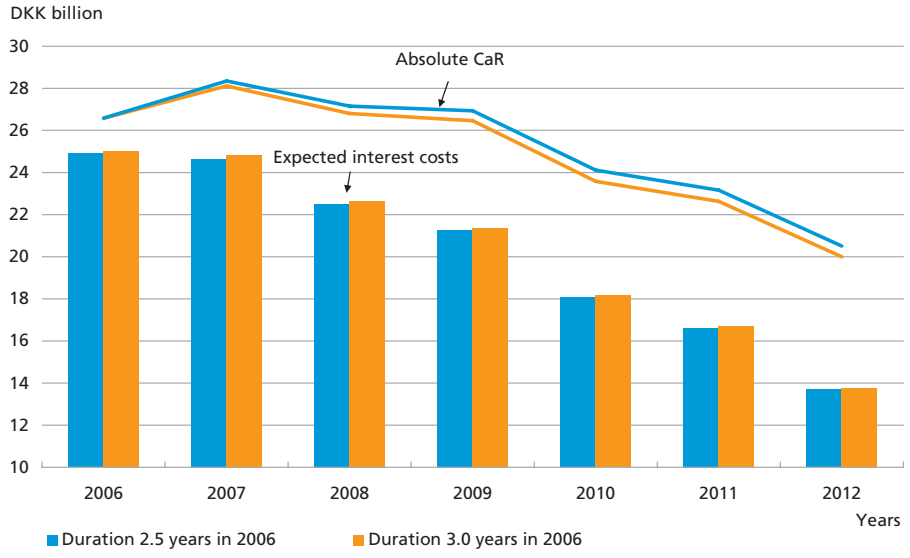
- *Expected interest costs* indicate the mean of the calculated interest-rate scenarios in a given year.
- *Absolute CaR* indicates the maximum interest costs with a probability of 95 per cent in a given year.
- *Relative CaR* indicates the difference between absolute CaR and the expected interest costs. Relative CaR thus indicates the maximum increase in costs compared to the mean in a given year with a probability of 95 per cent.

For a more detailed review of the Cost-at-Risk model, see *Danish Government Borrowing and Debt 2003*, Chapter 11.

The CaR analysis supplements the analysis of the development in the interest-rate fixing, which is solely a measure of exposure. The actual risk depends on the uncertainty concerning interest rates, and e.g. unchanged interest-rate fixing may entail a higher risk if the interest-rate volatility increases.

Against the background of the above results, which point to a reduction of the duration in the coming years, the consequences of reducing the duration in 2006 have been analysed in CaR. The starting point of the analysis is two strategies, where duration is set at 2.5 years and 3.0 years, respectively, in 2006, cf. Chart 8.1.3. As from 2007, the interest-rate fixing is kept at the 2006 levels for the two strategies. This method

EXPECTED INTEREST COSTS AND ABSOLUTE CaR, 2006-12 — Chart 8.1.3



Note: Relative CaR, i.e. the difference between absolute CaR and the expected interest costs, increases over the simulation horizon due to greater uncertainty of the range of results for the level of interest rates.

isolates the impact of the duration decision for 2006 since the two strategies differ solely in terms of the number of interest-rate swaps in 2006.

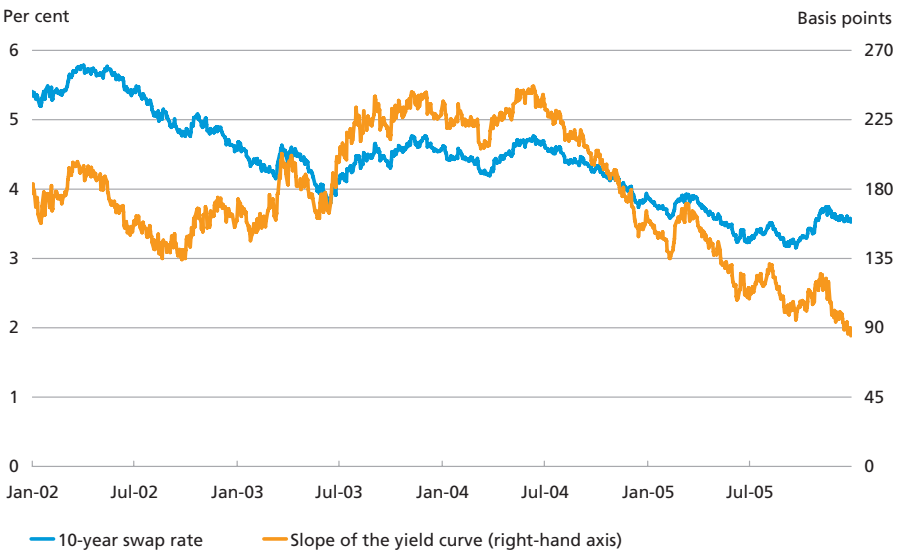
The Ministry of Finance's technical projection of the government budget balance shows that the central-government debt will decrease. This helps to explain the falling trend for interest costs over the simulation horizon. A simulated increase in the general level of interest rates has the opposite effect. The impact of the reduction in the government debt dominates in the projection, which contributes to explaining why both expected interest costs and absolute CaR decline over the simulation horizon.

If the duration is shortened by 0.5 years in 2006, the expected interest costs will, all other things being equal, be reduced by around DKK 100 million in 2006 and by around DKK 190 million in 2007. The risk, measured as absolute CaR, remains virtually unchanged in 2006 and increases by more than DKK 250 million in 2007. The reason is that interest-rate swaps transacted in 2006 are not fully reflected in the risk profile until 2007.

Over longer horizons, the risk increases by up to around DKK 500 million in 2010, while the expected savings are on the low side of DKK 100 million.

The expected savings on a reduction of the duration in 2006 are modest in relation to both the total interest costs and the increased interest-rate risk. Firstly, the yield curve is rather flat, cf. Chart 8.1.4, and thus the

LEVEL OF INTEREST RATES AND THE SLOPE OF THE YIELD CURVE, 2002-05 Chart 8.1.4



Note: The slope of the yield curve is calculated as the 10-year swap rate less the 6-month Cibor. The reason is that the central government receives a fixed 10-year yield and pays the 6-month Cibor for interest-rate swaps in kroner. The slope is thus an expression of the immediate interest saving on an interest-rate swap.
Source: Bloomberg and own calculations.

saving on short-term relative to long-term borrowing is limited. Secondly, the level of interest rates is lower than the average interest-rate level over the simulation horizon, which contributes to reducing the central government's expected net saving on interest-rate swaps transacted in 2006. The fixed swap rate received by the central government throughout the lifetime of the swap reflects the level of interest rates at the time of its transaction, while the floating rate is set on market terms on a current basis.

In view of the above, it has been decided to maintain the strategic benchmark for duration unchanged at 3 years ± 0.5 years in 2006. If the development in interest rates leads to a change in the trade-off between short-term and long-term borrowing relative to the CaR assumptions, the duration can be adjusted within the duration band.

EXCHANGE-RATE RISK 8.2

Exchange-rate risk is the risk that the value of the central-government debt in kroner increases as a result of changes in exchange rates. On a consolidated basis, cf. Box 8.1, the foreign government debt is exposed solely in euro. This entails a low exchange-rate risk due to Denmark's fixed-exchange-rate policy vis-à-vis the euro. In addition, Danmarks Nationalbank's foreign-exchange reserve is predominantly exposed in euro.

CREDIT RISK 8.3

Credit risk is the risk of financial loss as a consequence of a counterparty's default on its payment obligations. Interest-rate and currency swaps entail credit risk for the central government. The credit risk arises because the market value of a swap may develop to the advantage of the central government during the lifetime of the swap. When a swap is transacted, its market value is normally zero. Over time, the development in interest and exchange rates will entail that the market value may become both positive and negative for the central government. A swap with a positive market value is an asset for the central government and is thus subject to credit risk since the central government is exposed to the swap counterparty's ability to pay. The key principles of the central government's credit management are described in Box 8.4. A more detailed account is presented in the Appendices.

In 2005, the central government transacted 32 new swaps with a total principal of DKK 17.2 billion, while 10 swaps expired. At end-2005, the central-government swap portfolio comprised 351 swaps, with a total principal of DKK 148.7 billion, cf. Table 8.3.1.

CENTRAL-GOVERNMENT CREDIT-RISK MANAGEMENT Box 8.4

The central government's credit risk is minimised by observing a number of credit management principles. The key principles are:

- Counterparties must have high credit ratings
- The credit exposure for a counterparty must be kept within relatively narrow lines
- Swaps are transacted only with counterparties that have signed a unilateral collateral agreement
- Swaps can be terminated if the counterparty's rating falls below a certain level (rating triggers).

The central government's credit exposure on a counterparty is a measure of the expected maximum positive market value of all swaps, less collateral, transacted with the counterparty. This is equivalent to the expected maximum loss to the central government as a consequence of a counterparty's default on its payment obligations. Since counterparties must maintain a high credit rating throughout the lifetime of the swap, the probability of losses resulting from default is kept at a low level. If a counterparty defaults on its payment obligations, the unilateral collateral agreement limits the central government's loss. The collateral agreements entail that counterparties must deposit securities with the central government if the market value of the swap portfolio exceeds a threshold value. This threshold value depends on the credit rating of the counterparty.

The market value of the swap portfolio

The development in the market value of the central government's swaps primarily reflects fluctuations in the level of interest rates and in the dollar rate. The market value, and thus the credit exposure, increases when the dollar appreciates and/or interest rates fall. The reason is that the central government receives dollars in some currency swaps and mainly receives long interest on the interest-rate swaps.

CENTRAL-GOVERNMENT SWAP PORTFOLIO, 2003-05, YEAR-END Table 8.3.1

	2003	2004	2005
Number of counterparties	29	26	25
Number of swaps	294	329	351
	Principal, DKK billion		
Interest-rate swaps, Danish kroner	43.6	59.7	61.5
Interest-rate swaps, other currencies	52.7	47.4	58.6
Currency swaps, DKK-EUR, EUR-DKK	16.2	16.2	16.9
Currency swaps, DKK-USD[1]	-	0.5	2.7
Currency swaps, other	24.1	14.8	8.8
Structured swaps	1.6	0.2	0.2
Principal, total	138.2	138.8	148.7

[1] In connection with re-lending to Danish Ship Finance A/S.

EXCHANGE-RATE EXPOSURE OF THE SWAP PORTFOLIO TO USD, 2002-05, YEAR-END — Table 8.3.2

DKK billion	2002	2003	2004	2005
Change in market value on appreciation of USD vis-à-vis DKK by 1 per cent	0.32	0.18	0.11	0.04

The exposure of the swap portfolio to fluctuations in the dollar rate has been considerably reduced, cf. Table 8.3.2. The reason is partly that some currency swaps have expired on which the central government has received dollars, and partly that the central government transacts currency swaps from kroner to dollars in connection with re-lending to Danish Ship Finance A/S. Since the central government pays dollars in these swaps, the net exposure to fluctuations in the dollar rate is reduced.

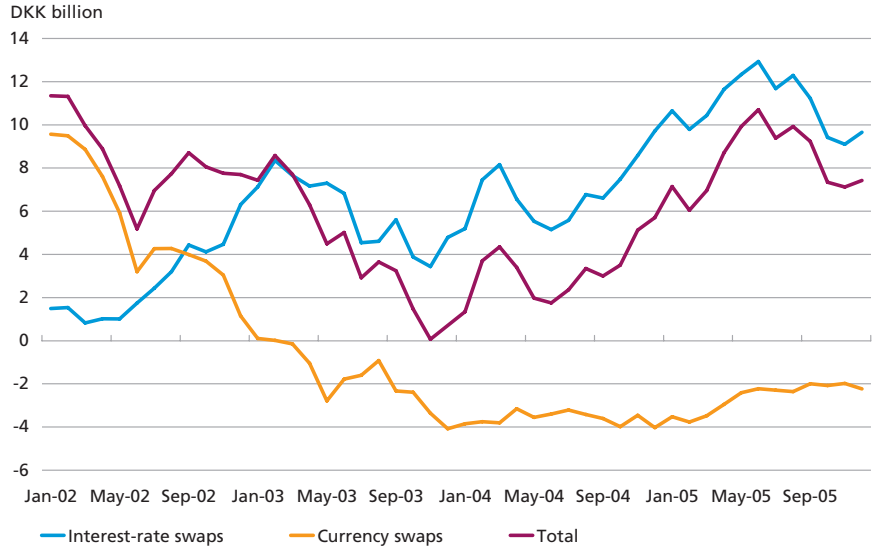
The market value of the central government's swap portfolio rose substantially in the 1st half of 2005 in view of the falling level of interest rates, cf. Chart 8.3.1.

Subsequently, the market value has declined by around DKK 3 billion, reflecting the rising interest rates in the autumn, to its present level of almost DKK 8 billion, cf. Table 8.3.3.

Credit exposure on the swap portfolio

The credit exposure on the swap portfolio is calculated on the basis of the current market value of the portfolio, the value of pledged collat-

MARKET VALUE OF THE CENTRAL GOVERNMENT'S SWAP PORTFOLIO, 2002-05 — Chart 8.3.1



Note: The market value of currency swaps does not include the EUR/DKK currency swap portfolio.

MARKET VALUE (NET) OF THE SWAP PORTFOLIO, 2003-05, YEAR-END Table 8.3.3

DKK billion	2003	2004	2005
Interest-rate swaps, Danish kroner	4.0	5.6	5.3
Interest-rate swaps, other currencies	2.4	4.3	4.5
Currency swaps, DKK-EUR, EUR-DKK	-0.0	-0.0	-0.1
Currency swaps, DKK-USD[1]	-	-0.0	-0.1
Currency swaps, other	-4.2	-3.9	-1.9
Structured swaps	0.1	0.0	-0.0
Total	2.3	5.9	7.7

Note: The net market value of the swap portfolio is the sum of market values of the individual swaps. When the central government's credit exposure is calculated, the starting point is the net market value of the central-government swaps calculated for each swap counterparty. The reason is that netting is applied in the event of counterparty default so that swaps with negative market values are offset against swaps with positive market values in the calculation of the final claim on the default estate.

[1] In connection with re-lending to Danish Ship Finance A/S.

eral and a supplement to take account of potential future fluctuations in the market value.

New swaps are transacted only with counterparties that have signed a unilateral collateral agreement. In 2005, the credit exposure on the swap portfolio rose by DKK 0.6 billion to DKK 6.5 billion, cf. Table 8.3.4. This is attributable to an increase in the current exposure by DKK 0.6 billion, which was only partly offset by an increase of DKK 0.2 billion in the pledged collateral, and an increase of DKK 0.2 billion in the potential exposure.

CREDIT QUALITY OF THE SWAP PORTFOLIO, 2003-05, YEAR-END Table 8.3.4

	2003		2004		2005	
Rating	Number of counterparties	Credit exposure (DKK billion)	Number of counterparties	Credit exposure (DKK billion)	Number of counterparties	Credit exposure (DKK billion)
AAA	6	0.8	6	1.2	4	1.0
AA+	3	1.1	3	0.8	2	0.9
AA	5	1.4	5	1.8	7	2.2
AA-	7	1.2	6	1.2	5	1.8
A+	7	1.0	5	1.0	4	0.6
A	-	-	-	-	2	0.0
A-	1	0.0	1	0.0	1	0.0
Total	29	5.5	26	5.9	25	6.5
Of which:						
- Current market value		6.2		9.2		9.7
- Collateral pledged		-3.4		-5.6		-5.8
- Potential exposure		2.8		2.4		2.6

Note: The credit exposure comprises both the actual 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-2005 Table 8.3.5

Rating	Number of counter-parties	Principal, DKK billion	Percentage with collat-eral agree-ment	Credit expo-sure, DKK billion
AAA	4	11.2	82	1.0
AA+	2	24.6	98	0.9
AA	7	38.7	99	2.2
AA-	5	53.7	100	1.8
A+	4	17.0	100	0.6
A	2	3.2	98	0.0
A-	1	0.2	0	0.0
Total	25	148.7	98	6.5

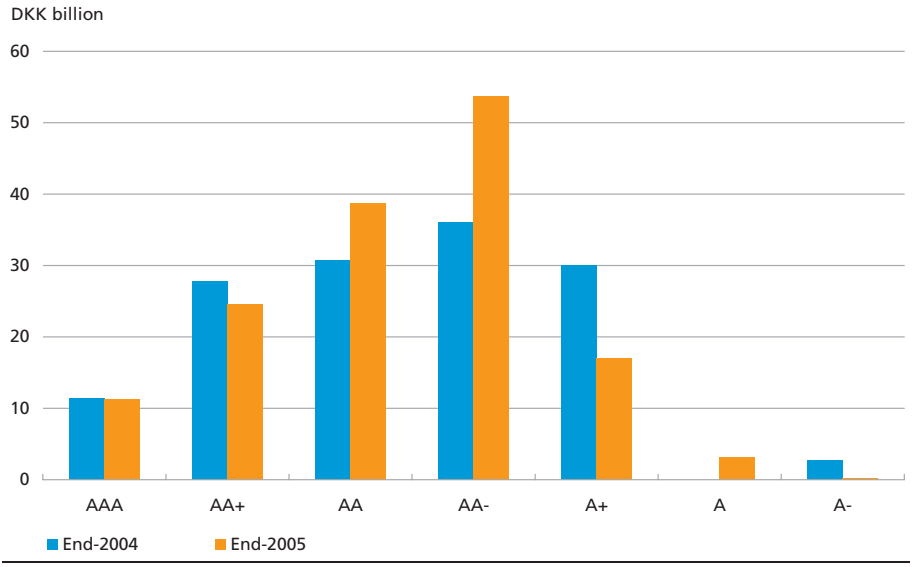
At year-end, the central government had signed unilateral collateral agreements with 22 counterparties. Swaps transacted with these counterparties account for 98 per cent of the total swap portfolio in terms of swap principals, cf. Table 8.3.5. The explanation for the coverage of 0 per cent in the A- rating class is that the central government previously transacted a swap with a single counterparty that is now in this rating class and with which no collateral agreement has been concluded, cf. below. For the highest rating class, the proportion covered is also somewhat lower, but on the other hand the credit risk is limited in view of the high credit ratings of these counterparties. The proportion of the swap portfolio not covered by collateral agreements decreases as old swaps with counterparties that have not signed collateral agreements expire.

The distribution of the swap portfolio by counterparties shifted somewhat in 2005, cf. Chart 8.3.2. During the year, three counterparties were upgraded and three downgraded by either Moody's, Fitch or Standard & Poor's. In five of these six cases (three downgradings and two upgradings), the changed rating led to a change of line (lines are based on the lowest rating given to a counterparty by either Moody's, Fitch or Standard & Poor's).

The central government has very small exposures to the three downgraded counterparties, including its only counterparty in rating class A-, since none of these has concluded a collateral agreement. Consequently, these banks are no longer used as counterparties – and have not been for some years – and the central government's largest credit exposure with one of the downgraded counterparties is DKK 52 million on a swap maturing in 2007.

Two of the downgraded counterparties are German *Landesbanks*, and their downgrading is a result of the discontinuation of guarantees by

PRINCIPAL OF THE SWAP PORTFOLIO BY COUNTERPARTY RATINGS Chart 8.3.2



the German *Länder*. Existing debt obligations are still covered by guarantees until they mature, and the rating of these liabilities is therefore unchanged, cf. for example the rating agency Standard & Poor's.[1] The central government's transactions with the *Landesbanks* were concluded prior to the discontinuation of the guarantees.

The prudent accounting principle entails that the *Landesbanks* are registered in the central government's credit-management system on the basis of their new, lower ratings.

OPERATIONAL RISK 8.4

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".[2]

Operational risk is minimised by applying a number of different measures. Government Debt Management is divided into front, middle and back offices with separate functions. A clear division of functions reduces operational risk and facilitates internal control. Moreover, only standardised, well-known financial instruments are used, and legal risk is minimised by exclusively using standardised contracts.

1 "*Existing issue ratings on grandfathered obligations remain unchanged as they continue to be guaranteed until maturity*". See *German Landesbanks' Transformation Still Far From Complete,* July 2005, Standard & Poor's.

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

Clear procedures have been defined for the individual tasks, and all procedures are peer-reviewed and approved by the manager in charge. In 2005, Government Debt Management's procedures were transferred to a database where review and approval take place electronically in a defined workflow.

In the event of major business disruptions, a contingency plan has been prepared, including a second site from which key Government Debt Management activities can be continued.

Special-Topic Section

CHAPTER 9

Issuance of Long-Term Government Bonds

During 2005, several government issuers resumed or commenced the issuance of ultra-long fixed-rate nominal or inflation-linked government bonds with maturities of 30 years or more.

Issuance of ultra-long bonds should be viewed against the background of falling interest rates and flattening yield curves in several countries in recent years.

Some market participants have indicated that the life insurance sector and pension funds have underpinned the structural demand for ultra-long government bonds, which may have contributed to the flattening of the yield curve.

In view of the very low borrowing requirement, Government Debt Management has no current plans to change its issuance strategy to include more instruments with longer maturities.

NEW TRENDS IN GOVERNMENT BORROWING 9.1

During 2005, several government issuers resumed or commenced the issuance of ultra-long fixed-rate nominal or inflation-linked government bonds. Ultra-long government bonds have maturities of 30 years or more.

In February 2005, France issued the longest government bond in the euro area so far[1], maturing in 2055, cf. Table 9.1.1. Several issuers resumed or continued issuing in the 30-year segment, while Greece issued in this segment for the first time in March 2005.

Outside the euro area, the UK issued a fixed-rate 50-year government bond in May and an inflation-linked 50-year government bond in September. The US has indicated that it plans to resume issuance of 30-year bonds in 2006 after being absent from this maturity segment for several years.

[1] Several European countries, including Denmark, have very limited outstanding issues in old, perpetual bond series. This Chapter deals only with ordinary fixed-term government bonds.

ULTRA-LONG BOND ISSUES Table 9.1.1

Country	Maturity date	Issuance date	Type	Status
Belgium	28-03-2035	12-05-2004	Fixed	Resumed
France	25-04-2055	23-02-2005	Fixed	New
Greece	20-09-2037	02-03-2005	Fixed	New
Netherlands	15-01-2037	18-04-2005	Fixed	Resumed
Italy	01-02-2037	10-10-2005	Fixed	Continued
Poland	20-07-2055	06-07-2005	Fixed	New
Spain	31-01-2037	12-01-2005	Fixed	Resumed
UK	07-12-2055	17-05-2005	Fixed	New
UK	22-11-2055	13-09-2005	Inf.	New
Germany	04-01-2037	18-01-2005	Fixed	Continued
USA[1]	30-year	February 2006	Fixed	Resumed
USA[1]	15-04-2032	15-10-2001	Inf.	-

Note: The "fixed" type indicates a bond with fixed nominal coupon payments and amortisations. The "inf." type indicates that payment flows are inflation-linked.
Source: Bloomberg and Bureau of the Public Debt (www.publicdebt.treas.gov).
[1] The issuance of 30-year nominal and inflation-linked government bonds in the US was ceased in 2001. The Bureau of the Public Debt plans to issue a new 30-year fixed-rate government bond in February 2006.

Investors and price formation in long-term government bonds

Several of the countries mentioned have held consultations with primary dealers and investors prior to their decision to resume or commence issuance of ultra-long securities.

Generally, the market participants consulted have indicated that particularly the life insurance and pension sector (L&P) has contributed to increasing the structural demand for ultra-long government bonds. The L&P sector is mainly characterised by its long-term obligations such as guaranteed pension payments, and in step with the ageing of the population, private contributions to pension schemes are expected to rise substantially.[1]

Several countries are introducing – or have already introduced – legislative requirements for hedging of pension obligations. In addition, there is an increasing tendency to introduce market valuation of both assets and liabilities.[2] These principles are already applied in Denmark.

The transition to market valuation entails that the sector's solvency fluctuates with the level of interest rates to a far greater extent than before. For instance, a fall in interest rates will lead to an increase in the market value of liabilities as a result of the long duration of the obligations. To the extent that the duration of the assets is shorter than the duration of the liabilities, the increase in the market value of the assets will not match the increase in liabilities. This reduces solvency. Ultra-long fixed-rate bonds contribute to alleviating this problem by lengthening the duration

[1] See *Financial Market Trends, Ageing and Pension System Reform – Implications for Financial Markets and Economic Policies*, 2005, OECD.
[2] Ibid.

of the assets. Inflation-linked bonds are particularly suitable if the liabilities include obligations that are linked to the level of prices or wages.

Ultra-long bonds can also be attractive to speculative investment managers, e.g. hedge funds, due to the high positive convexity of long-term bonds. Convexity is a measure of the interest-rate sensitivity of a bond's duration, cf. Box 9.1. Interest from this investor category was clearly apparent on the issue of the 50-year French government bond, when hedge funds took up a significant share of the initial offering. This emphasises that it can be difficult to target issues at specific investor segments with particular requirements. In addition, investors in large government issues will typically show a broad geographical distribution, entailing that the issue cannot be placed exclusively with national investors.

During 2005, the average spread between 10-year and 30-year euro yields was around 45 basis points, cf. Chart 9.1.1. In other words, an extension of the term to maturity from 10 to 30 years entails a yield premium of around 45 basis points for a government issuer in the euro area. Against this background, it should be noted that the 50-year French issue was priced 3 basis points above a French 30-year issue. In the UK, the 50-year bond yield is lower than the 30-year bond yield, and the yield curve is thus inverted for longer maturities.

The difference between the 10/30-year yield spread and a 30/50-year yield spread in the euro area is partly attributable to the high convexity of 50-year bonds, cf. Box 9.1. In addition, several market participants indicate that the – expected or actual – hedging requirements of the L&P sector are an additional explanatory factor behind the very flat yield curve for longer maturities.

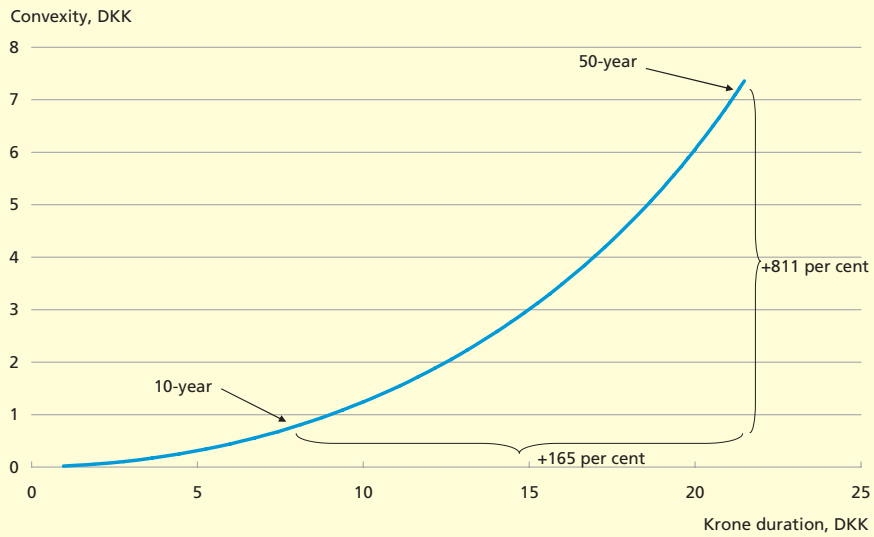
Swap spreads for ultra-long bonds

Euro-denominated interest-rate swaps with maturities of 30 and 50 years have been traded for several years. The spread between the 30-year and 50-year French government bonds is close to the 30/50-year spread in the European swap market, which indicates that the bond market has used the swap market as the basis for pricing the French 50-year issue, cf. Chart 9.1.2. On the other hand, the 10/30-year spread in the swap market is around 6 basis points higher than the 10/30-year government yield spread. By and large this implies that a government issuer wishing to swap the cash flow on a fixed-rate bond for a variable-rate cash flow can save 6 basis points by issuing in the 30-year rather than the 10-year segment. This saving is not increased by issuing 50-year bonds, which indicates that the government's comparative advantage relative to the swap market does not increase further for maturities exceeding 30 years.

CONVEXITY — Box 9.1

Convexity of a bond is defined as the second derivative of the price in relation to the yield, i.e. the interest-rate sensitivity of duration.[1] An increase in term to maturity increases convexity relatively more than duration, cf. the Chart, which shows the relationship between duration and convexity for bullet loans. For instance, the krone duration increases from 8.1 to 21.5, equivalent to 165 per cent, when term to maturity is increased from 10 to 50 years, while convexity increases from 0.8 to 7.4, equivalent to 811 per cent.

CONVEXITY AND DURATION, BULLET LOANS



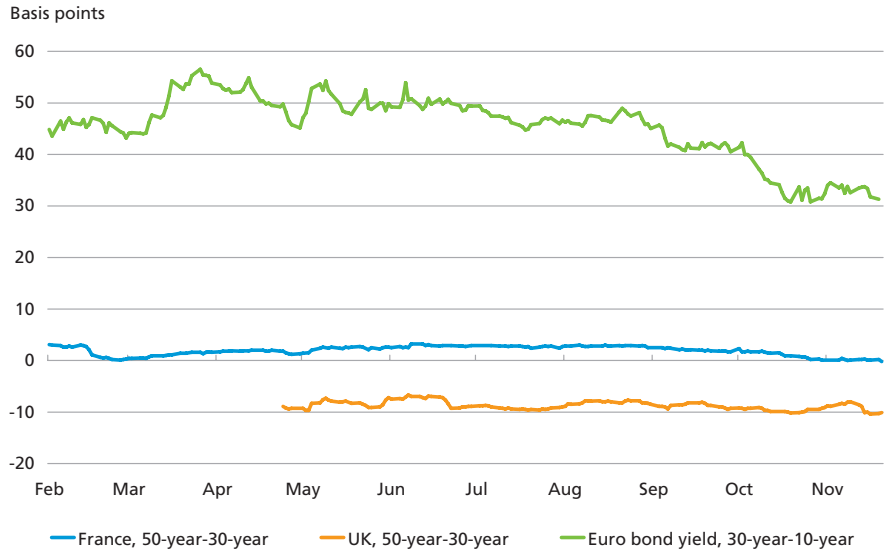
Note: The calculations were made on the basis of a flat term structure and 4 per cent coupon rates. Krone duration is calculated as the change in the price on a parallel shift to the term structure of 100 basis points. Convexity is calculated as the change in the krone duration on a parallel shift to the term structure of 100 basis points.

Positive convexity of a bond means that the value of the bond increases more on a given fall in interest rates than it declines on an equivalent rise in interest rates. All other things being equal, positive convexity thus increases the return on a bond, irrespective of the direction of any fluctuations in interest rates. On the basis of a flat yield structure of 4 per cent, a 10-year bond e.g. increases 10 per cent more in market value on a fall in interest rates of 1 per cent than it decreases in market value on an equivalent rise in interest rates. For a 50-year bond, the price increase is 40 per cent greater than the price decrease, which can be attributed to the greater convexity. The more the level of interest rate fluctuates, the greater the increase in return as a result of positive convexity. Bonds with high positive convexity are therefore particularly attractive if higher volatility is expected in the interest-rate market.

The contribution from increased convexity means that the yield spread between long-term and ultra-long bonds is very small.

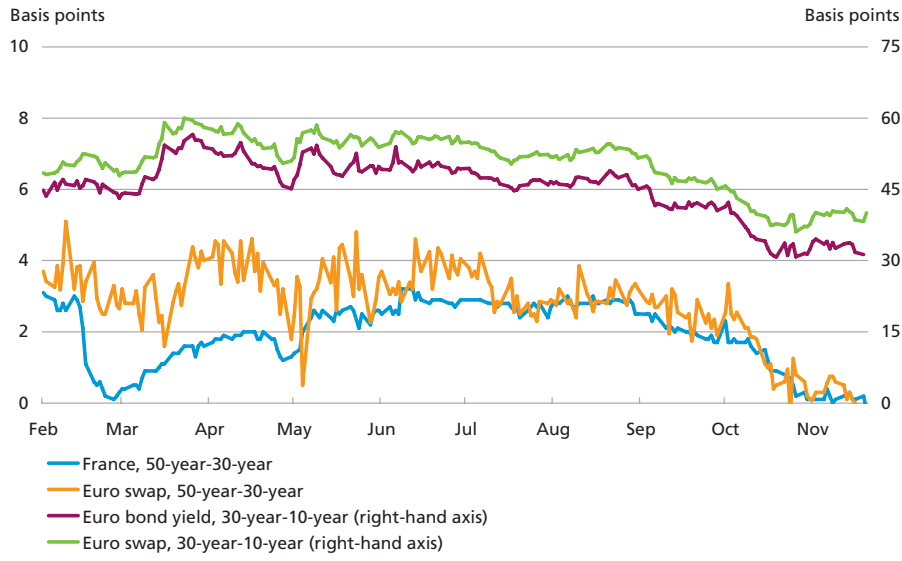
[1] See Christensen, M., 2001, *Bond investments, Theoretical considerations and practical use* (in Danish only), DJØF Publishing.

YIELD SPREAD, 10-, 30- AND 50-YEAR GOVERNMENT BOND YIELDS, 2005 Chart 9.1.1



Note: In the UK, the current 30-year security has a remaining maturity of just over 33 years, compared to 30 years in France. Maturity-adjusted yields for German government bonds have been used to illustrate the development in euro-area yields.
Source: Bloomberg.

YIELD SPREAD, GOVERNMENT BOND YIELDS AND SWAP RATES, 2005 Chart 9.1.2



Note: Maturity-adjusted yields for German government bonds have been used to illustrate the development in euro-area yields.
Source: Bloomberg.

CONSIDERATIONS BEHIND LONG-TERM ISSUES 9.2

The overall objective of the government debt policy is typically to cover the central government's financing requirement at the lowest possible borrowing costs, subject to a prudent degree of risk. In addition, the government debt policy is often designed to ensure well-functioning capital markets.

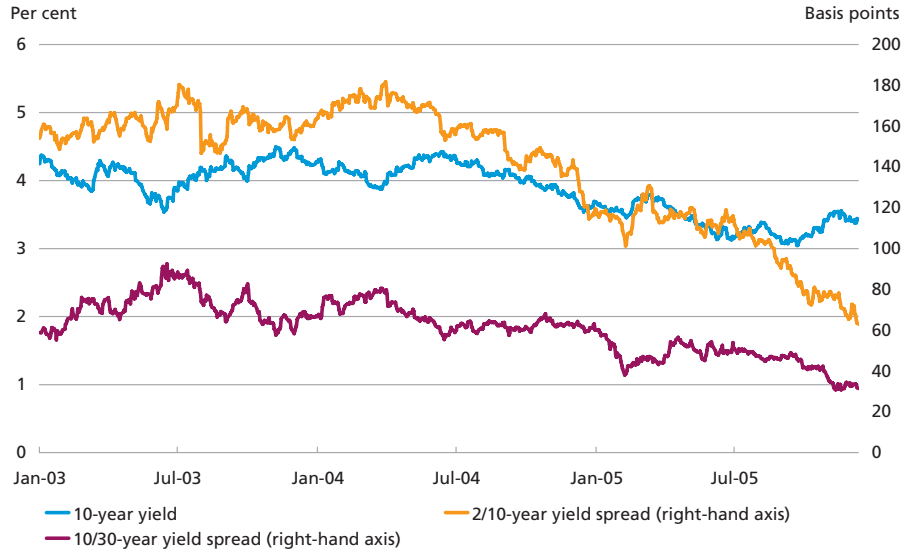
Costs and risk

The yield curve, i.e. the relationship between the yield to maturity and the term to maturity of a bond, has a positive slope in most countries. This means that the interest costs of short-term borrowing are typically lower than for long-term borrowing. On the other hand, the risk increases for short-term borrowing relative to long-term borrowing since the debt must be refinanced more frequently at unknown future interest rates.

In recent years, the absolute level of interest rates has fallen substantially, and the spread between long-term and short-term interest rates has narrowed considerably, cf. Chart 9.2.1.

The decline in interest rates and the narrowing of the spread between short-term and long-term interest rates imply that the costs of increasing

YIELDS AND YIELD SPREADS IN THE EURO AREA, 2003-05 Chart 9.2.1



Note: Maturity-adjusted yields for German government bonds have been used to illustrate the development in euro-area yields.
Source: Bloomberg.

duration have fallen. In other words, it has become relatively less expensive to reduce risk by locking in interest rates for a longer period. Thus, the trade-off between costs and risk has changed.

According to AFT (the French government debt management office), the demand for long duration has contributed to the decision to issue ultra-long bonds.[1] Likewise, the UK Debt Management Office has indicated that the issuance of ultra-long bonds is consistent with an objective of minimising debt costs over the long term while taking account of the degree of risk.[2]

Well-functioning capital markets

A very flat or inverted yield curve may indicate that investors require long-term instruments that are currently not offered, or are only offered to a limited extent.[3] On the basis of an analysis of the trade-off between costs and risk, a government issuer may in this case supplement the market by issuing long-term bonds.

The demand for long-term bonds is difficult to estimate. Based on assumptions of portfolio restructuring in the L&P sector, it is estimated that the potential demand from this sector is around twice the circulating volume of long-term government and corporate bonds in the UK, and around three times the circulating volume in the US.

Government issuers with limited borrowing requirements cannot be expected to cover total demand on this scale. Nevertheless, the establishment of a credit-risk-free reference yield curve through issuance of ultra-long bonds would be important. The reason is that it would subsequently be possible to price long-term bonds from non-government issuers as well as other financial instruments on the basis of the government yield curve.

Historically, central-government issuers have played an important role in the establishment of a liquid yield curve without any credit risk. Given the development of liquid markets for interest-rate swaps, which are often used as alternatives to government bonds when pricing non-government issues, this role has, however, become somewhat less significant.

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1 *Monthly Bulletin* no. 178, March 2005, Agence France Trésor. The document can be downloaded from www.aft.gouv.fr.

2 *Issuance of ultra-long gilt instruments, Response to Consultation*, 16 March 2005, United Kingdom Debt Management Office. The document can be downloaded from www.dmo.gov.uk/.

3 In the economic literature, the slope of the yield curve is often taken to indicate the future economic development. For example, an inverse yield curve will be taken to express an expected future economic slowdown, and thus lower interest rates, cf. *The Yield Curve as a Leading Indicator: Frequently Asked Questions*, 2005, Estrella A. The document is available at www.newyorkfed.org. In this chapter, the focus is solely on the impact of institutional factors on the yield curve.

For smaller government issuers with limited borrowing requirements, an expansion of the issuance universe entails conflicting considerations. The reason is that governments generally achieve a liquidity premium by issuing large bond series. The liquidity premium helps to reduce the borrowing costs. Firstly, the introduction of long-term bonds would, all other things being equal, increase the costs of issuing in existing maturity segments by diluting the liquidity premium. Secondly, liquidity supports a well-functioning capital market.

Since the introduction of the euro, small government issuers in the euro area have taken these considerations into account by focusing on a few, highly liquid benchmark bonds in certain maturity segments. Other countries with limited borrowing requirements, e.g. New Zealand[1], plan to issue long-term government bonds in connection with government financing of infrastructure projects. Long-term government issues can be natural instruments for financing infrastructure projects with a long investment horizon since the nominal interest-rate risk can be hedged over the entire horizon. In the same way, long-term inflation-linked issues are suitable for financing projects of which the current revenue correlates with inflation and where it is desirable to hedge the real interest-rate risk.

Large government issuers have been able to maintain several different borrowing programmes while also introducing new instruments.

THE DANISH PERSPECTIVE 9.3

In view of the very low borrowing requirement, Government Debt Management has no current plans to change its issuance strategy to include more instruments with longer maturities, cf. Chapter 4. On the contrary, the future strategy focuses on maintaining liquidity in fewer, core maturity segments.

Since the government debt is declining, it is not deemed appropriate to introduce ultra-long bonds instead of the existing benchmark bonds in the 10-year maturity segment. The longest Danish government security is 7-per-cent bullet loans 2024, where issuance ceased in 2001 in order to concentrate liquidity in the 10-year maturity segment.

Cost-at-Risk simulations indicate that the duration of the central-government debt can be reduced in the long term, cf. Chapter 8. Issuance of long-term bonds would therefore have to be counterbalanced by means of interest-rate swaps, whereby the overall duration contribution from the government to the market would be neutralised. The rea-

[1] See www.nzdmo.govt.nz/.

son is that the government would have to pay a long-term fixed bond yield and at the same time receive a long-term swap rate. The recipient of the long-term bond yield, e.g. a pension fund, would to a large extent be able to receive the long-term swap rate as a direct substitute. In addition, the fixed-exchange-rate policy allows Danish market participants to hedge positions as required in euro area government securities with a very limited exchange-rate risk.

CHAPTER 10

Interest-Rate Models for Cost-at-Risk Analysis

In the management of interest-rate risk on the central-government debt, the development in future interest costs is analysed under different assumptions regarding the level of interest rates. The analyses are performed using the Cost-at-Risk (CaR) model on the basis of simulations of the interest-rate development in an interest-rate model.

So far, the one-factor Cox-Ingersoll-Ross (CIR) model has been used to generate the interest-rate scenarios in the Cost-at-Risk model. On the basis of a principal component analysis of the development in the Danish yield curve, the interest-rate model has been extended to include two explanatory factors.

The extension improves the explanatory power of the model and allows for the decoupling of short-term and long-term interest rates that are observed historically for several periods. Simulation of the interest-rate development in the two-factor model indicates that the results are relatively robust to the choice of estimation period on an analysis horizon of 10 years.

RISK MANAGEMENT AND INTEREST-RATE MODELS 10.1

In the management of interest-rate risk on the government debt, the development in future interest costs is analysed under different assumptions regarding the level of interest rates. The analyses are performed using the Cost-at-Risk (CaR) model, which simulates the interest costs on central-government debt on the basis of the current debt portfolio, technical budgetary projections from the Danish Ministry of Finance, a strategy for future borrowing and an estimated development in interest rates.

In practice, *interest-rate models* are used to generate the interest-rate input to CaR. An interest-rate model is a mathematical formulation of the development in the yield curve. The latter expresses the relationship between term to maturity and the level of the interest rate on interest-bearing assets, typically government bonds.

Using an interest-rate model ensures that a large number of different interest-rate scenarios can be simulated and assigned a probability. In

each scenario, interest costs for the debt portfolio can be calculated to give *probability distributions* around future interest costs. The risk measure *absolute CaR* is defined by the 95th percentile in the interest cost distribution, while the mean value is an expression of the expected interest costs. The risk measure *relative CaR* is defined as absolute CaR less the mean value and is thus an expression of the maximum increase in costs in relation to the mean value, with a probability of 95 per cent. On the basis of the central government's risk tolerance, the risk measures may be used to support the choice of duration target, cf. Chapter 8.

CRITERIA FOR CHOICE OF INTEREST-RATE MODELS 10.2

The probability distribution around the future interest costs is determined by the interest-rate model selected, and the assessment of trade-off between costs and risk is therefore closely linked to the model's properties.

The development in the interest costs for the government debt is simulated over a 10-year horizon, and generally government bonds are issued with several different maturities. These two circumstances are important in relation to the interest-rate models used, since it is necessary to model both the long-term dynamics in the general level of interest rates and the covariation between the individual interest rates:

- The yield curve must fluctuate around a mean level (*mean reversion*) to prevent interest rates from rising or falling explosively over time.
- The model should exclude negative interest rates.
- The yield curve must exclude arbitrage opportunities so that the investor or borrower cannot achieve a risk-free gain.
- Uncertainty, i.e. volatility, in the individual maturity segments must reflect the historically observed uncertainty.
- The covariation between interest rates for different maturities must reflect the historically observed pattern.
- The model must be well-known, documented and easy to communicate.
- The model should be manageable. For instance, it must be possible to estimate the model's parameters, and to simulate yield curves within a reasonable time.

Macroeconomic and financial literature both include numerous interest-rate models that all meet several of the above requirements. It is not possible to identify a single, superior model, and any choice of interest-rate model will reflect an attempt to strike a balance between various considerations. Some models have attractive theoretical characteristics,

but cannot be used in practice. However, the simplest models often give an unrealistic picture of the yield curve dynamics.

For previous analyses of different interest-rate models for CaR simulations, see *Danish Government Borrowing and Debt 2001*, Chapter 9.

Interest-rate modelling in the CaR model

So far, the one-factor Cox-Ingersoll-Ross (CIR) model has been used to generate the interest-rate scenarios in the CaR model. The one-factor CIR model is an *affine term structure model*. In such models, zero-coupon rates for all maturities are affine functions[1] of a number of descriptive factors, cf. Box 10.1.

COX-INGERSOLL-ROSS MODELS — Box 10.1

In the one-factor CIR[1] model, the development in the short interest rate, r, is described by the stochastic differential equation

$$\mathrm{d}r_t = \kappa(\theta - r_t)\mathrm{d}t + \sigma\sqrt{r_t}\,\mathrm{d}W_t$$

The equation shows that the change in the short interest rate over a short horizon depends on the sum of two movements.

The first movement is deterministic. If the interest rate is higher than its mean level, θ, a falling interest rate is expected since κ is positive. κ indicates the speed at which the interest rate approaches its mean level. The first term thus ensures that the interest rate has a "mean reversion".

The second movement is stochastic, since W is a "Wiener process". Wiener processes are characterised by the change dW being normally distributed with the mean value 0 and the variance dt. The value σ is called the volatility and scales the uncertainty with the level of the short interest rate. The higher the volatility or the level of the short interest rate, the greater the uncertainty concerning the change in interest rates in the following period.

To calculate zero-coupon rates on the basis of the process for the short interest rate, it is necessary to assume that the market is arbitrage free. In an arbitrage-free market it is not possible to achieve risk-free gains by purchasing and selling different bonds. Any expected return in excess of the short interest rate is therefore an indication that the investor is assuming an increased risk.

Assuming that there is no arbitrage[2], it can be demonstrated that the yield to maturity on a zero-coupon bond, y, with the maturity τ in the one-factor CIR model is given by

$$y(\tau) = -\ln(A(\tau)) + B(\tau)r_t$$

Continued

[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.

[2] For an introduction to arbitrage theory and pricing, see Musiela, M. and Rutkowski, M., 1998, *Martingale Methods in Financial Modelling*, Springer Verlag

[1] Linear plus a constant.

CONTINUED Box 10.1

$A(\tau)$ and $B(\tau)$ are positive functions of κ, θ and σ, as well as an extra parameter, λ, which determines the expected additional return on long-term relative to short-term zero-coupon bonds. The CIR model is an affine interest-rate model since the zero-coupon rate is an affine function – i.e. a linear term plus a constant – of the short interest rate.

The CIR model can be expanded to include several explanatory factors by letting the short interest rate be given as

$$r = x_1 + x_2$$

where

$$\mathrm{d}x_1 = \kappa_1(\theta_1 - x_1)\mathrm{d}t + \sigma_1\sqrt{x_1}\,\mathrm{d}W_1$$
$$\mathrm{d}x_2 = \kappa_2(\theta_2 - x_2)\mathrm{d}t + \sigma_2\sqrt{x_2}\,\mathrm{d}W_2$$

If it is assumed that the two explanatory factors, x_1 and x_2, are independent, it can be demonstrated that the yield to maturity for a zero-coupon bond with the maturity τ in the two-factor CIR model is given by

$$y(\tau) = \left(-\ln\left(A_1(\tau)\right) + B_1(\tau)x_1\right) + \left(-\ln\left(A_2(\tau)\right) + B_2(\tau)x_2\right)$$

where $A_1(\tau)$ ($A_2(\tau)$) and $B_1(\tau)$ ($B_2(\tau)$) are as in the one-factor model, but calculated on the basis of the parameters from the two factor processes. In the two-factor model, the parameter space has been expanded to include two extra parameters, λ_1 and λ_2, which determine the expected additional return on long-term relative to short-term zero-coupon bonds. As in the one-factor model, it is seen that the zero-coupon rate is an affine function of the two explanatory variables.[3]

The parameters λ, λ_1 and λ_2 are referred to as risk premiums. In the one-factor model it can be shown that the expected additional return on a zero-coupon bond relative to the short interest rate is given by the bond's duration multiplied by its risk premium. A corresponding interpretation is not directly possible in the two-factor model, but here it applies that the risk premiums determine each factor's contribution to the expected additional return on a zero-coupon bond above the short rate of interest.

Parameter estimates for the two models are shown in the Table.

PARAMETER ESTIMATES, MONTHLY DATA FROM 1987

Parameter	κ_1	κ_2	θ_1	θ_2	σ_1	σ_2	λ_1	λ_2
One factor ..	0.24	-	0.047	-	0.11	-	-0.14	-
Two factor ...	0.024	0.59	0.032	0.029	0.048	0.091	-0.069	-0.036

Note: Parameter estimates based on methods described in Box 10.3.

[3] Multiple-factor affine term structure models are treated in full generality in Duffie, D. and Kan R., 1996, A Yield-Factor Model of Interest Rates. *Mathematical Finance* vol. 6, no. 4, pp. 379-406.

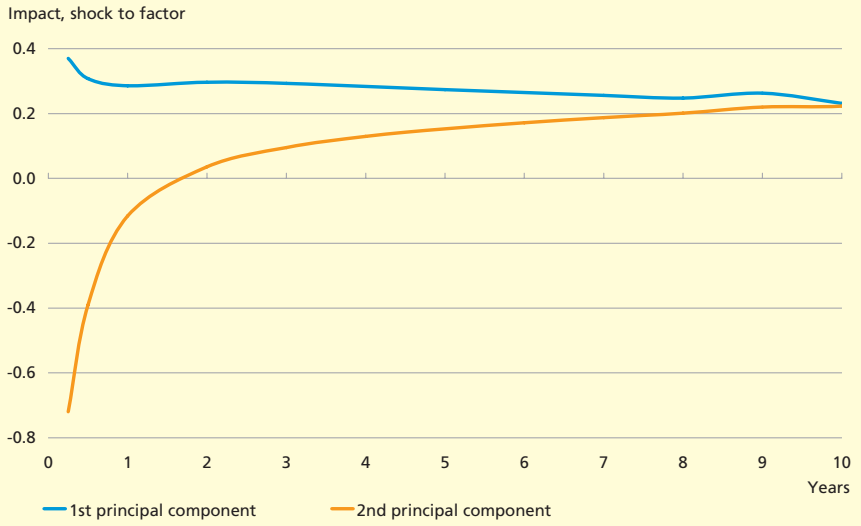
In the one-factor model, the explanatory variable is the very short-term interest rate. This assumption implies that the entire yield curve is determined by the short interest rate. For instance, the 10-year yield is always at a certain level if the short interest rate is held unchanged in the model. In addition, interest rates with different maturities are perfectly correlated.

PRINCIPAL COMPONENT ANALYSIS OF THE DANISH YIELD CURVE — Box 10.2

Principal component analysis is a statistical method that can be used to explain the covariance in a multi-dimensional system on the basis of independent factors.[1] In connection with interest-rate modelling, the multi-dimensional system comprises zero-coupon yields for different maturities, i.e. a cross-section of the yield curve.

If the individual variables in the system are closely correlated, a large part of the variance can be explained on the basis of relatively few independent factors. This is precisely the case for yields with different maturities. A principal component analysis of the development in the Danish yield curve from 1987 to 2005 shows that around 66 per cent of the variance can be explained on the basis of one factor, while two independent factors explain around 88 per cent of the variance. The impact of the factors on yields with different maturities can be deduced as "factor loadings", cf. the Chart.

FACTOR LOADINGS FOR PRINCIPAL COMPONENT ANALYSIS OF DANISH YIELD CURVE, 1987-2005



Note: The analysis was performed on the basis of *changes* in the level of interest rates. The impact on a shock to the factors indicates the influence from the factor on the month-on-month change in the level of interest rates.

Broadly speaking, the first principal component affects interest rates with different maturities in the same way and can therefore be interpreted as a *parallel shock* to the yield curve. This indicates that the component determines the *level* of the yield curve. The second principal component determines the *slope* of the yield curve, since long-term and short-term interest rates are not affected in the same way.

[1] See e.g. Golub, B.W. and Tilman. L.M., 2000, *Risk Management Approaches for Fixed Income Markets*. John Wiley & Sons. Inc.

In practice, many different types of yield curves are observed at the same level of the short interest rate, and moreover interest rates with different maturities are not perfectly correlated. These circumstances indicate that it may be necessary to expand the model in order to facilitate the recreation of empirical characteristics.

On the basis of a principal component analysis of the development in the Danish yield curve, it is found that the variation in the level of interest rates can be explained satisfactorily by two independent factors, viz. level and slope, cf. Box 10.2. Consequently, the one-factor CIR model has been expanded into a model with two explanatory factors.

Outside the class of affine term structure models, forward-rate models[1] and market models[2] are widely used. In the forward-rate models, the development in the entire forward curve, rather than the short interest rate alone, is specified. Market models are closely related to forward-rate models, but are based on observable, discretely compounded market interest rates rather than continuously compounded interest rates. Both types of model allow more flexible specification of the volatility structure, as well as exact recreation of the current yield curve in the model. These two properties are especially important when pricing interest-rate derivatives, and particularly the market models have become prevalent in the financial sector. For long-term simulation and risk management, however, forward-rate and market models are less appropriate as they are relatively less suitable for estimation based on historical data and difficult to implement.

HISTORICAL INTEREST-RATE DYNAMICS IN THE MODELS 10.3

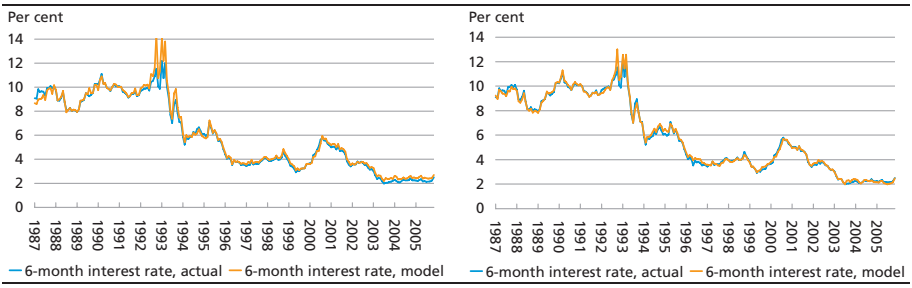
Initially, the ability of the one-factor and two-factor models to describe the historical development in interest rates in Denmark over a period of 18 years is investigated. In both models, the parameters are estimated on the basis of monthly data for the period 1987-2005, cf. Box 10.3, and the development in the model-based interest rates is then compared with the actual interest rates in the period.

Both models can explain the development at the short end of the yield curve, here represented by the 6-month interest rate, cf. Chart 10.3.1. Since the explanatory factor in the one-factor model is the 3-month interest rate, it is not surprising that the model-based 6-month interest

[1] See Heath, D., Jarrow, R. and Morton A., 1992, Bond Pricing and the Term Structure of Interest Rates: A New Methodology, *Econometrica*, vol. 60, no. 1, pp. 77-105.

[2] See Brace, A., Gatarek, D. and Musiela M., 1997, The Market Model of Interest Rate Dynamics, *Mathematical Finance*, vol. 7, no. 2, pp. 127-155.

6-MONTH YIELD, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.3.1



Note: Continuously compounded zero-coupon yields.
Source: Danmarks Nationalbank and own calculations.

rate matches the actual level of interest rates. The difference between the 3- and 6-month interest rates is generally very limited.

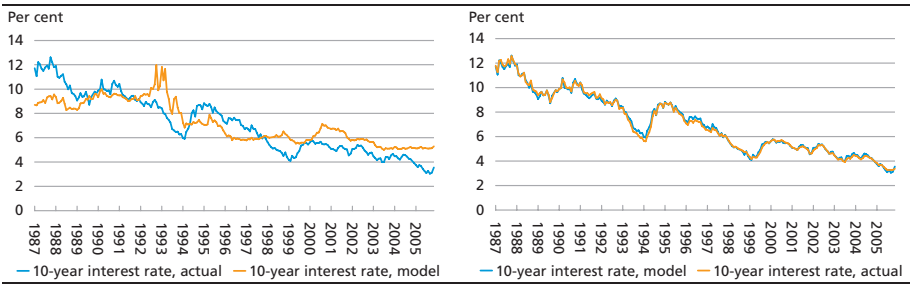
As stated, the two-factor model is estimated on the basis of a cross-section of the yield curve, and not just a single interest rate. In the modelling of the historical development in the 6-month interest rate, this does not result in major differences relative to the one-factor model.

Considering interest rates with longer maturities, it becomes clear that the one-factor model overestimates or underestimates the level of interest rates over longer periods of time, cf. Chart 10.3.2. The two-factor model, on the other hand, can model the level and dynamics in both short-term and long-term interest rates.

Identification of the descriptive factors

The primary reason for the one-factor model's limited explanatory power at the long end of the yield curve is that the only explanatory variable in the model has been defined as the short interest rate. If the yield curve for a given level of the short interest rate deviates from the "normal scenario", it will be very difficult for the model to capture this.

10-YEAR YIELD, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.3.2



Note: Continuously compounded zero-coupon yields.
Source: Danmarks Nationalbank and own calculations.

ESTIMATION OF CIR MODELS Box 10.3

So far, the one-factor model has been estimated on the basis of a procedure developed by Overbeck and Rydén (1997)[1]. The method results in closed-form estimators on the basis of a time series for the 3-month interest rate, which ensures simple implementation. The risk premium cannot be estimated solely on the basis of a time series for the short interest rate, but is subsequently found on the basis of the yield curve's average slope over the estimation period.

In the general two-factor model, it is not possible to identify the underlying factors with observable interest rates, which impedes the estimation. The model can e.g. be estimated using a Kalman filter[2] where the unobservable factors are derived simultaneously with the estimation of the parameters.

The Kalman filter is a general method for estimation of unobservable variables on the basis of observable data, where the relationship between the two data sets is known. The development in the observable data is summarised in a "measurement equation", while the development in the unobservable variables is summarised in a transition equation. The measurement equation is given by the affine relationship between factors and yields, which can be vectorised as follows:

$$\mathbf{y}_t = \mathbf{A} + \mathbf{B}\mathbf{x}_t + \boldsymbol{\varepsilon}_t$$

The vector **y** contains a cross-section of the yield curve as zero-coupon rates with different maturities (3 months, 2 years, 5 years, 10 years and 15 years), the matrix **A** (**B**) contains the **A** functions (**B** functions) described in Box 10.2, and the vector **x** contains the unobservable factors. The last term is a measurement error indicating that the model-based interest rates always deviate from the actual interest rates when the number of factors is lower than the number of zero-coupon rates. The transition equation is given by the conditional mean value and variance of the underlying factors.[3] Closed-form expressions of the conditional mean and variance are available since the transitional distribution in a CIR process is a "noncentral Chi^2 distribution". The transition equation can be vectorised as follows:

$$\mathbf{x}_t = \mathbf{C} + \mathbf{D}\mathbf{x}_{t-\Delta t} + \mathbf{u}_t$$

The vector **x** contains the factors, while the matrixes **C** and **D** are selected so that the conditional mean value and variance of **x** are in accordance with the distribution of the underlying factors. The mean value and the variance in the transition equation are therefore consistent with the underlying interest-rate model.

The general principle behind the estimation is that the measurement equation can be used to calculate a theoretical yield curve based on an estimate of the unobservable factors and parameter values. If the theoretical yield curve deviates from the actual yield curve, the reason must be that either the parameter values or the factors deviate from the true values. The Kalman filter ensures optimum derivation of the estimates for the underlying factors within the class of linear estimators.

By minimising the difference between the actual and calculated yield curves over the estimation period, it is possible to derive both the parameter values and a time series for the factors. In practice, this difference is minimised using an approximative maximum likelihood procedure.

[1] Overbeck, L. and Rydén, T., 1997, Estimation in the Cox-Ingersoll-Ross Model, *Econometric Theory*, vol. 13, pp. 430-461.
[2] See e.g. Harvey, A.C., 1990, *Forecasting, Structural Time Series Models and the Kalman Filter*, Cambridge University Press.
[3] See e.g. Duan, J. C. and Simonato, J. G., 1995, Estimating and Testing Exponential-Affine Term Structure Models by Kalman Filter, Centre Interuniversitaire de Recherche en Analyse des Organisations.

The improved fit provided by the two-factor model can initially be ascribed to the increased number of parameters in the model. Further insight into the dynamics in the models is achieved by analysing the influence of the factors on the formation of interest rates. In the models, the impact of the factors on the individual interest rates is determined on the basis of *factor loadings.* Mathematically, factor loadings are calculated as

$$\text{Factor loading on factor i} = \frac{\partial y(\tau)}{\partial x_i},$$

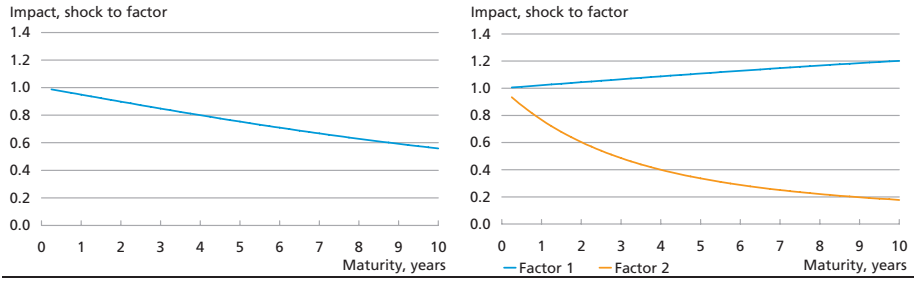
which corresponds to the change in the zero-coupon rate with term to maturity τ for a small change in the ith factor, x_i. Unlike factor loadings from the principal component analysis presented above, which are solely based on the covariance of the data set, the factor loadings defined here depend on the interest-rate model selected.

Depicting factor loadings as a function of the maturity gives insight into the formation of interest rates in the models, cf. Chart 10.3.3.

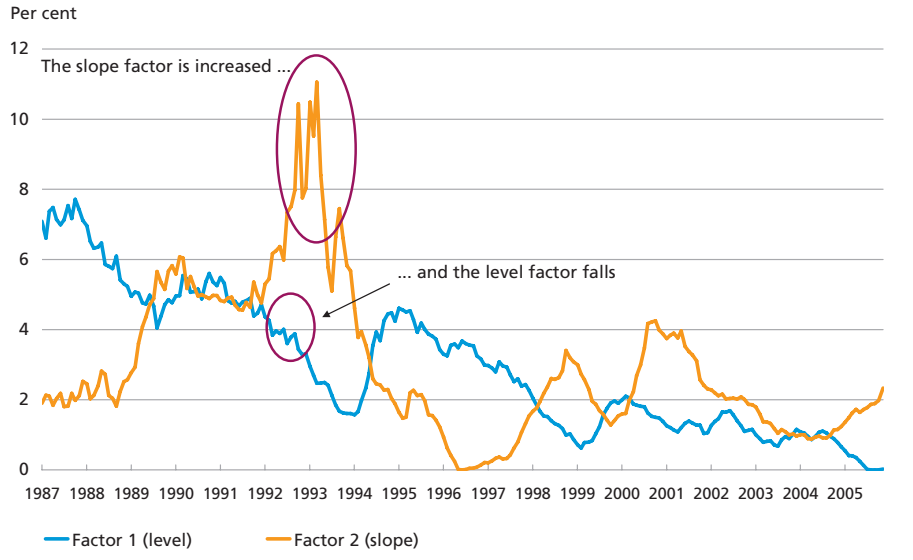
In the one-factor model, the short interest rates increase one-to-one with positive shocks to the factor, and the effect diminishes with maturity. A positive shock thus always increases the general level of interest rates, with a diminishing effect over maturities. If the yield curve is normal, i.e. increasing in the remaining term to maturity, a flatter yield curve in the one-factor model will always coincide with an increase in interest rates, whereas a steeper yield curve will always coincide with falling interest rates. As previously stated, the long-term interest rates will thus not change in the one-factor model, unless the short interest rate also changes.

In the two-factor model, a shock to one of the factors affects all interest rates, with a marginally increasing impact over maturities. The second factor, however, diminishes substantially over maturities and thus primarily influences interest rates with shorter maturities. More specifically, factor 1 can be identified with level and factor 2 with slope, which was precisely the case in the model-independent principal component

FACTOR LOADINGS, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.3.3



HISTORICAL DEVELOPMENT IN FACTORS, TWO-FACTOR MODEL, 1987-2005 Chart 10.3.4



analysis. The fact that level and slope can be managed independently is the primary reason for the increased flexibility and higher explanatory power in the two-factor model.

The increased flexibility of the two-factor model is clearly seen around the currency crisis in 1992, when short-term interest rates rose considerably, while long-term interest rates were virtually unaffected. In the two-factor model, the level of the short interest rates is raised through an increase in the slope factor, cf. Chart 10.3.4. Long-term interest rates are also affected, but to a far lesser extent, and the impact is neutralised via a small decrease in the level factor, cf. Chart 10.3.5.

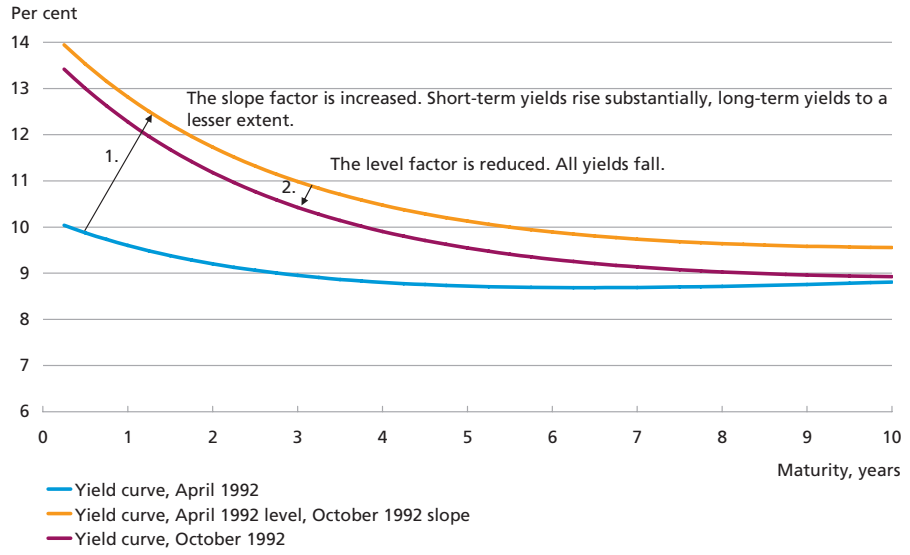
In summary, it is seen that the two-factor model enables the decoupling of short-term and long-term interest rates that is observed historically in several periods. Since the shape of the yield curve is significant to the trade-off between long-term and short-term borrowing, it is appropriate that the interest-rate model applied does not from the outset specify a clear correlation between changes in short-term and long-term interest rates.

Modelling of average interest rates, percentiles and correlations

A further examination of the models' ability to explain the empirical characteristics of the yield curve can be performed by comparing descriptive statistical values for the model-based and empirical yield curves.

In the one-factor model, the average level of interest rates is underestimated by 70-120 basis points for the period 1987-2005, while the vola-

YIELD CURVE, APRIL-OCTOBER 1992 Chart 10.3.5

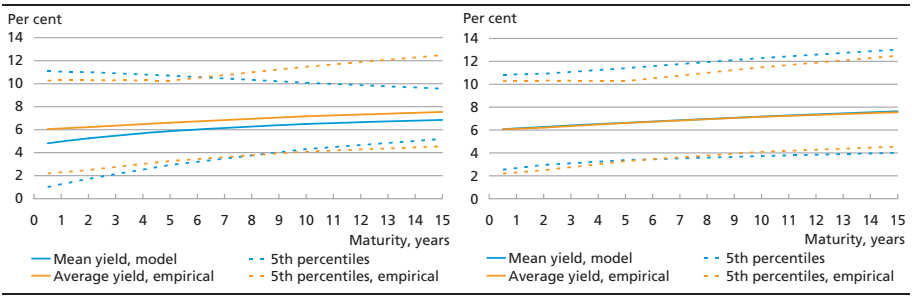


Source: Danmarks Nationalbank and own calculations.

tility of the level of interest rates is overestimated for short maturities and underestimated for long maturities, cf. Chart 10.3.6. The volatility of the interest rates is represented by the 5th percentiles for the yield curve, indicating the upper and lower limits of a confidence band within which the yield curve will stay with a probability of 90 per cent.[1] All other things being equal, higher volatility entails greater fluctuations in interest rates and thus a wider confidence band.

The extra factor in the two-factor model provides for significantly better concordance between the model-based and empirical percentiles,

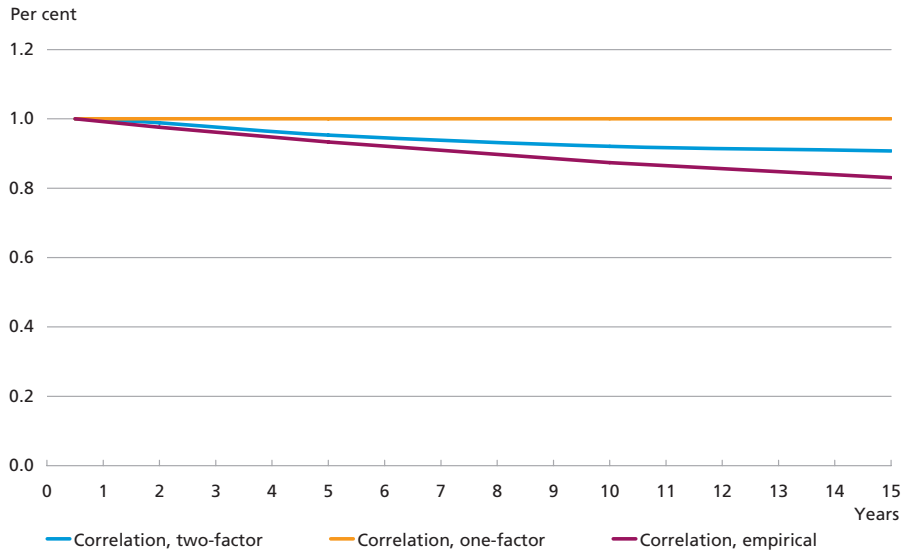
AVERAGE YIELD CURVE AND PERCENTILES, 1987-2005, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.3.6



Note: Continuously compounded zero-coupon yields.
Source: Danmarks Nationalbank and own calculations.

[1] The confidence band is two-sided, which means that the highest and lowest 5 per cent of observations are excluded.

CORRELATION STRUCTURE FOR THE DANISH ZERO-COUPON CURVE, 1987-2005 Chart 10.3.7



Note: Correlation calculated on the basis of the level of interest rates.
Source: Danmarks Nationalbank and own calculations.

even though the model consistently overestimates the 95th percentile (upper limit of the band) by around 60 basis points. The mean-yield curve in the two-factor model is identical to the empirically observed average-yield curve.

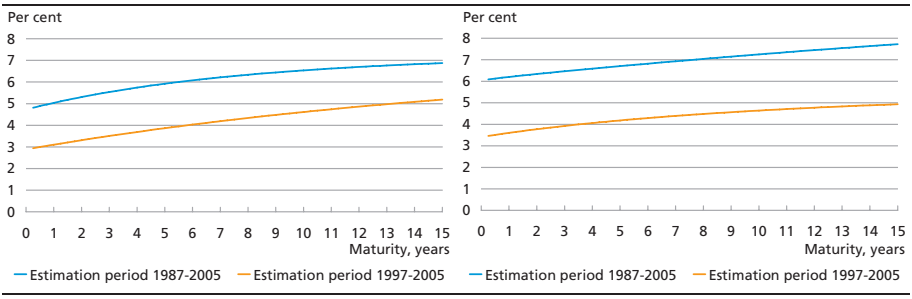
In the same way, the correlation structure in the data can be analysed. The central variable is taken to be the 6-month interest rate, and the correlation between this interest rate and interest rates with longer maturities is calculated on the basis of data and the two models, cf. Chart 10.3.7.

In the one-factor model, the correlation across maturities equals one per definition. The two-factor model permits decoupling of the individual interest rates, but for longer maturities the correlation is overestimated by around 7 per cent in relation to the empirical correlation structure. The increased flexibility of the two-factor model thus allows substantially better modelling of the covariation between yields with different maturities than the one-factor model.

ESTIMATION PERIODS AND SIMULATIONS 10.4

One of the criteria for selecting interest-rate models is that the yield curve fluctuates around a constant level of interest rates. This entails that the long-term mean in the model by and large corresponds to the observed average level of interest rates over the estimation period, cf. above.

LONG-TERM MEAN-YIELD CURVES, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.4.1



Note: Long-term is defined on the basis of the mean-yield levels for the factors.

The above analyses were performed on the basis of interest-rate data for the period 1987-2005. Over this period, the 10-year yield fell steadily from around 12 per cent to around 3.5 per cent. A shorter estimation period would therefore result in a lower long-term mean yield level in the models, cf. Chart 10.4.1.

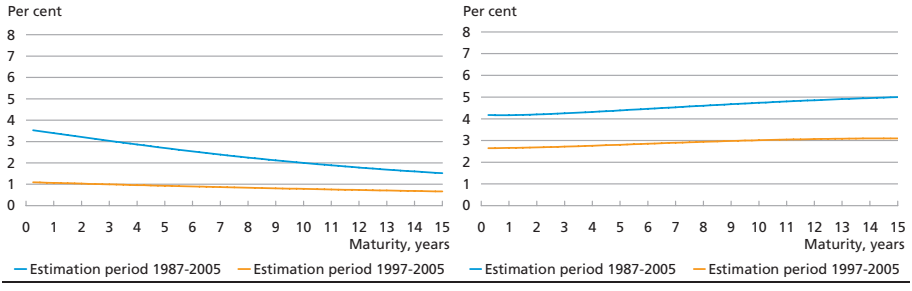
In the same way, the standard deviation is reduced around the long-term mean yield level when a shorter estimation period is applied, cf. Chart 10.4.2.

The choice of estimation period may therefore affect the trade-off between costs and risk in CaR. For instance, a model estimated on the basis of a shorter estimation period may result in a lower long-term mean yield level and a narrower fluctuation band around this level. This naturally raises the question of which estimation period should be used in connection with model simulations.

Simulation over a 10-year horizon

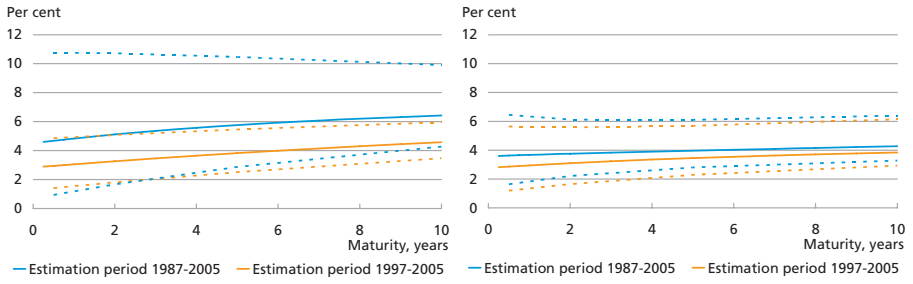
In the CaR model, the level of interest rates is simulated 10 years ahead, and the models' properties must therefore be compared over this horizon. It cannot be determined beforehand whether a 10-year analysis horizon would give the same results as the long-term levels outlined above.

STANDARD DEVIATION AROUND LONG-TERM YIELD CURVE, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.4.2



Note: Long-term is defined on the basis of the mean-yield levels for the factors.

MEAN-YIELD CURVES ON A 10-YEAR HORIZON, ONE-FACTOR (LEFT) AND TWO-FACTOR (RIGHT) Chart 10.4.3



Note: 90-per-cent confidence bands indicated with dashed lines.

In order to illustrate the significance of the chosen estimation period for CaR analyses performed in 2005, the yield curve is simulated 10 years ahead on the basis of the yield curve at end-2005, cf. Chart 10.4.3.

In the one-factor model, there are substantial differences between the mean-yield curves and particularly the confidence bands based on the two estimation periods. In the two-factor model, the expected yield curves and the 90-per-cent confidence bands deviate by around 30-80 basis points, depending on the term to maturity.

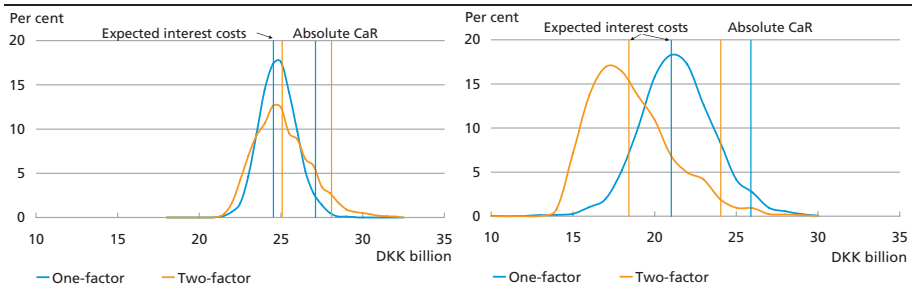
In addition to estimating CaR on the basis of historical data, the one-factor model has in recent years been calibrated on the basis of the interest-rate forecasts from the Danish Ministry of Finance. By explicitly setting limits to the expected future level of interest rates in the model, the dependence on the selected estimation period is reduced.[1]

The fairly small deviations in the two-factor model indicate that the results are relatively robust to the choice of estimation period if the analysis horizon is limited to 10 years. In view of the difference between the mean-yield curves and the standard deviations in the long term, this result may seem surprising. However, a further analysis of the parameter estimates reveals that the speed at which the level factor approaches its mean level, κ_1, is halved in the period 1987-2005 relative to 1997-2005. Since the level factor is very low in 2005, this means that the higher level of interest rates in the period 1987-2005 is only achieved for very long analysis horizons. Consequently, the choice of estimation period becomes less significant in the two-factor model.

Based on a principle of prudence, it has been decided to use the parameter set from the period 1987-2005 for analyses in the CaR model based on the two-factor model. Between the two estimation periods, this gives the highest mean yield level and the greatest volatility in interest rates.

[1] This method is not directly comparable with the model implementation described here, which is solely based on historical data. The calibration procedure is described in *Danish Government Borrowing and Debt 2003*, Chapter 11.

DISTRIBUTION OVER INTEREST COSTS, 2007 (LEFT) AND 2010 (RIGHT) Chart 10.5.1



Note: The calculations are based on the future issuance strategy as described in Chapter 4. The year 2007 has been chosen since swaps concluded in 2006 are not fully reflected in the risk profile until 2007.
Source: Own calculations in the CaR model.

CaR ANALYSIS 10.5

In connection with the determination of the duration band for 2006, the Government Debt Management Office has, for the first time, applied the two-factor model to CaR simulations. In order to examine whether the risk profile for the selected strategy changes with the introduction of the new interest-rate model, the basic scenario with a duration of 3.0 years ± 0.5 year has been recalculated using the one-factor model, cf. Chart 10.5.1.

The expected interest costs in 2007 are close to identical in the two models, while the cost distribution based on the two-factor model is wider than the distribution based on the one-factor model. This means that the probability of observing high interest costs is greater in the two-factor model. Consequently, the short-term risk, i.e. absolute CaR, is assessed to be higher in the two-factor model than in the one-factor model.

In the longer term, here represented by 2010, the distribution of costs based on the two-factor model is displaced leftwards in relation to the distribution based on the one-factor model. Both the expected interest costs and absolute CaR are reduced relative to simulations in the one-factor model.

CHAPTER 11

Government Cash Management

The Danish central government holds liquid funds in order to handle current payment flows. The funds are held in the central government's account at Danmarks Nationalbank, and the central government's large receipts and disbursements are settled via this account. The account accrues interest on market terms. The overall management of the liquid funds is handled by Government Debt Management via the issuance and buy-back policy of maintaining a specific balance on the account at year-end, as well as ensuring that the balance is always positive.

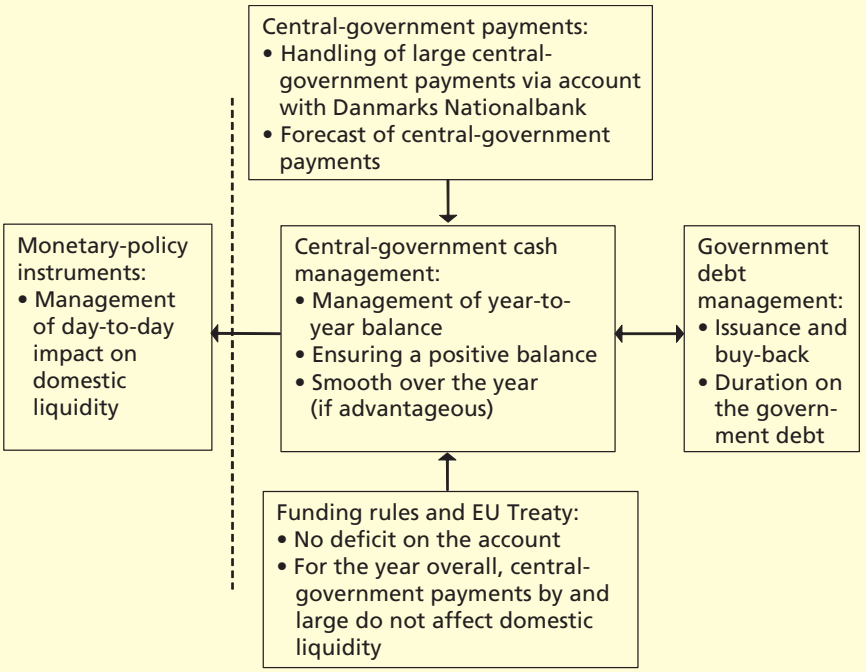
In the management of costs and risk, the central government's account is an integral part of the government debt portfolio. This means that the overall duration of the government debt, as well as the issuance policy and buy-back policy, are subject to coordinated management with the balance of the central government's account.

CASH MANAGEMENT IN DENMARK 11.1

As a consequence of timing differences between central-government receipts and disbursements, the central government has a cash requirement. In Denmark these liquid funds are held on the central government's account at Danmarks Nationalbank, and large payments are settled via this account. The central government's retail payments are outsourced to the banking sector, so that ingoing and outgoing retail payments are handled by a bank, and only a net amount is transferred between Danmarks Nationalbank and the intermediary bank. The balance of the central government's account accrues interest at the discount rate. The management of the central government's account and its payment flows constitutes the cash management by the central government. Rather than management of revenue and expenditure accounts, this is in fact liquidity management.

The overall framework for the cash management by the central government is given by the EU Treaty's prohibition of monetary financing, combined with the central-government funding rules. This entails that the central government's account with Danmarks Nationalbank cannot show a deficit and that the central government on an annual basis normally does not influence the overall domestic liquidity, and thereby the

STRUCTURE OF GOVERNMENT CASH MANAGEMENT Box 11.1



total (net) deposits of the banks and mortgage-credit institutes with Danmarks Nationalbank. Over the course of the year, payment fluctuations will entail temporary shifts in domestic liquidity. In Denmark, these liquidity impacts are managed via Danmarks Nationalbank's monetary-policy instruments[1].

The central government's account is managed within this framework as an integral part of the overall government debt portfolio, where the balance of the account is included in the duration target for the overall debt.

Box 11.1 illustrates the framework and the overall relations between cash management, government debt management and the monetary-policy instruments.

Central-government payments

The Danish Ministry of Finance prepares forecasts of the overall amounts of central-government payments in *Budget Reviews* and *Finance Acts*.

[1] More details of Danmarks Nationalbank's monetary-policy instruments are available in Danmarks Nationalbank, *Monetary Policy in Denmark*, 2nd edition, 2003.

FORECAST OF CENTRAL-GOVERNMENT PAYMENTS AND BALANCE OF THE CENTRAL GOVERNMENT'S ACCOUNT Box 11.2

Cash management by the central government is based on forecasts of the balance of the central government's account. Government Debt Management uses the forecasts to ensure adequate funds on the central government's account. The forecasts are also a significant input to the management of the duration of the government debt within a band. Duration is calculated for the overall government debt including the central government's account.

Danmarks Nationalbank uses the forecasts to plan operations in the money market as a consequence of the liquidity impacts of central-government payments. The forecasts are published and thus also contribute to improving the monetary-policy counterparties' management of their own liquidity.

Three times a year, Danmarks Nationalbank prepares and issues a monthly distribution of central-government payments. The monthly distribution is based on government finance estimates from the Ministry of Finance that are published in the *Budget Reviews*. On the basis of the *Budget Reviews*, the large items are distributed on a monthly basis according to payment patterns in previous years, as well as data on changes in payment dates.

Taking Danmarks Nationalbank's monthly distribution of central-government payments as the starting point, the day-to-day distribution of central-government payments is prepared. The objective is an estimate of the monetary-policy counterparties' liquidity requirement, as well as of the central government's liquidity position on individual days. The day-to-day distribution is published on the penultimate banking day of each month and presents the day-to-day forecast of central-government payments, as well as Danmarks Nationalbank's planned purchase and sale of certificates of deposit over the following two months.

Both forecasts are available at Danmarks Nationalbank's website www.nationalbanken.dk.

On this basis, as well as information on the timing of the payments, Danmarks Nationalbank forecasts the course of central-government payments over the year, cf. Box 11.2. The forecasts are a significant input to the central government's cash management and to the use of Danmarks Nationalbank's monetary-policy instruments.

Payments to the central government's account originate from direct and indirect taxes, the EU and other central-government receipts. In 2005, these payments totalled DKK 526 billion, of which the largest share stems from ingoing VAT and income tax payments.

Payments from the central government's account are disbursements to local government and abroad (development aid, EU, etc.), salaries and pensions, government benefits and subsidies, and interest and redemption payments on the central-government debt. In 2005, these disbursements totalled approximately DKK 480 billion.

Funding rules and the EU Treaty

Domestic and foreign borrowing are subject to funding rules. The domestic funding rule stipulates that in principle domestic borrowing denominated in kroner covers the central government's gross domestic financing requirement, i.e. the central government's current deficit and redemptions on the domestic debt. Viewed in isolation, a gross domestic financing requirement implies that the central government increases liquidity in the domestic money market. An equivalent level of domestic borrowing offsets the liquidity impact and ensures that over the course of the year the central government by and large does not influence domestic liquidity.

The foreign funding rule implies that the foreign borrowing requirement, which is equivalent to the redemptions on the foreign debt, is financed by foreign borrowing (in foreign currency). The foreign debt is raised primarily in order to maintain the foreign-exchange reserve. Foreign borrowing thus does not influence domestic liquidity, but is included directly in the foreign-exchange reserve, cf. Table 11.1.1.

The domestic and foreign funding rules set the framework for the issuance strategy for the year. There is a degree of flexibility within this framework, e.g. in the event of unforeseen receipts or disbursements at the end of the year, or in order to avoid inexpedient purchase or sale of government securities due to narrow focus on the calendar year.

Table 11.1.1 illustrates the principal elements of the central government's debt portfolio and Danmarks Nationalbank's balance sheet. When foreign loans are raised by the central government, the central government's account and the foreign-exchange reserve increase by the same amount on Danmarks Nationalbank's balance sheet. In the case of domestic borrowing by the central government, the increase in the account is offset by a reduction of the net deposits of the banks and mort-

KEY ELEMENTS OF THE CENTRAL GOVERNMENT'S DEBT PORTFOLIO AND DANMARKS NATIONALBANK'S BALANCE SHEET — Table 11.1.1

Government debt portfolio		Danmarks Nationalbank	
Assets	Liabilities	Assets	Liabilities
Central-government funds	Foreign debt	Foreign-exchange reserve	Banknotes and coins
Central-government account	Domestic debt	Bonds, etc.	Central-government account
		Other	Net deposits of banks and mortgage-credit institutes
	Central-government debt		Equity

gage-credit institutes on Danmarks Nationalbank's balance sheet. Via the funding rules it is, however, ensured that normally there is no long-term impact on the net balance with Danmarks Nationalbank.

Article 101 of the EU Treaty prohibits lending by Danmarks Nationalbank to the central government. Thus, the central government's account cannot show a deficit.

Handling the central government's liquidity impact

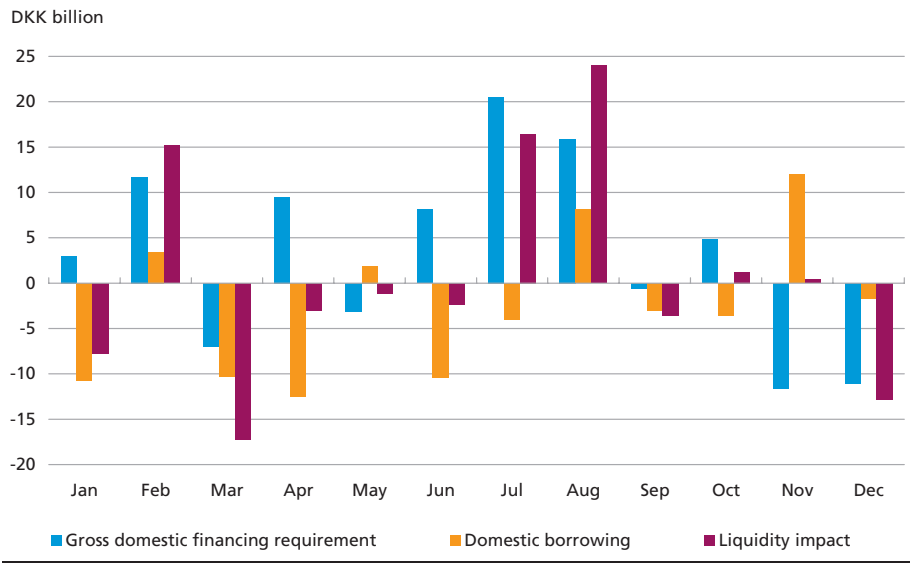
Most receipts and disbursements via the central government's account at Danmarks Nationalbank affect the liquidity of the banks and mortgage-credit institutes, cf. Chart 11.1.1. The liquidity impact is managed via Danmarks Nationalbank's monetary-policy instruments.

The forecasts of central-government payments are important to the planning of the central government's issuance and buy-back policy and to Danmarks Nationalbank's management of the short-term liquidity impact, cf. Box 11.2. Danmarks Nationalbank applies the forecast to planning market operations in cases where the banks and mortgage-credit institutes overall need to obtain or place liquidity.

Government cash management

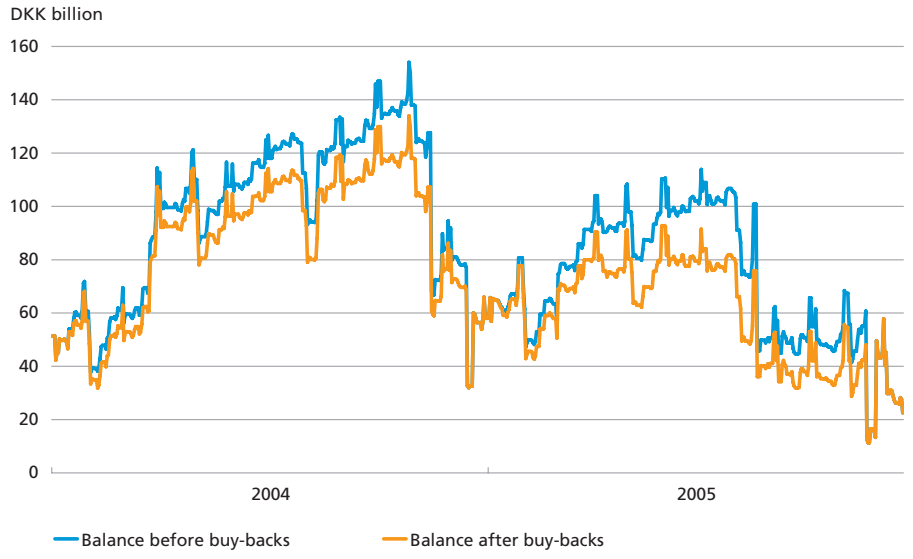
On the basis of the funding rules, a target is set for the balance of the account at the end of the year, and an adequate buffer is ensured to absorb any uncertainty regarding forecasts, shifts in payments, etc. As a

CENTRAL GOVERNMENT'S LIQUIDITY IMPACT, 2005 Chart 11.1.1



Note: Negative borrowing entails that the central government is a net borrower, and positive borrowing corresponds to net redemptions.
Source: Danmarks Nationalbank.

EFFECT ON BALANCE OF BUY-BACKS DURING THE YEAR, 2004-05 Chart 11.1.2



precautionary measure, the objective is therefore a minimum balance of DKK 10 billion on any given day. Within this framework, the buy-back and issuance policy is used to smooth the balance of the account over the year, where this is considered to be advantageous, cf. Chart 11.1.2.

Government debt management

The central government's account is a sub-portfolio of the overall government debt. In this way, cash management is an integral part of the management of the government debt.

In the cost and risk management of the government debt, the central government's account is subject to coordinated management with the government debt via a duration band for the overall government debt. The central government's account is included in the duration calculation with a duration of 0 years. In terms of costs, it is less important whether e.g. an increase in the balance of the central government's account remains on the account or is used to buy back government securities, provided that the duration remains unchanged. This is because the reduction of the interest payments on buying back government securities, rather than receiving interest at the discount rate, will essentially be set off by the profit on the higher swap volume that is required. In general, the interest costs on the overall debt will by and large be unaffected by movements in the distribution of the debt on assets and liabilities, provided that the duration is kept constant.

Government Debt Management's issuance and buy-back strategy is determined in accordance with the funding rules, which makes central-

METHODS FOR HANDLING A NEGATIVE BALANCE FORECAST Box 11.3

Government Debt Management has access to various instruments to ensure an adequate balance on the central government's account.

- Timing of issuance and buy-back. The overall issuance volume is determined on the basis of the financing requirement for the year, but the time of issuance can be used to "move" the balance of the central government's account within the year. This also applies to the Treasury bill programme, where a change in the issuance pattern will move the balance within the year without affecting the target for the net financing contribution for the Treasury bill programme for the overall year.
- Commercial Paper (CP) are short-term securities that can be issued quickly via banks with which a CP programme has been established. The central government has two CP programmes directed at respectively the European and US markets. The programmes were last used in November 2005 to ensure adequate funds on the central government's account, cf. Chapter 3.
- Timing of government payments. For example, receipts and disbursements can be coordinated with the interest payment and maturity dates of government securities.

government cash management an integral part of the strategy. Moreover, the issuance and buy-back policy is used to manage the central government's account in the event that a negative balance on the central government's account is forecast if no further measures are taken, cf. Box 11.3.

CASH MANAGEMENT IN AN INTERNATIONAL PERSPECTIVE 11.2

In most other countries, cash management is also an integral part of government debt management. The key difference in various countries' approaches to cash management lies in the access to a remunerated account at the central bank.

In a number of countries, the central government does not have access to a remunerated account at the central bank. This means that the central government's deposit with the central bank is minimised and the rest of the central government's liquid funds are placed directly in the money market. As a consequence, the country's ministry of finance or government debt management office becomes an active player in the money market and assumes a certain credit risk. The investment strategy is designed to achieve the highest possible return, with due consideration of the market and credit risk. Many euro-area member states place the central government's liquid funds directly in the money market. Within the euro area, each member state is typically a small player in a large market, and thereby a price taker.

In the Danish cash management model, with access to a remunerated account at Danmarks Nationalbank, the central government has dele-

gated its active money-market role to Danmarks Nationalbank. In Denmark the central government would in all probability not be a price taker if it pursued an active investment strategy in the Danish money market. This would mean that both the central government and the central bank would be able to influence the short-term market rates. In view of the fixed-exchange-rate policy, and in accordance with international best practice, monetary policy should not be conducted via government finances. Clear separation of the central government and Danmarks Nationalbank at the very short end of the money market is therefore important.

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 MTSDenmark's website, www.mtsdenmark.com.

Enquiries concerning government borrowing and debt should be directed to Danmarks Nationalbank, Government Debt Management Office, 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	Frequency
Danish Government Debt Management Strategy, June and December	• Borrowing strategy • On-the-run issues • Securities eligible for buy-back • Duration band	• CSE • www.nationalbanken.dk	Semi-annually
Opening of new securities	• Coupon • Maturity date • Opening date	• CSE • DN News, screens 55-57 • Reuters DKNA-55-57 • www.nationalbanken.dk	Irregularly
Treasury bill auction	• Convening of auction • Result of auction	• CSE • DN News, screens 52 and 53 • Reuters, DKNA-52 and 53 • www.nationalbanken.dk (result of auction)	Monthly
Daily buy-backs and sales	• Daily sales by securities • Daily buy-backs by securities	• DN News, screens 51 and 58 • Reuters, pages DKNA-51 and DKNA-58 • www.nationalbanken.dk	Daily
Monthly buy-backs and sales, 1st banking day	• Monthly sales by securities • Monthly buy-backs by securities • Monthly currency swaps	• www.nationalbanken.dk	Monthly
Government funds' holding of government securities, 1st banking day	• Government funds' holding of government securities as of end of previous month	• www.nationalbanken.dk	Monthly
Daily domestic borrowing requirement	• Domestic borrowing requirement based on *Budget Review* • Subsequent buy-backs • Subsequent currency swaps (monthly) • Total domestic borrowing requirement	• DN News, screen 54 • Reuters, page DKNA-54 • www.nationalbanken.dk	Daily
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	• Past year's development • Detailed statement of debt and transactions • Report on issues of relevance to debt management	• Publication from Danmarks Nationalbank • www.nationalbanken.dk	Annually
Budget Review, normally in May, August and December	• Gross financing requirement, current and coming years	• Publication from the Ministry of Finance • www.fm.dk (website of the Ministry of Finance)	Normally 3 times a year
Trading in Danish government securities on MTSDenmark	• Information about prices and turnover in Danish government securities traded on MTSDenmark	• www.mtsdenmark.com	Ongoing

Note: *Budget Review* is published by the Ministry of Finance. CSE denotes the Copenhagen Stock Exchange. CSE's website is at www.cse.dk.

Principles for Management of 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). If a counterparty is rated by three rating agencies, the minimum requirement is based on the lowest rating. 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 net worth, cf. Table 1.

Compilation of 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.

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 net worth	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 a 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.

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 collateral agreements (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.

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

- 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 needed. 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, 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 Pension Fund's Securities Lending Facilities

Primary Dealers in Danish government securities will have the right to use the securities lending facilities to which the participants are eligible. The purpose of the securities lending facilities is to supplement and strengthen market efficiency. Considering the functioning of the repo-market, Primary Dealers in Danish government securities shall make every effort to support a well-functioning market, and to prevent occurrence of intended market failures. Information on the terms for Central Government's and the Social Pension Fund's Securities Lending Facilities are given below.

The central government's securities lending facility

1. The lending facility applies to on-the-run government securities and government securities with benchmark status.
2. The specific terms for lending in the individual government securities are published in the central government's announcements concerning on-the-run issues.
3. For government bonds, the lending facility is available for Primary Dealers in government bonds.
4. For T-bills the lending facility is available for the Primary Dealers in Danish T-bills.
5. In normal circumstances, the maximum lending in each bond series is DKK 4 billion and the maximum lending in all T-bills is DKK 10 billion. However, these limits may be raised in the event of abnormal price formation on the market for securities lending.
6. The fee is 0.2 per cent per year for securities lending of government bonds. The fee is 0.15 per cent per year for securities lending of T-bills.
7. 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.
8. The securities may be borrowed for a period from 1 to 5 trading days.
9. Transactions can be made during the day between 9.00 a.m. and 3.30 p.m., but should, as far as possible, be concluded before 2.00 p.m. (CET).

10. 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.
11. 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.
12. A Haircut of 2.5 per cent is applied to each buy/sell-back transaction. Hence, the market price of the security lend by the central government is raised by 2.5 per cent and the market price of the security provided as collateral by the borrower is lowered by 2.5 per cent.
13. Settlement takes place on the following trading day. Transactions are settled as trading transactions in the VP system.
14. In case settlement only succeeds for one of the buy/sell-back transaction, be that the lending transaction or the collateral transaction as it may, borrowers are obliged to ensure immediate settlement of the failed transaction.
15. 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.
16. 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 in government securities at least one week prior to implementation of any change to the terms of the lending facility.
17. Any enquiries concerning securities lending transactions should be made to Danmarks Nationalbank, Market Operations, on tel. +45 3363 6747 or +45 3363 6736.

The Social Pension Fund's securities lending facility

1. Lending is in all government bonds with more than 13 months remaining maturity of the type bullet loans in the Social Pension Fund's portfolio.
2. The lending facility is available to Primary Dealers in government bonds.
3. The fee is 0.2 per cent per year.
4. 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.

5. The securities may be borrowed for a period from 1 to 5 trading days.
6. Transactions can be made during the day between 9.00 a.m. and 3.30 p.m., but as far as possible should be concluded before 2.00 p.m. (CET).
7. 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.
8. 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.
9. A Haircut of 2.5 per cent is applied to each buy/sell-back transaction. Hence, the market price of the security lend by the central government is raised by 2.5 per cent and the market price of the security provided as collateral by the borrower is lowered by 2.5 per cent.
10. Settlement takes place on the following trading day. Transactions are settled as trading transactions in the VP system.
11. In case settlement only succeeds for one of the buy/sell-back transaction, be that the lending transaction or the collateral transaction as it may, borrowers are obliged to ensure immediate settlement of the failed transaction.
12. 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.
13. 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 in government bonds at least one week prior to the implementation of any change to the terms of the Social Pension Fund's Securities Lending Facility.
14. Any enquiries concerning securities lending transactions should be made to Danmarks Nationalbank, Market Operations, on tel. +45 3363 6747 or +45 3363 6736.

Appendix of Tables

CENTRAL-GOVERNMENT DEBT, YEAR-END 1995-2005 Table 1

DKK million	1995	1996	1997
A. Debt			
Domestic debt denominated in DKK[1]			
- Fixed-rate bonds	466,608	516,812	556,874
- Floating-rate bonds	20,722	16,760	9,848
- Lottery bonds	1,200	1,200	1,200
- Treasury notes	102,697	84,499	49,140
- Treasury bills	58,385	51,234	50,001
- Currency swaps from DKK to EUR	-	-	-
- Currency swaps from DKK to USD			
- Government securities held by the central government	-	-	-
- Interest rate swaps, notional amount			
from fixed rate	-	-	-
to floating rate	-	-	-
Domestic debt denominated in DKK	649,612	670,505	667,063
Domestic debt denominated in EUR[2 3]			
- Fixed-rate bonds	9,244	9,597	6,634
- Government securities held by the central government	-1,138	-2,372	-
Domestic debt, total	657,719	677,730	673,697
Foreign debt, total			
- in USD	6,425	4,562	1,514
- in CHF	13,836	6,179	3,974
- in JPY	9,329	2,396	1,047
- in EUR[3]	69,975	88,826	90,661
- in other currencies	11,599	6,519	6,418
- Government securities held by the central goverment[4]	-5,516	-6,986	-
Foreign debt, total	105,647	101,495	103,613
Domestic and foreign debt, total	763,366	779,225	777,310
B. Government deposits with the central bank[5]	-33,677	-31,052	-29,024
C. The Social Pension Fund, The Financing Fund, and The High-Technology Foundation			
- Government securities	-68,889	-83,435	-92,453
- Other securities	-82,517	-65,336	-54,368
The three funds, nominal value, total[6]	-151,406	-148,772	-146,821
Central-government debt, total (A+B+C)	578,283	599,401	601,465
Central-government debt, per cent of GDP	56.7	56.0	53.4

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.

CENTRAL-GOVERNMENT DEBT, YEAR-END 1995-2005 Table 1

1998	1999	2000	2001	2002	2003	2004	2005
550,989	537,289	506,992	494,875	497,938	480,874	480,590	440,351
4,346	-	-	-	-	-		
1,000	900	900	900	400	400	400	200
-	-	-	-	-	-	-	
58,830	74,040	81,257	70,788	79,371	78,532	71,690	33,980
41,255	36,350	36,846	49,224	63,404	67,347	68,602	60,092
-	-	-	-4,800	-16,200	-16,200	-16,200	-15,456
						-524	-2,688
-	-	-2,000	-	-	-	-	-
						-	-
-500	-7,950	-20,950	-27,400	-37,300	-43,600	-59,700	-61,500
500	7,950	20,950	27,400	37,300	43,600	59,700	61,500
656,420	648,579	623,995	610,987	624,913	610,953	604,558	516,479
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
656,420	648,579	623,995	610,987	624,913	610,953	604,558	516,479
1,336	1,187	-	-	-	-	518	2,810
1,094	3,616	3,822	-	-	-	-	-
562	2,453	1,672	-	-	-	-	-
84,982	82,386	79,287	83,753	83,689	83,861	83,370	87,833
365	383	428	42	42	42	40	38
-	-	-	-	-	-	-	-
88,338	90,025	85,209	83,795	83,730	83,903	83,929	90,681
744,758	738,604	709,204	694,782	708,644	694,856	688,487	607,160
-30,400	-35,231	-31,332	-39,621	-45,952	-40,451	-56,768	-53,475
-100,135	-105,432	-106,312	-109,474	-113,132	-118,138	-120,799	-124,635
-43,468	-36,207	-33,244	-31,621	-28,230	-20,576	-16,065	-11,284
-143,603	-141,640	-139,556	-141,095	-141,362	-138,714	-136,864	-135,919
570,755	561,733	538,316	514,066	521,329	515,691	494,855	417,766
49.1	46.3	41.6	38.5	38.0	36.6	33.7	27.1

[4] Recorded at acquisition price. From 1993 exchange-rate-adjusted.

[5] For 2005, the central government's account is compiled in accordance with the monthly balance sheet of Danmarks Nationalbank.

[6] Index-linked bonds are compiled at indexed value.

SERVICE ON CENTRAL-GOVERNMENT DOMESTIC DEBT[1], END-2005 Table 2.1

DKK billion	Interest	Redemptions	Total
2006	23.2	56.9	80.2
2007	20.1	45.5	65.6
2008	17.0	45.4	62.5
2009	15.2	60.3	75.5
2010	11.6	27.9	39.5
2011	11.0	60.3	71.3
2012	7.7	-0.2	7.5
2013	7.7	79.1	86.8
2014	3.8	-0.2	3.6
2015	4.0	56.7	60.6
2016	1.7	-0.2	1.5
2017	1.7	-0.1	1.6
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	137.0	456.4	593.4

[1] Excluding Treasury bills. Including net interest payments on domestic interest-rate swaps. Krone payments to and from the central government in currency swaps are included in the redemptions.

SERVICE ON CENTRAL-GOVERNMENT FOREIGN DEBT[1], END-2005 Table 2.2

DKK billion	Interest	Redemptions	Total
2006	1.7	12.2	14.0
2007	1.3	19.0	20.3
2008	0.8	22.6	23.3
2009	-0.0	21.6	21.6
2010	-0.6	13.7	13.0
2011	-1.0	0.2	-0.8
2012	-1.1	0.2	-0.9
2013	-0.2	0.2	0.0
2014	-0.1	0.2	0.2
2015	-0.2	0.2	0.1
2016	0.0	0.2	0.2
2017	0.0	0.2	0.2
Total	0.6	90.7	91.2

[1] Including net interest payment on swaps. Payments in foreign currency to and from the central government in currency swaps are included in the redemptions.

THE CENTRAL GOVERNMENT'S CURRENT, INVESTMENT AND LENDING BALANCE, NET CASH BALANCE AND GROSS DEFICIT, 1995-2004 Table 3

DKK billion	1995	1996	1997
Current, investment and lending budget	-31.3	-21.5	7.6
Net bond purchases[1]	-11.5	-4.4	7.4
Re-lending of government loans	-1.6	-1.4	-0.8
Disturbed capital losses on issue and due interest[2]	5.7	7.4	5.1
Other capital items[3]	0.1	0.4	-6.6
Net cash balance	-38.5	-19.5	12.7
Redemptions on domestic government debt	104.5	76.7	81.4
Redemptions on foreign government debt	28.5	30.8	31.4
Gross deficit	-171.5	-126.9	-100.1
Gross domestic financing requirement	138.8	94.7	73.8
Sale of government securities, market value[4]	137.2	96.0	73.0

Note: Refer to Chapter 3 for 2005.
Source: Central-government accounts.
[1] As from 1998, net bond purchases by the Social Pension Fund are no longer included in the net cash balance, but are instead included in the redemptions on the domestic government debt.
[2] Including capital losses on buy-back.
[3] Includes e.g. movements in the central government's holdings, cf. *Budget* Review from the Ministry of Finance.
[4] Includes net sales of Treasury bills.

THE CENTRAL GOVERNMENT'S CURRENT, INVESTMENT AND LENDING BALANCE, NET CASH BALANCE AND GROSS DEFICIT, 1995-2004 Table 3

1998	1999	2000	2001	2002	2003	2004
31.4	9.1	30.7	24.0	25.8	12.4	27.7
-	-	-	-	-	-	-
0.3	-1.6	-2.8	-2.4	-8.9	-0.8	-5.4
2.1	3.2	1.4	0.4	-0.1	-0.7	0.5
0.1	0.2	-2.3	0.9	-20.0	-4.1	0.9
34.0	10.9	27.0	22.9	-3.2	6.9	23.6
79.0	75.9	91.3	101.2	112.4	106.3	101.7
37.4	20.0	15.7	17.8	22.5	17.1	16.1
-82.5	-85.0	-80.0	-96.2	-138.1	-116.6	-94.1
64.4	67.9	62.3	81.1	115.5	99.7	75.5
68.0	68.8	65.7	87.7	121.9	94.1	92.6

DOMESTIC CENTRAL-GOVERNMENT SECURITIES ISSUED IN 2005 Table 4.1

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Issued in 2005, DKK million
Government bonds, fixed interest rate				
424	4	4 pct. stående lån 2008 22 Jan 2002-	15 Aug 2008	3,180
490	4	4 pct. stående lån 2010 20 Apr 2004-	15 Nov 2010	12,280
487	4	4 pct. stående lån 2015 12 Feb 2004-	15 Nov 2015	19,330
485	3	3 pct. stående lån 2006 13 Jan 2004-	15 Nov 2006	3,660
Treasury bills				
492	0	Skatkammerbevis 2005 II 3 May 2004-1 Feb 2005	2 May 2005	2,101
505	0	Skatkammerbevis 2005 III 2 Aug 2004-2 May 2005	1 Aug 2005	3,971
529	0	Skatkammerbevis 2005 IV 1 Nov 2004-1 Aug 2005	1 Nov 2005	8,875
546	0	Skatkammerbevis 2006 I 1 Feb 2005-1 Nov 2005	1 Feb 2006	23,377
547	0	Skatkammerbevis 2006 II 2 May 2005-1 Feb 2006	1 May 2006	15,615
548	0	Skatkammerbevis 2006 III 1 Aug 2005-	1 Aug 2006	14,340
549	0	Skatkammerbevis 2006 IV 1 Nov 2005-	1 Nov 2006	6,760

FOREIGN CENTRAL-GOVERNMENT SECURITIES ISSUED IN 2005 Table 4.2

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Issued in 2005, DKK million
Euro loan				
1018	3.125	Obligationslån EUR 1.800 mil.EUR 2 Mar 2005	15 Oct 2010	13,335.9
US Commercial Paper				
244-12	0	USCP 25 mil.USD 17 Oct 2005	31 Oct 2005	155.3
244-14	0	USCP 50 mil.USD 24 Oct 2005	23 Nov 2005	309.6
244-16	0	USCP 25 mil.USD 1 Nov 2005	29 Nov 2005	154.7
244-18	0	USCP 75 mil.USD 1 Nov 2005	30 Nov 2005	464.6
244-20	0	USCP 170 mil.USD 1 Nov 2005	30 Nov 2005	1,053.1
244-22	0	USCP 100 mil.USD 1 Nov 2005	30 Nov 2005	619.5
244-24	0	USCP 20 mil.USD 2 Nov 2005	30 Nov 2005	124.1
244-26	0	USCP 102,7 mil.USD 4 Nov 2005	29 Nov 2005	640.3
244-28	0	USCP 300 mil.USD 8 Nov 2005	22 Nov 2005	1,890.8
244-30	0	USCP 100 mil.USD 7 Nov 2005	22 Nov 2005	630.2
244-32	0	USCP 100 mil.USD 7 Nov 2005	21 Nov 2005	630.3
244-34	0	USCP 100 mil.USD 7 Nov 2005	30 Nov 2005	629.6
244-36	0	USCP 100 mil.USD 7 Nov 2005	28 Nov 2005	629.8
244-38	0	USCP 200 mil.USD 7 Nov 2005	22 Nov 2005	1,260.4
244-40	0	USCP 75 mil.USD 8 Nov 2005	22 Nov 2005	476.0
244-42	0	USCP 50 mil.USD 9 Nov 2005	22 Nov 2005	317.4
244-44	0	USCP 10 mil.USD 8 Nov 2005	21 Nov 2005	63.5
244-46	0	USCP 150 mil.USD 8 Nov 2005	22 Nov 2005	952.0
244-48	0	USCP 25 mil.USD 8 Nov 2005	28 Nov 2005	158.6
244-50	0	USCP 75 mil.USD 8 Nov 2005	29 Nov 2005	475.6
244-52	0	USCP 75 mil.USD 8 Nov 2005	21 Nov 2005	476.0

FOREIGN GOVERNMENT SECURITIES ISSUED IN 2005 Table 4.2

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Issued in 2005, DKK million
US Commercial Paper – continued				
244-54	0	USCP 75 mil.USD 8 Nov 2005	22 Nov 2005	476.0
EURO Commercial Paper				
298-26	0	ECP 100 mil.USD 17 Oct 2005	31 Oct 2005	622.0
298-28	0	ECP 30 mil.USD 25 Oct 2005	25 Nov 2005	185.7
298-30	0	ECP 100 mil.EUR 25 Oct 2005	25 Nov 2005	744.8
298-32	0	ECP 20 mil.USD 1 Nov 2005	30 Nov 2005	122.5
298-34	0	ECP 50 mil.USD 1 Nov 2005	30 Nov 2005	306.4
298-36	0	ECP 400 mil.USD 4 Nov 2005	30 Nov 2005	2,482.3
298-38	0	ECP 20 mil.USD 7 Nov 2005	30 Nov 2005	123.7
298-40	0	ECP 20 mil.USD 9 Nov 2005	30 Nov 2005	149.1
298-42	0	ECP 75 mil.USD 9 Nov 2005	30 Nov 2005	472.3
298-44	0	ECP 20 mil.USD 10 Nov 2005	23 Nov 2005	126.9

CENTRAL-GOVERNMENT INTEREST-RATE SWAPS, TRANSACTIONS IN 2005 Table 5

Loan no.	Start date[1]	Termination date[1]	Amount in DKK million
Domestic interest-rate swaps			
539	12-01-05	12-01-15	300
540	14-01-05	14-01-15	200
541	18-01-05	19-01-15	300
542	20-01-05	20-01-15	200
543	24-01-05	24-01-15	200
544	26-01-05	26-01-15	300
545	27-01-05	27-01-15	300
Total domestic interest-rate swaps			1,800
Foreign interest-rate swaps			
1016	16-02-05	16-02-15	744
1017	23-02-05	23-02-15	744
1019	24-03-05	24-03-10	931
1020	29-03-05	29-03-10	372
1021	22-04-05	22-04-15	745
1022	06-05-05	06-05-15	372
1023	23-05-05	23-05-15	372
1024	25-05-05	25-05-15	372
1025	10-06-05	10-06-15	744
1026	20-06-05	20-06-15	744
1027	30-06-05	30-06-15	745
1028	08-07-05	08-07-15	745
1029	18-07-05	18-07-15	746
1030	21-07-05	21-07-15	746
1031	08-08-05	08-08-15	746
1032	23-08-05	23-08-15	373
1033	31-08-05	31-08-15	746
1034	16-09-05	16-09-15	746
1035	22-09-05	22-09-15	746
Total foreign interest-rate swaps			12,482

Note: The Kingdom of Denmark receives fixed interest and pays 6-month Cibor on all domestic interest rate swaps entered into in 2005. The Kingdom of Denmark receives fixed interest and pays 6-month Euribor on all foreign interest-rate swaps entered into in 2005.

[1] Date format: dd-mm-yy.

CENTRAL-GOVERNMENT CURRENCY SWAPS, TRANSACTIONS IN 2005 Table 6

Loan no.	Start date[2]	Receiving			Paying			Termination date[2]	Fee in DKK million
		Currency	Million	Interest	Currency	Million	Interest		
				6-month			6-month		
10034	17-06-05	EUR	100.0	Euribor	DKK	744.4	Cibor-0.03	18-06-07	0.1
20003[1]	28-07-05	DKK	281.0	2.9496	USD	45.4	4.355	28-01-17	1.8
20004[1]	10-08-05	DKK	465.2	3.0056	USD	76.8	4.4875	10-02-17	-2.2
20005[1]	11-08-05	DKK	465.9	3.0454	USD	76.8	4.497	11-08-17	-2.3
20006[1]	20-10-05	DKK	478.5	2.9896	USD	76.8	4.66	20-10-17	1.9
20007[1]	15-12-05	DKK	519.0	3.1748	USD	81.9	4.7925	15-12-17	-7.0

[1] Currency swaps in connection with re-lending to Danish Ship Finance A/S.
[2] Date format: dd-mm-yy.

CENTRAL-GOVERNMENT FORWARD CONTRACTS IN FOREIGN-EXCHANGE WITH DANMARKS NATIONALBANK, 2005[1] Table 7

Loan no.	Start date[2]	Receiving on the termination date USD million	Paying on the termination date EUR million	Termination date[2]
1036	17-10-05	100.0	83.4	31-10-05
1037	17-10-05	25.0	20.8	31-10-05
1038	25-10-05	30.0	24.9	25-11-05
1039	24-10-05	50.0	41.6	23-11-05
1040	01-11-05	20.0	16.5	30-11-05
1041	01-11-05	50.0	41.1	30-11-05
1042	01-11-05	25.0	20.8	29-11-05
1043	01-11-05	345.0	286.9	30-11-05
1044	02-11-05	20.0	16.7	30-11-05
1045	04-11-05	400.0	333.1	30-11-05
1046	07-11-05	20.0	16.6	30-11-05
1047	04-11-05	102.7	85.9	29-11-05
1048	08-11-05	300.0	253.5	22-11-05
1049	09-11-05	75.0	63.4	30-11-05
1050	07-11-05	300.0	253.5	22-11-05
1051	07-11-05	100.0	84.5	21-11-05
1052	07-11-05	100.0	84.5	30-11-05
1053	07-11-05	100.0	84.5	28-11-05
1054	08-11-05	25.0	21.3	28-11-05
1055	08-11-05	75.0	63.8	29-11-05
1056	08-11-05	300.0	255.3	22-11-05
1057	09-11-05	50.0	42.6	22-11-05
1058	10-11-05	20.0	17.0	23-11-05
1059	08-11-05	85.0	72.3	21-11-05

[1] Forward contracts in foreign-exchange connected to Commercial Paper issues.
[2] Date format: dd-mm-yy.

CENTRAL-GOVERNMENT DOMESTIC DEBT AS OF 31 DECEMBER 2005 Table 8.1

Loan no.	Coupon, per cent	Name Issue Period[1]	Redemption date	Outstanding amount, DKK million
Government bonds, fixed interest rate				
Bullet loans				
264	7	Stående lån 2024 6 Apr 1994-31 Dec 2000	10 Nov 2024	25,001.0
269	8	Stående lån 2006 5 Dec 1994-10 Apr 1996	15 Mar 2006	25,886.0
279	7	Stående lån 2007 10 Apr 1996-30 Dec 1997	15 Nov 2007	51,159.0
291	6	Stående lån 2009 14 Jan 1998-3 May 2000	15 Nov 2009	66,146.0
358	6	Stående lån 2011 4 May 2000-18 Feb 2002	15 Nov 2011	60,501.0
424	4	Stående lån 2008 22 Jan 2002-	15 Aug 2008	47,274.0
428	5	Stående lån 2013 19 Feb 2002-11 Feb 2004	15 Nov 2013	79,325.0
487	4	Stående lån 2015 12 Feb 2004-	15 Nov 2015	56,910.0
490	4	Stående lån 2010 20 Apr 2004-	15 Nov 2010	28,040.0
Amortized loans				
14	5	S 2007 20 Oct 1953-12 Sep 1958	15 Sep 2007[2]	10.6
16	4	S 2017 29 Nov 1955-12 Sep 1958	15 Jun 2017[2]	60.3
Perpetuals				
1	3,5	Dansk Statslån 11 Dec 1886	*Perpetuals*[2]	37.1
80	5	Dansk-Islandsk Fond 1918 20 May 1919	*Perpetuals*	1.0
Government bonds, fixed interest rate, total				440,351.0

CENTRAL-GOVERNMENT DOMESTIC DEBT AS OF 31 DECEMBER 2005 Table 8.1

Loan no.	Coupon, per cent	Name Issue Period[1]	Redemption date	Outstanding amount, DKK million
Treasury notes				
Bullet loans				
485	3	Stående lån 2006 13 Jan 2004-	15 Nov 2006	33,980.0
Treasury notes, total				33,980.0
Treasury bills				
Zero-coupon loans				
486	0	Skatkammerbevis 2006 I 1 Feb 2005-1 Nov 2005	1 Feb 2006	23,377.0
492	0	Skatkammerbevis 2006 II 2 May 2005-	1 May 2006	15,615.0
505	0	Skatkammerbevis 2006 III 1 Aug 2005-	1 Aug 2006	14,340.0
529	0	Skatkammerbevis 2006 IV 1 Nov 2005-	1 Nov 2006	6,760.0
Treasury bills, total				60,092.0
Lottery bonds				
20	7	Præmieobligationslån af 1965/2010 22 Sep 1965	22 Sep 2010	100.0
21	7	Præmieobligationslån af 1969/2009 1 Oct 1969	31 Dec 2009	100.0
Lottery bonds, total				200.0
Domestic government securities, total				534,623.0
Swap from DKK to EUR				-15,455.6
Swap from DKK to USD				-2,688.2
Central-government domestic debt, total				516,479.2

[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 2005[1] Table 8.2

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Outstanding amount, DKK million[2]
DKK				
1	3	1894[3]	*Perpetual*	15.6
2	3.5	1901[3]	*Perpetual*	7.0
3	3.5	1909[3]	*Perpetual*	15.5
Total DKK				38.2
EUR				
713	float.	1996/06 FRF-loan	30 Aug 2006	568.7
-	float.	1996/06 swap to DEM		-568.7
-	float.	1996/06 swap from FRF		559.3
735	float.	1996/06 swap to DEM	30 Aug 2006	-559.3
-	6.3875	1996/06 swap from DEM (swap attached to no. 713)		559.3
772	6.065	1996/06 swap to EUR	20 Dec 2006	-126.5
-	float.	1996/06 swap from USD		114.2
790	float.	1996/06 swap to DEM	20 Dec 2006	-114.2
-	5.925	1996/06 swap from DEM (swap attached to nr. 772)		114.2
895	float.	1999/06 swap to USD	20 Dec 2006	-127.4
-	6.065	1999/06 swap from EUR (swap concerning buy-back of loan no. 772)		126.5
794	float.	1997/07 JPY-loan	29 Jan 2007	53.7
-	float.	1997/07 swap to DEM		-53.7
-	float.	1997/07 swap from JPY		52.0
799	float.	1997/07 swap to DEM	29 Jan 2007	-52.0
-	5.73	1997/07 swap from DEM (swap attached to no. 794)		52.0
835	2.63	1997/07 JPY-loan	27 Jun 2007	268.6
-	2.63	1997/07 swap to DEM		-268.6
-	float.	1997/07 swap from JPY		264.9
842	float.	1997/07 swap to DEM	27 Jun 2007	-264.9
-	5.826	1997/07 swap from DEM (swap attached to no. 835)		264.9
838	3.46	1997/07 JPY-loan (AUD interest)	20 Jun 2007	161.1
-	3.46	1997/07 swap to DEM		-161.1
-	float.	1997/07 swap from JPY (AUD Interest)		169.1
844	float.	1997/07 swap to DEM	20 Jun 2007	-169.1
-	5.6925	1997/07 swap from DEM (swap attached to no. 838)		169.1
850	float.	1997/07 JPY-loan	10 Sep 2007	107.4
-	float.	1997/07 swap to DEM		-107.4
-	float.	1997/07 swap from JPY		118.2
853	float.	1997/07 JPY-loan	9 Oct 2007	26.9
-	float.	1997/07 swap to DEM		-26.9
-	float.	1997/07 swap from JPY		28.9
855	2.02	1997/07 EIB JPY-loan	20 Oct 2007	182.6
-	2.02	1997/07 swap to DEM		-182.6
-	float.	1997/07 swap from JPY		188.0

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2005[1] Table 8.2

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Outstanding amount, DKK million[2]
EUR – continued				
862	4	1997/07 USD-loan	19 Nov 2007	189.7
-	4	1997/07 swap to DEM		-189.7
-	float.	1997/07 swap from USD		166.0
879	4.625	1998/08 EUR-loan	4 Sep 2008	3,543.7
881	6.25	1998/07 NOK-loan	15 Jan 2007	308.3
-	6.25	1998/07 swap to DEM		-308.3
-	float.	1998/07 swap from NOK		283.4
888	5	1998/07 SEK-loan	8 Oct 2007	397.3
-	5	1998/07 swap to DEM		-397.3
-	float.	1998/07 swap from SEK		389.1
890	5.12	1998/07 SEK-loan	12 Oct 2007	397.3
-	5.12	1998/07 swap to DEM		-397.3
-	float.	1998/07 swap from SEK		387.2
891	5.065	1998/06 SEK-loan	12 Oct 2006	317.8
-	5.065	1998/06 swap to DEM		-317.8
-	float.	1998/06 swap from SEK		312.4
952	5.125	2001/06 USD-loan	28 Dec 2006	6,324.1
-	5.125	2001/06 swap to EUR		-6,324.1
-	float.	2001/06 swap from USD		8,427.0
962	4.875	2002/07 EUR-loan	18 Apr 2007	11,190.8
1000	3.25	2003/08 EUR-loan	14 Nov 2008	17,159.2
1015	3.125	2004/09 EUR-loan	15 Oct 2009	15,667.1
1018	3.125	2005/10 EUR-loan	15 Oct 2010	13,428.9
EUR-loans, total				72,321.8
Foreign loans, total				72,360.0
Swaps – EUR				
10001	float.	2001/06 swap from DKK	3 Jul 2006	500.5
10002	float.	2001/06 swap from DKK	10 Aug 2006	501.0
10003	float.	2001/06 swap from DKK	15 Aug 2006	1,002.4
10004	float.	2001/08 swap from DKK	8 Oct 2008	351.2
10005	float.	2001/08 swap from DKK	15 Oct 2008	351.2
10006	float.	2001/06 swap from DKK	16 Oct 2006	301.0
10007	float.	2001/07 swap from DKK	5 Nov 2007	501.1
10008	float.	2001/08 swap from DKK	12 Nov 2008	400.6
10009	float.	2001/08 swap from DKK	19 Nov 2008	500.8
10010	float.	2001/06 swap from DKK	26 Nov 2006	400.8
10011	float.	2002/09 swap from DKK	8 Jan 2009	401.2
10012	float.	2002/09 swap from DKK	15 Jan 2009	501.6
10013	float.	2002/09 swap from DKK	28 Jan 2009	502.1
10014	float.	2002/07 swap from DKK	28 Jan 2007	502.1
10015	float.	2002/09 swap from DKK	7 Feb 2009	502.2
10016	float.	2002/09 swap from DKK	19 Mar 2009	502.0
10017	float.	2002/09 swap from DKK	19 Mar 2009	301.2
10018	float.	2002/09 swap from DKK	18 Mar 2009	501.9
10019	float.	2002/09 swap from DKK	18 Mar 2009	501.9
10020	float.	2002/09 swap from DKK	20 Jun 2009	501.7
10021	float.	2002/09 swap from DKK	24 Jun 2009	501.9
10022	float.	2002/09 swap from DKK	2 Jul 2009	1,004.3
10023	float.	2002/07 swap from DKK	19 Sep 2007	502.2

CENTRAL-GOVERNMENT FOREIGN DEBT AS OF 31 DECEMBER 2005[1] Table 8.2

Loan no.	Coupon, per cent	Name Issue Period	Redemption date	Outstanding amount, DKK million[2]
Swaps – EUR – continued				
10024	float.	2002/07 swap from DKK	25 Sep 2007	502.1
10025	float.	2002/07 swap from DKK	30 Sep 2007	502.2
10026	float.	2002/07 swap from DKK	4 Oct 2007	502.2
10027	float.	2002/07 swap from DKK	16 Oct 2007	502.1
10028	float.	2002/07 swap from DKK	29 Oct 2007	501.9
10029	float.	2002/07 swap from DKK	31 Oct 2007	502.0
10030	float.	2002/07 swap from DKK	8 Nov 2007	501.9
10031	float.	2002/07 swap from DKK	20 Nov 2007	401.8
10032	float.	2002/07 swap from DKK	26 Nov 2007	401.8
10033	float.	2002/07 swap from DKK	3 Dec 2007	401.9
10034	float.	2005/07 swap to DKK	18 Jun 2007	-746.1
EUR, total				15,510.8
Swaps – USD				
20001	4.164	2004/16 swap from DKK	30 Jun 2016	273.5
20002	4.164	2004/16 swap from DKK	30 Jun 2016	273.8
20003	4.355	2005/17 swap from DKK	28 Jan 2017	287.4
20004	4.4875	2005/17 swap from DKK	10 Feb 2017	485.4
20005	4.497	2005/17 swap from DKK	11 Aug 2017	485.9
20006	4.66	2005/17 swap from DKK	20 Oct 2017	485.9
20007	4.7925	2005/17 swap from DKK	15 Dec 2017	518.2
USD, total				2,810.3
Foreign debt, total				90,681.0

[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.

[2] The outstanding amount as of 31 December 2005 is calculated on the basis of the following exchange rates as of 30 December 2005 expressed as the exchange rate per 100 units: EUR = 746.05, JPY = 5.3711, NOK = 93.43, SEK = 79.46, USD = 632.41. The outstanding amount as of 31 December 2005 in the former national currencies in the euro zone is converted into DKK by use of the irrevocable fixed exchange rates vis-à-vis EUR: DEM = 1.95583, FRF = 6.55957

[3] Multi-currency loan. The creditor can choose which currency to make payments in, however, at a fixed rate of exchange. Redeemable by the Kingdom of Denmark at 3 months' notice.

CENTRAL-GOVERNMENT INTEREST-RATE SWAPS AS OF 31 DECEMBER 2005 Table 9

Termination year	Krone interest-rate swaps	Euro interest-rate swaps	
	Notional amount in DKK million	Notional amount in EUR million	Notional amount in DKK million[1]
2007	9,700	700	5,222
2008	800	50	373
2009	12,550	0	0
2010	14,600	175	1,306
2011	9,150	150	1,119
2012	0	4,235	31,595
2013	4,400	810	6,043
2014	8,500	0	0
2015	1,800	1,500	11,191
Interest rate swaps, total	61,500	7,620	56,849

Note: The Kingdom of Denmark receives fixed interest and pays 6-month Cibor on all domestic interest-rate swaps. The Kingdom of Denmark receives fixed interest and pays 6-month Euribor on all foreign interest-rate swaps.

[1] Converted to DKK on the basis of the following exchange rate of 30 December 2005: EUR = 746.05.

KINGDOM OF DENMARK'S RATING IN DOMESTIC CURRENCY — Table 10.1

	Moody's	Standard & Poor's
1986, Jul	Aaa	
1992, Jul		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 10.2

	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 10.1 for ranking of the rating categories.

RATING OF SELECTED COUNTRIES' CENTRAL-GOVERNMENT DEBT Table 11

	Moody's		Standard & Poor's	
	Domestic	Foreign	Domestic	Foreign
Australia	Aaa	Aaa	AAA	AAA
Belgium	Aa1	Aa1	AA+	AA+
Canada	Aaa	Aaa	AAA	AAA
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	Aaa	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	AAA	AAA
UK	Aaa	Aaa	AAA	AAA
Sweden	Aaa	Aaa	AAA	AAA
South Africa	A2	Baa1	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 2006. See the note in Table 10.1 for ranking of the rating categories.
Source: Moody's Investors Service and Standard & Poor's.

Glossary

This glossary presents explanations of a number of key terms and concepts in the area of government 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.

Annuity loan
Loan for which service payments (interest and redemptions) are constant throughout the lifetime of the loan.

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. An eligible group of market participants may submit 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 intends 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.

Basis points
1 basis point is 0.01 percentage point. This is applied especially to *yield 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 bonds are determined and published by Government Debt Management after discussion in the *Primary Dealer* Committee.

Bid/ask price
The bid/ask price is the price from the perspective of the *market maker*. The difference between the ask and bid price is the bid-ask spread.

Borrowing requirement
The part of the *gross financing requirement* that is covered by *issuance* of government securities. Both domestic and foreign borrowing requirements are applied.

Bullet loan
Loan on which only interest is paid during the term of the loan. The loan is repaid in full on the maturity date. Danish government bonds and Treasury notes are bullet loans.

Buy-back issues
The government securities which the central government can buy back before maturity. Buy-backs are used to manage *interest-rate risk*, smooth the central government's redemption profile and to maintain liquid on-the-run issues.

Callable bond
Bond that can be redeemed before maturity by the borrower 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.*

Cibor (Copenhagen InterBank Offered Rate)
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 calculated on the basis of rates offered by a number of individual banks (Cibor quoters). Cibor is fixed for 8 different maturities: 1, 2, 3, 4, 5, 6, 9 and 12 months.

Cibor is the reference interest rate for a large number of financial contracts. See also *Euribor* and *Libor*.

Clearing
Compilation of each participant's purchase and sale resulting in the net position of each participant. See also *Settlement*.

Clearstream
Securities *clearing/settlement* and custody institution.

Commercial Paper (CP)
Short-term debt instruments (*zero-coupon paper*) with maturities of up to one year. CP are mainly issued to cover a short-term financing requirement. The central government has a CP programme in the American and European markets.

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 one of the parties default on its payment obligations vis-à-vis the counterparty or a third party.

Distributed capital losses on issuance
Capital losses/gains on issuance are distributed linearly in the government accounts over the maturity of the loan.

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 pay-

ments) in one currency and a zero-coupon loan (redemptions) in the other currency. See also *Reverse dual currency bond.*

Duration
The average fixed-interest period for a financial *portfolio*. Long duration of the government debt implies a low *interest-rate 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.

Electronic trading
Placement of orders (bid or ask) via electronic facilities to a trading system in which orders are matched and executed automatically.

Euribor (Euro InterBank Offered Rate)
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 a reference interest rate in a large number of financial contracts, e.g. *swaps*. See also *Cibor* and *Libor*.

Euroclear
Securities *clearing/settlement* and custody institution.

EuroMTS
Electronic trading platform for the most liquid *benchmark bonds* denominated in euro. Fully owned by MTS S.p.A. See also *electronic trading*.

Exchange-rate risk
The exchange-rate risk on the government debt is the risk of an increase in the value of the debt due to exchange-rate movements.

Final exposure
Denotes the currency or interest-rate exposure on a loan compiled after *swaps*.

Financial derivative
An instrument of which the value is derived from the price of an underlying asset, e.g. securities, goods or currency. *Options* and *swaps* are examples of financial derivatives.

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 issued with floating interest rate.

Foreign-exchange reserve
The purpose of the foreign-exchange reserve is first and foremost to support Denmark's fixed-exchange-rate policy vis-à-vis the euro area. The foreign-exchange reserve is held at Danmarks Nationalbank and mainly placed in foreign bonds and as foreign bank deposits.

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*).

Forward price
The price fixed at the time of agreement in a *forward contract* on future delivery of goods, securities or currency.

Funding rules
Framework for the distribution of the central government's domestic and foreign borrowing. Under the domestic funding rules, the domestic borrowing in kroner in principle covers the central government's *gross domestic financing requirement*. The foreign funding rule implies that the foreign borrowing corresponds to the redemptions on the foreign debt raised in order to maintain the foreign-exchange reserve.

Government debt
Comprises liabilities in the form of domestic and foreign debt as well as assets in the Social Pension Fund, the High-Technology Foundation, the Financing Fund for increased distributions from the Danish National Research Foundation, and the balance of the central government's account.

Government-guaranteed company
Government-owned company that can raise government-guaranteed loans.

Gross financing requirement
The gross domestic financing requirement is compiled as the *net domestic financing requirement* with addition of redemptions on the domestic debt including *buy-backs*, the net bond purchases of three government funds, and krone payments from the central government in currency swaps.

The gross foreign financing requirement is compiled as the net foreign financing requirement with addition of repayments on the foreign debt including buy-backs and foreign-exchange payments from the central government in currency swaps. See also *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.

ICMA (International Capital Market Association)
International association of financial institutions that trade securities in the international market and e.g. work for standardisation of practice and documentation of *settlement* of trades.

ICMA was established on 1 July 2005 on the merger of the International Securities Market Association (ISMA) and the International Primary Market Association (IPMA).

Interest-rate fixing
The interest-rate fixing at a given time is the amount for which a new interest rate is to be fixed within one year. The *portfolio* at a given time affects the interest-rate fixing via the redemptions within the next 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. Analyses of the interest-rate fixing take account of the expectations of the Ministry of Finance of future budget surpluses or deficits that respectively reduce and increase the interest-rate fixing, as well as new *swaps* and *buy-backs*.

Interest-rate risk
In connection with the government debt this is the risk of higher interest costs as a consequence of the development in interest rates. See also *refinancing risk*.

In other contexts, interest-rate risk applies to the risk of capital losses as a consequence of interest-rate fluctuations.

ISDA (International Swaps and Derivatives Association)
International association of financial institutions. ISDA's objective is to work for 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
Denmark	Krone	DKK
UK	Pound sterling	GBP
Euro area	Euro	EUR
Belgium	*Franc*	*BEF*
Finland	*Markka*	*FIM*
France	*Franc*	*FRF*
Greece	*Drachma*	*GRD*
Netherlands	*Guilder*	*NLG*
Ireland	*Punt*	*IEP*
Italy	*Lira*	*ITL*
Luxembourg	*Franc*	*LUF*
Portugal	*Escudo*	*PTE*
Spain	*Peseta*	*ESP*
Germany	*Deutsche Mark*	*DEM*
Austria	*Schilling*	*ATS*
Japan	Yen	JPY
Norway	Krone	NOK
Sweden	Krona	SEK
USA	Dollar	USD

Issuance
Danish government bonds are issued on *MTSDenmark*. See also *auction* and *tap sale*.

Key on-the-run issues
Government series that are being built up and which are issued to cover the current domestic *borrowing requirement*. Key on-the-run issues are open for current *issuance*.

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. A syndicate of banks normally undertakes distribution of the bond loan, cf. also *syndicated bond issue.* Government Debt Management uses syndicated bond issues in its foreign borrowing.

Libor (London InterBank Offered Rate)
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*. See also *Cibor* and *Euribor*.

Liquidity
Liquidity expresses tradability. Liquid bonds are often characterised by a large outstanding amount, 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).

Market maker
A securities dealer that quotes current tradable *bid and ask prices* in securities.

Medium Term Note (MTN)
A bond issued in accordance with standardised loan documentation.

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 (Consolidated Act No. 1015 of 24 October 2005).

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 compiled, rounded down to the nearest whole 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 whole 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.

MTS Associated Markets (MTSAM)
Belgian company with market segments for wholesale trading in Belgian, Danish and Finnish government securities.

MTSDenmark (MTSDk)
A market segment under *MTS Associated Markets (MTSAM)* for wholesale trading in Danish government bonds. The segment uses the electronic trading system *Telematico*. Further information on trading in Danish government securities is available on www.mtsdenmark.com. See also *Electronic trading*.

Net financing requirement
The net domestic financing requirement is compiled as the deficit on the central government's current, investment and lending (CIL) account with addition of domestic *re-lending* (net of redemptions) and *portfolio* movements and accruals. The net foreign financing requirement corresponds to re-lending in foreign currency (net of redemptions).

Operational risk
The risk of economic loss as a consequence of faults in internal processes, human errors or system faults, or as a consequence of external events.

Option
A contract giving the owner (the buyer) 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 an agreed 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, option-adjusted duration is used to calculate the duration of the Social Pension Fund's *portfolio* of callable bonds.

Par yield
Par yields are adjusted for differences in the remaining maturities of the bonds and are used e.g. when comparing yields over time or across countries. Par yields are calculated on the basis of estimated zero-coupon yield curves. For instance, the par yield for a 10-year Danish government bond is the coupon rate which ensures that a synthetic *bullet loan* with a maturity of exactly 10 years has a theoretical value of 100 ("par"), calculated on the basis of the zero-coupon *yield curve* for Danish government 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.*

Portfolio
Term used for holdings of assets and/or liabilities.

Primary dealer
Primary dealers are financial institutions that by agreement with the issuer, against special rights, are obliged to provide *liquidity* 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 *issuance* of bonds. See also *Secondary market*.

Private placement
Bond or other loan offered to a small group of buyers and not normally listed. See also *Public issue.*

Public issue
Bond loan that is offered to the general public and is listed. See also *Private placement.*

Rating
Credit rating given by rating institutes such as Standard & Poor's and Moody's, cf. Tables 10 and 11 of the Appendix of Tables.

Re-financing risk
The risk that the borrower has to refinance redemptions on the debt at a time when the interest-rate level is 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 (the Ørestad Development Corporation), but also to A/S Storebælt (the Great Belt Bridge) and A/S Øresund (Øresund Landworks), etc. These loans precisely reflect an existing government paper. Coupon, interest due date and maturity date will thus be identical with an existing government paper. The price of the loan is set on the basis of the current market conditions.

In addition, Danish Ship Finance A/S has access to a re-lending facility whereby re-lending is offered as fixed-rate serial loans with a maturity of up to 12 years. Re-lending to Danish Ship Finance A/S can take place in both Danish kroner and US dollars.

Re-lending list
The range of government securities in which *re-lending* can be granted. The re-lending list is determined by Government Debt Management and

comprises all fixed-rate government bonds that are *bullet loans* in Danish kroner in maturity segments between 2 and 10 years. The central government finances re-lending via *key on-the-run issues.*

Reverse dual currency bond
Loans raised and repaid in one currency, while interest is paid in another. See also *Dual currency bond.*

Saxess
Electronic trading system for bonds and shares used on e.g. the Copenhagen Stock Exchange. See also *Electronic trading*.

Secondary market
Market for trading of bonds after they are issued in the *primary market.*

Securities lending
Securities lending is a transaction whereby the seller/borrower is paid to transfer securities to a buyer/lender. On conclusion of the agreement, the seller/borrower simultaneously commits to buy back the securities at an agreed price on expiry of the agreement. For legal/technical reasons, securities lending is defined in the contracts as sale and buy-back of securities, but in reality these are collateralised loans. The counterparty in this transaction lends against securities as collateral.

The central government and the Social Pension Fund lend government bonds to *primary dealers* in Danish government bonds.

Serial loan
A loan for which the debt is repaid in equal redemptions 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.

Settlement
Completion of trade by final settlement of agreed commitments. See also *Clearing*.

Strategic benchmarks
Guiding points for liquidity and interest-rate exposure used in the implementation of the Danish government debt strategy. For example, strategic benchmarks are set for the outstanding amount in *key on-the-run* government securities and for the *duration* of the government debt.

Structured loan
A loan on special terms, e.g. 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 a 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, *settlement* is at the market value of the swap.

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 government bonds, as well as mortgage-credit bonds, is normally via tap sale. See also *auction.*

Telematico
The dominant *electronic trading* system for wholesale trading of European *benchmark bonds*.

The Cost-at-Risk (CaR) model
Simulation model developed by Government Debt Management to quantify the risk on the exposure of the central-government debt *portfolio* to future interest-rate developments. The model simulates 2,500 scenarios for the central government's annual interest costs 10 years ahead.

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). Conditional CaR quantifies relative CaR for a given future year, conditional on known interest rates up until that year. The target is therefore not affected by a longer calculation horizon.

Value date
Settlement date, i.e. the date on which e.g. a securities deal is closed by delivery of securities against payment.

Volatility
The movements in the price of an asset, e.g. the fluctuation in a bond price.

VP Securities Services
Securities *clearing/settlement* and custody institution. VP also handles electronic *issuance* of securities and registration of ownership and rights pertaining to electronic securities.

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. A falling term structure is described as inverse.

Yield spread
The spread between the *yields to maturity* on two bonds. On calculating yield spreads, adjustment is often made for differences in the bonds' remaining terms to maturity, e.g. based on an estimated *yield* or *zero-coupon yield* curve (*par yield* spread).

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
Loan that is not subject to current interest payments, and which is redeemed on maturity. The cost of borrowing is solely a result of a *capital loss on issuance*. Treasury bills and *Commercial Paper* are zero-coupon bonds.

Zero-coupon rate
The *yield to maturity* on a *zero-coupon bond.* The zero-coupon-yield structure indicates the relation between remaining maturity and the zero-coupon rate.