



**DANMARKS  
NATIONALBANK**

**Consequences for  
the Danish bond market  
if Denmark decides  
to adopt the euro.  
Technical considerations.**

**Consequences for the Danish bond market if Denmark decides to adopt the euro. Technical considerations.**

Translation of "Konsekvenser for det danske obligationsmarked i forbindelse med Danmarks eventuelle indførelse af euroen. Tekniske overvejelser."

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## Foreword

In the summer of 1998 the Nationalbank issued a report (in Danish) entitled "Consequences of EMU for the Danish bond market and the handling of euro in the Danish payment system". The purpose of this report was to describe the consequences for the Danish capital market of the fact that 11 of the 15 EU member states commenced the third stage of EMU on 1 January 1999. The report was the result of discussions in two working groups of representatives of the financial sector. One of the working groups analysed the consequences of EMU for the Danish bond market, while the other analysed the handling of euro in the Danish payment system.

On 1 December 1999 the Ministry of Economic Affairs presented a report on the changeover to euro in the event of Danish participation. It presents an estimate of how long it will take to achieve a changeover from krone to euro, should Denmark decide to adopt the euro. This follows up on a number of questions from the Folketing (Parliament) to the Minister of Economic Affairs during spring 1999. In the light of the Ministry of Economic Affairs' work on the report on the changeover to euro in the event of Danish participation Danmarks Nationalbank established a working group to follow up on the 1998 report.

The working group discussed the consequences for the Danish bond market if Denmark joins the euro area. In particular, the working group discussed the issue of the redenomination of bonds in circulation. This report presents the deliberations and the conclusions drawn from the discussions of this topic.

The working group held four meetings with the participation of representatives of the Danish Securities Dealers Association, the Ministry of Finance, the Danish Bankers Association, the Danish Financial Supervisory Authority, the Copenhagen Stock Exchange, Danmarks Nationalbank, the Association of Danish Mortgage Banks, the Danish Securities Centre and the Ministry of Economic Affairs.



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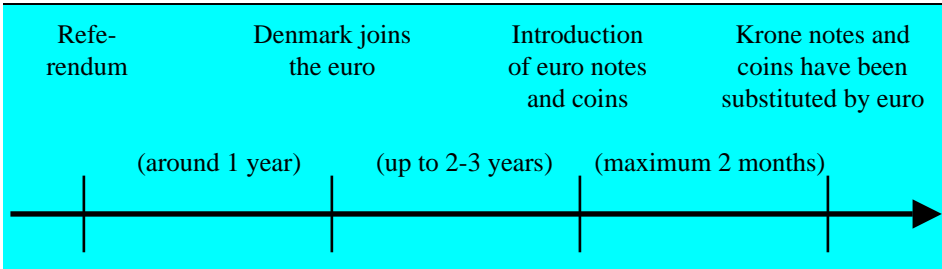


# 1 Summary

The objective of the working group was to analyse technical aspects of importance to the Danish bond market, should Denmark join the euro area. The working group did not discuss the consequences for other elements of the Danish capital market of Denmark's joining the euro area. The working group thus did not analyse the consequences of the introduction of the euro for the stock market, the market for FUTOP contracts or the markets for mortgage deeds and other unlisted products.

The evaluations and recommendations of the working group are based on the report on changeover to the euro in the event of Danish participation of the Ministry of Economic Affairs. The report was published on 1 December 1999. In accordance with the report around 1 year is allocated from a positive referendum outcome on the euro until Denmark can join the euro area. It is estimated to take a further period of up to 2-3 years from Denmark's joining the euro until euro notes and coins are circulated. Finally, the report allocates a period of between 4 weeks and 2 months from the circulation of euro notes and coins until Danish kroner are finally withdrawn from circulation and the krone ceases to be legal tender. The schedule is outlined in Chart 1 below<sup>1</sup>.

*Chart 1: Schedule*



<sup>1</sup> As also stated in the report of the Ministry of Economic Affairs it is the evaluation of the banking sector itself that it will take 1½-2 years from the date of the referendum for all banks to have made the extensive changes to IT systems which are required in order to be able to handle euro on the same scale as kroner. In addition, the banks expect to require ½-1 year after Denmark's adoption of the euro until euro notes and coins are circulated.

The exchange rates between the national currencies of the present euro area member states and the new currency, the "euro", were fixed on 31 December 1998 and the euro area came into effect from 1 January 1999. Euro notes and coins will not be introduced until 1 January 2002 after which time notes and coins in national currencies will be withdrawn from circulation.

The working group in particular discussed the issue of the redenomination of bonds in circulation. The deliberations and the conclusions drawn from these discussions are presented in this report.

Redenomination relates to several aspects in connection with the conversion of bonds from kroner to euro, should Denmark decide to adopt the euro. Based on the experience from the present euro area member states the working group discussed the technical aspects of redenomination, including the need for regulation by adoption of a special EU regulation and by adoption of a national Redenomination Act.

The redenomination process has progressed smoothly in the present euro area member states. An important factor has been that the redenomination method and the necessary legislation were decided at an early stage. One of the purposes of this report is to adequately clarify central issues regarding the possible redenomination of Danish bonds.

The working group discussed the following:

- ◆ Regulation of the redenomination process.
- ◆ Various redenomination methods.
- ◆ The volume of bonds to be redenominated.
- ◆ The timing of possible redenomination.
- ◆ Preparation of redenomination.

## **1.1 Regulation of the redenomination process**

In the present euro area member states the redenomination process is subject to an EU Council regulation based on Article 123(4) (ex Article 109l(4)) of the Amsterdam Treaty, which applies only to the euro area member states, as well as a regulation based on Article 308 (ex Article 235) of the Amsterdam Treaty, which applies to all EU member states.

According to the Article 123(4) regulation, the euro area member states may take measures to redenominate the debt instruments of the general government and to make it possible for the private sector to redenominate certain types of debt instrument. The Article 308 regulation ensures the continuation of all other contractual terms than references to national currency and thus establishes the principle of continuity of contracts.

The basis for the working group's findings is that, should Denmark join the euro area, redenomination shall be subject to the same overall legal framework as applied to the introduction of the euro by the present euro area member states. According to the working group's evaluation the following will be needed:

- ◆ Adoption of a regulation on the legal basis which takes the aforementioned factors into account.

All present euro area member states, except Luxembourg, have adopted national redenomination acts with the purpose of a smooth redenomination process. The working group finds that Denmark should also:

- ◆ Adopt supplementary national legislation on redenomination.

This Act should state the redenomination method to be used for government securities and give other public and private issuers the right to redenominate by the same method. The individual issuer takes the redenomination decision.

## **1.2 Method, scope and timing of redenomination**

Redenomination can either be based on each individual bond owner's holdings of a given bond, or on the minimum denomination of the individual bonds, i.e. the "bottom-up" method or the "top-down" method respectively. Most of the present euro area member states have opted for the "bottom-up" method, rounding the converted amounts to eurocents. Should Denmark join the euro area, the working group recommends:

- ◆ That redenomination is by the "bottom-up" method, with rounding to the nearest eurocent amount.

Redenomination of Danish krone-denominated bonds into euro should take place immediately if Denmark joins the euro area in order quickly and effectively to create a large liquid market for Danish euro-denominated bonds, for the benefit of borrowers and investors alike. The working group recommends:

- ◆ That redenomination of government securities and mortgage-credit bonds takes place at the same time, i.e. at the time of joining the euro area.

The decision on redenomination is taken by each issuer. It is the intention that all government securities – probably with the exception of lottery bonds – and all mortgage-credit bonds should be redenominated.

Around a year-end the financial sector is busy with annual closing procedures which require vast computer resources. The working group finds that IT capacity around year-end will be insufficient to also handle redenomination of the total volume of government securities and mortgage-credit bonds.

Should Denmark join the euro area around a year-end, or at any other time when the number of days that the Danish Securities Centre is closed prevents the redenomination of the total volume of government securities and mortgage-credit bonds, the working group recommends the following:

- ◆ The introduction of one or more extraordinary days of closing of the Danish Securities Centre system.

If it is not possible to redenominate the total volume of government securities and mortgage-credit bonds for example because the Danish Securities Centre cannot be closed extraordinarily, the working group recommends the following:

- ◆ Immediate redenomination of government securities at the time of adopting the euro and redenomination of the total volume of mortgage-credit bonds soon afterwards.

Other public-sector issuers may also find it appropriate to redenominate soon after joining the euro area.

Not all issuers of corporate bonds can be expected to have made their final decisions on redenomination prior to a Danish adoption of the euro, should Denmark decide to join. The working group makes the following recommendation:

- ◆ To provide for redenomination of corporate bonds within a specified period after Denmark's joining the euro area.

The Danish Securities Centre will establish the framework for the practical implementation in cooperation with the other parties in the sector.

### **1.3 Preparation of the redenomination process**

The report of the Ministry of Economic Affairs allocates around 1 year from a positive referendum outcome until Denmark can join the euro area.

During the period up to Denmark's adoption of the euro the Danish Securities Centre, the issuers and the banks have to make a number of system adjustments in preparation for redenomination. The issuers must furthermore decide on an issuing strategy, and the necessary legal basis for redenomination must be established.

## **2 What is redenomination?**

Redenomination of securities entails that the currency denomination is changed from one currency to another, in Denmark's case from krone to euro. The redenomination does not change the financial value or other terms of the relevant securities.

Redenomination requires a number of adjustments to trading and registration systems. It calls for changes in securities registers, implying adjustment of the nominal value of the securities from national currency to euro. Redenomination from national currency to euro also applies to safekeeping accounts. Furthermore, trading systems must be adjusted to accommodate trading in euro of redenominated securities.

The present 11 euro member states' bonds and other securitised debt will be considered as euro liabilities by no later than the commencement of circulation of euro notes and coins on 1 January 2002. Should public-sector or private-sector bond issuers refrain from redenominating their debt before then, any reference to national currency in the bond terms shall be interpreted as a reference to euro. The issuers are not subject to any obligation to redenominate.

Once euro notes and coins are put into circulation electronic payment of interest and instalments to investors can take place only in euro. However, for a period hereafter payment may also take place using krone notes and coins. Reports to public authorities will likewise be filed in euro, regardless of whether they relate to previously redenominated securities or not.

Any securities in the electronic registers which have not been redenominated by the end of the transitional period must be converted from the national currency to euro by the clearing centres and the account-holding credit institutions. In connection with the adoption of a national Redenomination Act it may be appropriate to set out specific provisions for the handling of securities which have not been redenominated before euro notes and coins are put into circulation.

Physical securities are not subject to re-registration. The nominal value of these securities will still be stated in national currency, which must be

read as a value in euro after the circulation of euro notes and coins. On the circulation of euro notes and coins the national currency units cease to be subdenominations of the euro, so that the currency is stated exclusively in euro<sup>2</sup>. It can thus be established that any transactions concluded after this date are concluded in euro.

This entails that if the nominal value of a physical paper is e.g. 100 national currency units, after the circulation of euro notes and coins the paper becomes a euro-denominated claim equivalent to the value in euro of 100 national currency units. Should the holder of the paper choose to sell it after the circulation of euro notes and coins has begun, the sale is based on the value in euro.

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<sup>2</sup> Disregarding that the circulation of krone notes and coins will continue for a limited period.

### 3 Redenomination on joining the euro area

In the present 11 euro area member states the general government's domestic borrowing was to be denominated in euro as from the commencement of the third stage of EMU on 1 January 1999, as set out in the conclusions of the EU Presidency at the Madrid Summit on 15-16 December 1995. Similar rules can be expected to apply to Denmark, should Denmark opt to join.

The euro area member states have chosen to redenominate the largest part of the general government's tradable debt immediately on joining the euro area. The objectives were to ensure the liquidity of the outstanding securities and to quickly establish a substantial market for euro-denominated securities. Redenomination was also a prerequisite for continued issues in open securities, cf. the requirement of public issuers to issue in euro as from the commencement of the third stage of EMU. Box 1 presents a brief description of the redenomination process in the present euro area member states.

In the working group there has been agreement that Danish bonds should be redenominated at the time of joining the euro area. A very considerable proportion of Danish government and mortgage-credit bonds are

*Box 1: The redenomination process in the present euro area member states*

The redenomination of government bonds in circulation in the euro area member states has been linked to several other adjustments to bond terms. The need for these adjustments is to some extent determined by the choice of redenomination method. The redenomination process in connection with the transition to the third stage of EMU has comprised the following elements:

- ◆ *Redenomination method.* Choice of method to convert bonds from national currency to euro.
- ◆ *Rounding.* Choice of rounding principle for the redenominated bonds.
- ◆ *Renominalisation.* Assessment of the need for renominalisation of the redenominated bonds. This means that the minimum denomination of the relevant securities is rounded to whole euro values, e.g. 10 or 100 euro.
- ◆ *Adjustment of market convention* for bonds in circulation. This relates particularly to the amendment of market conventions for calculation of accrued interest on traded bonds. See also Box 2.
- ◆ *Legislation.* Adoption of national redenomination acts.

held by foreign investors. For a number of years non-resident ownership of Danish krone-denominated government securities has been around 40 per cent. Interest in mortgage-credit bonds among non-resident investors has been rising in recent years and at the end of the 3rd quarter of 1999 constituted more than 10 per cent of the mortgage-credit bonds in circulation. Turnover of Danish bonds is subject to strong competition with the bonds of other European issuers.

It is expected that competition from other European issuers will intensify further if Denmark joins the euro. It is therefore important that the conditions on the Danish bond market reflect those on the international financial markets. The working group finds that the continuation of Danish bonds as krone-denominated securities after the fixing of the exchange rate between the Danish krone and the euro may have an adverse impact on demand from foreign investors. Redenomination will facilitate the investors' management of Danish bonds and contribute to maintaining interest from abroad in the Danish bond market.

As in a number of other countries, a key element of the central government's issuing strategy is to build up large liquid series in order to achieve a liquidity premium and reduce borrowing costs. The central government's financing requirement is fulfilled by tap issues in a small number of bond series. These series are built up gradually to a level which ensures that investors can buy and sell substantial amounts without this in itself affecting the trading price.

The working group assumes that if Denmark joins the euro area, general-government borrowing will be subject to rules similar to those prevailing in the present euro area member states. In other words: public authorities must make issues in euro should Denmark join the euro area. A continuation of issues in the central government's open series therefore requires that such series are redenominated immediately on Denmark's joining the euro area.

Other issuers than the general-government issuers may still issue krone-denominated bonds until euro notes and coins are circulated.

The mortgage-credit institutes call for the redenomination of mortgage-credit bonds immediately after Denmark has joined the euro area.

Mortgage-credit institutes emphasise that mortgage-credit bonds must continue to be attractive to foreign investors and that a large market for euro-denominated mortgage-credit bonds must be established quickly. Market liquidity is improved on the redenomination to euro, thereby increasing demand for Danish mortgage-credit bonds. This will make price formation more effective and thereby reduce funding costs, and ultimately enhance the mortgage-credit institutes' competitiveness on the loan market.

The working group also finds it important to ensure the simultaneous redenomination of the bonds held by individual mortgage-credit institutes.

## 4 Choice of redenomination method

There are various ways to redenominate bonds in circulation. To a great extent the choice of method depends on practical issues concerning securities registration and settlement in connection with trading. Apart from the technical considerations other criteria for the choice of method are the consequences for the bond holders. Additional factors are the methods chosen by and experience from the present euro area member states.

The experience from the present euro area member states shows that it is important to make a decision on the redenomination method as early as possible in order to provide a firm basis for the subsequent preparations.

### 4.1 The various methods

Overall, the following options apply<sup>3</sup> to conversion from national currency units to euro and the subsequent rounding of the resulting amounts:

#### *Conversion:*

- ◆ The "bottom-up" method – for each securities code each investor's bond holdings per safekeeping account are converted from krone to euro.
- ◆ The "top-down" method – conversion from krone to euro on the basis of the minimum denomination of the individual bonds.

#### *Rounding:*

- ◆ To the nearest euro, or possibly larger amounts, such as 100 euro.
- ◆ To the nearest eurocent.

According to the "bottom-up" method conversion from krone to euro is made on the basis of each investor's total holdings of a given bond. If the conversion from krone to euro is at the exchange rate of kr. 7.46038 per euro, equivalent to the ERM-II central rate, rounding to the nearest whole eurocent amount will result in a maximum deviation of +/- kr.

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<sup>3</sup> The methods are described in further detail in the Giovannini report, the European Commission (COM(97)337).

0.04<sup>4</sup> for each investor's holdings of a given bond. If the amount is instead rounded to a whole euro amount, the result is equivalently maximum +/- kr. 4. If the investor holds several different bond series, the amount may in principle increase by the number of different bond series in the investor's portfolio. In practice, upward and downward rounding will offset each other.

Using the "top-down" method the total outstandings in the individual bond series are broken down by the number of bonds based on their minimum denomination. Each bond is redenominated and the resulting amount in euro is rounded either to whole euro or eurocent units. If an investor for example holds bonds for kr. 100,000 with a minimum denomination of kr. 1,000, this corresponds to the investor owning 100 bonds, which are each redenominated. The total rounding of the bond holder's portfolio of the bond in question is thus 100 times maximum +/- kr. 0.04, or +/- kr. 4, depending on whether the rounding is to eurocents or whole euro amount. If the total rounding considerably reduces the bond holder's portfolio of the given bond series, it may be necessary to compensate the bond holder with either a cash amount or with bonds.

With regard to rounding of the redenominated amounts it is important that the securities registration and settlement systems can handle nominal bond values to several decimal places. The changeover to mathematical drawing of Danish mortgage-credit bonds and of the central government's serial loans with effect from 8 February 2001 requires adjustment of the systems of the Danish Securities Centre and the account-holding credit institutions to handle nominal amounts stated to two decimal places. There will then be no problems in rounding to the nearest eurocent in connection with redenomination of Danish bonds. The rules for calculation of accrued interest will be amended on the transition to mathematical drawing. The new market conventions are described in further detail in Box 2.

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<sup>4</sup> The maximum rounding is ½ eurocent, equivalent to kr. 0.04.

*Box 2: Amendment of market conventions and drawing procedure*

The Danish Securities Dealers Association, the Danish Bankers Association, Danmarks Nationalbank and the Association of Danish Mortgage Banks have decided to amend the market conventions for the calculation of accrued interest on traded bonds with effect from 8 February 2001. (Trading partners may still conclude an agreement which deviates from the conventions even after amendment of the market conventions). Amendment of the market conventions for calculation of accrued interest consists of two elements:

- ◆ The interest convention on the Danish market is amended from the day count basis 30/360 to actual/actual. This means that accrued interest is calculated on the basis of the actual number of days as from the most recent coupon date to the value date of a transaction. The new convention is thus more accurate than the previous calculation method.

The amendment of the interest-rate conventions affects only the calculation of accrued interest in connection with purchase and sale of bonds and disbursement and redemption of mortgage-credit loans. The coupon-interest calculation result is not affected by the amendments. For borrowers interest payments for entire interest periods will be calculated as before.

- ◆ The ex-coupon period is abolished. The investor holding the bond at the start of the coupon day is thus entitled to the coupon interest. The abolition of the ex-coupon period applies to bonds which go ex-coupon on 8 February 2001 or later. Bonds which go ex-coupon on 7 February 2001 or before are subject to normal completion of the ex-coupon period.

The aforementioned amendments apply solely to bond trading. The market conventions for the money market are not changed as they are already in compliance with international standards.

The drawing procedure for mortgage-credit bonds and for central-government serial loans is amended together with the conventions for collection of accrued interest.

By tradition, repayments and extraordinary redemptions by borrowers were carried back to the bond owners via a drawing procedure based on the drawing of lots. This procedure is amended to a purely mathematical model whereby drawing is based on øre/eurocent with ordinary rounding of marginal residual amounts. In the future the relative proportion of bond holdings which is drawn will thus be the same for all investors.

The amendment of the drawing procedure requires the Danish Securities Centre to be able to handle nominal bond amounts to two decimal places. This is not the case today and therefore the Danish Securities Centre's systems are currently being adapted to the new drawing procedure.

## 4.2 Experience from the present euro area member states

Virtually all of the present euro area member states have redenominated by the "bottom-up" method with rounding to eurocents, cf. Table 1. Only Austria and Italy have opted for the "top-down" redenomination method. The Netherlands and France have chosen to round off to the nearest euro. The Netherlands chose not to adjust securities settlement systems to handle decimals since this would entail excessive costs.

The primary criteria for the euro area member states' choice of redenomination method were the practical issues related to securities registration, the design of securities settlement systems, and the need for systemic adjustments among banks and other market participants. Irrespective of their choice of redenomination method, all euro area member states have redenominated government securities in circulation without problems.

*Table 1: Redenomination in the euro area member states*

Member state	Level of redenomination	Rounding of nominal values	Disbursement of remainder	Use of decimals in clearing systems after 1 January 1999
Belgium.....	Individual holdings	Eurocent	No	Yes
Finland .....	Individual holdings	Eurocent	No	Yes
France.....	Individual holdings	Euro	Yes	Yes
Netherlands ...	Individual holdings	Euro	Possible	No
Ireland .....	Individual holdings	Eurocent	No	Yes
Italy .....	Bond level	Eurocent	No	Yes
Luxembourg..	Individual holdings	Eurocent	No	Yes
Portugal.....	Individual holdings	Eurocent	No	Yes
Spain .....	Individual holdings	Eurocent	No	Yes
Germany.....	Individual holdings	Eurocent	No	Yes
Austria.....	Bond level	Eurocent	No	Yes

Source: European Commission.

### 4.3 Choice of redenomination method for Denmark

Redenomination should be by the same method for all bonds. Redenomination by several principles will be unnecessarily costly for the Danish Securities Centre and might also give rise to uncertainty among market participants.

The working group recommends the redenomination of Danish bonds by the "bottom-up" principle with rounding to the nearest whole eurocent.

The method has been used in most of the present euro area member states, including Germany. The method is well-known among international investors, who hold a considerable proportion of the Danish bonds. Furthermore, the international clearing centres such as Euroclear and CEDEL have experience of this method and can be expected to be able to handle the redenomination of Danish bonds relatively smoothly.

Secondly, the "bottom-up" method with rounding to the nearest whole eurocent gives a moderate number of roundings, and the total rounding difference for each bond series is relatively moderate. This appears from Table 2 which shows the rounding difference for five selected bond series. It appears that for the large mortgage-credit bond used in the calculation the rounding entails an additional issue of only kr. 7.08. Likewise the nominal outstanding amount in the government bond is reduced by kr. 12.91. This must be viewed in relation to a total outstanding of almost kr. 53 billion.

Table 3 presents the calculation of the change in outstanding of the government bond. As the Table also shows, the change in the individual

*Table 2: Total rounding for five selected bond series*

Bond	Outstanding volume in kr. million	Total rounding in kr.
Large liquid government bond.....	52,605.0	-12.91
Large liquid mortgage-credit bond .	41,167.3	7.08
Small mortgage-credit bond.....	40.9	0.08
Small mortgage-credit bond.....	71.1	-0.07
Older mortgage-credit bond.....	0.4	0.00

Note: + is an additional issue, - is a reduced issue.

*Table 3: Calculation of spikes on redenomination of the government bond by the "bottom-up" method with rounding to eurocents*

Nom. amount in kroner	Number of accounts	Nom. amount in euro	Nom. amount in kroner after redenomination	Spikes per safekeeping account in kr.	Spikes for all safekeeping accounts with this portfolio
1,000	48	134.48	1,000.0336	0.03	1.44
2,000	43	268.95	1,999.9929	-0.01	-0.43
3,000	37	403.43	3,000.0265	0.03	1.11
4,000	62	537.90	3,999.9858	-0.01	-0.62
5,000	84	672.38	5,000.0194	0.02	-1.68
:	:	:	:	:	:
:	:	:	:	:	:
52,605,000,000	12,557	6,758,802,765			-12.91

safekeeping account does not depend on the size of the account. As previously stated, the maximum change is  $\pm$  kr. 0.04.

The working group finds that there will be no need for exchange of payments in connection with redenomination of Danish bonds by the "bottom-up" method combined with rounding to eurocents. This corresponds to the experience from the present euro area member states which have rounded to eurocent in connection with redenomination. Only the Netherlands and France, which have both rounded to the nearest euro, have made it possible for any residual amounts to be disbursed to investors by the account-holding credit institutions. In the Netherlands the account-holding credit institutions on practical grounds have chosen to round up customers' safekeeping accounts and write down their own holdings by the same amount. According to the Dutch National Debt Office the account-holding credit institutions have not requested compensation from the State for the losses suffered in this connection. In the case of the Netherlands, these amounts have been negligible.

## 5 Legal framework for redenomination

The euro area member states' access to redenominate is subject to a Council regulation based on Article 123(4) (ex Article 109I (4)) of the Amsterdam Treaty. The regulation enables a euro area member state to take measures to redenominate general-government debt<sup>5</sup> and enables the private sector to redenominate bonds and other securitised debt instruments traded on capital and money markets. A precondition for non-government issuers' access to redenomination is that government issuers have redenominated their domestic debt in full or in part. The redenomination is subject to the conversion rate established pursuant to Article 123(5) of the Amsterdam Treaty.

This regulation concerns issues relating to the present euro area member states' adoption of the euro and was adopted unanimously by these countries. The regulation is not immediately applicable to new countries joining the euro area.

The Article 308 regulation (ex Article 235) was the first regulation on the introduction of the euro to be adopted. This regulation lays down the overall framework for the effect on existing agreements of the introduction of the euro. The regulation sets out a rule of assumption to the effect that the introduction of the euro shall not have the effect of altering any term of a contract nor give a party the right unilaterally to alter or terminate such a contract, unless otherwise specified in the contract terms. Terms such as interest, coupon dates, etc. are therefore not affected by the introduction of the euro, nor by possible redenomination. The regulation was adopted unanimously and has entered into force in all EU member states.

The basis for the working group's findings is that redenomination in connection with a Danish adoption of the euro, should Denmark decide to join, will be subject to an overall legal framework equivalent to that of the present member states' introduction of the euro.

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<sup>5</sup> The general government is defined in the ESA regulation concerning compilation of the EU member states' national accounts. In Denmark, the general government implies the central government, regional and local government and social security funds.

## 5.1 A Danish Redenomination Act

Under Article 8 of the 123(4) regulation the euro area member states may take the measures which may be necessary in order to redenominate. In other words: the regulation provides for a certain level of supplementary national regulation. Adoption of legislation concerning the redenomination process provides a clear framework for redenomination, while at the same time guaranteeing uniform treatment of investors. The working group finds that a Danish Redenomination Act should be adopted if Denmark joins the euro area.

All of the present 11 euro area member states except Luxembourg have adopted separate legislation on redenomination. The objective has been to create a clear framework for the redenomination process, including a method of redenomination of bonds for both general-government and non-government issuers.

Taking the legislation on redenomination adopted by the present euro area member states as its source of inspiration the working group furthermore finds that the Act should regulate the redenomination of general-government debt.

Depending on the time of and the specific circumstances for a Danish adoption of the euro the Act should furthermore consider the issue of redenomination of debt issued under Danish law in the currency units of other euro area member states. However, redenomination of such debt must be conditional on the redenomination by the relevant country of its domestic debt either in full or in part. The provision is only relevant if Denmark adopts the euro at the same time as other countries, or if the present euro area member states have not eliminated their respective national currency units. Debt denominated in third-country currencies is not affected by EMU and therefore cannot be redenominated.

A Redenomination Act should also specify the redenomination method ("top-down" or "bottom-up" method) and how amounts are rounded (to whole euro or eurocents). The Act should also stipulate private issuers' right to redenominate by the same method as for government issuers.<sup>6</sup>

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<sup>6</sup> If a private issuer wishes to use other redenomination principles than those stipulated in the Act, the redenomination method used must be subject to further agreement. This agreement can be achieved e.g. by holding a bond holders' meeting where the redenomination method is approved by the investors. Alternatively, an issuer may at the time of issue state a specific redenomination method in the bond terms.

It may also be appropriate for the Act to include minimum requirements of the information to investors. Such requirements might include that a proposed redenomination be published in a particular way and at a particular time before it takes place. Further requirements might be stipulated regarding the content of the notification, e.g. statement of securities code and redenomination method. Legislation concerning information to investors is particularly relevant if the information requirements are not set out in the bond terms.

The legislation of certain present euro area member states stipulates that redenomination issues are to be brought before the courts within 1 year of the redenomination. At the same time, several of these countries have limited such legal proceedings to a few criteria, i.e. whether the redenominated debt is covered by the Act, whether the bond terms preclude redenomination, or whether the redenomination complies with the provisions of the Redenomination Act. Whether a Danish Redenomination Act should contain similar provisions is subject to further evaluation.

As stated above, with effect from 8 February 2001 it has been decided to change the method for calculation of accrued interest with regard to trading in the secondary market. In this connection it was concluded that it was possible to implement the changes with regard to government bonds and mortgage-credit bonds without legislation, since the bond terms contain a reference to current market conventions. This is not generally the case for corporate bonds. It might be considered whether a Danish Redenomination Act at the same time should make provision for corporate bond issuers to be able to amend the bond terms in line with current market conventions.

The working group also discussed whether a Redenomination Act should stipulate methods of conversion from kroner to euro with regard to the securities which are not redenominated before the circulation of euro notes and coins. This issue has not been settled.

Furthermore, it must be investigated whether an extra closing day for the Danish Securities Centre will entail derived problems for the financial sector which require special legislation, cf. section 7 below.

Finally, it must be clarified how the redenomination legislation will affect the principle of balance to which mortgage-credit institutes are subject, and the fact that outstanding mortgage-credit loans contain direct reference to the bond side.

## 6 Scope of redenomination

The proportion of government debt redenominated by the individual euro area member states varies considerably. Table 4 shows the scope of redenomination for government issuers in the present euro area member states. The variations can be attributed partly to the fact that several countries still have a certain volume of paper-based bonds. Redenomination of paper-based bonds is more cost-intensive than redenomination of dematerialised, i.e. electronically-registered, bonds. Several countries have therefore chosen not to redenominate paper-based bonds.

For the proportion of a country's debt which is not traded or traded only to a very limited extent the advantages of redenomination are limited. As Table 4 shows, none of the present euro area member states have redenominated the non-tradable proportion of their central-government debt.

Several countries have also refrained from redenominating Treasury bills and bonds with a short remaining term to maturity.

More than 99 per cent of Denmark's domestic central-government debt is dematerialised. It is the intention that this part of the debt should be

*Table 4: The scope of redenomination of government securities in the present euro area member states*

Member state	Tradable debt in national currency as a percentage of total debt in national currency	Of which redenominated	Non-tradable debt in national currency as a percentage of total debt in national currency	Of which redenominated
Belgium.....	96	81	4	0
Finland .....	95	77	5	0
France.....	89	100	11	0
Netherlands ...	91	95	9	0
Ireland .....	83	100	17	0
Italy .....	88	100	12	0
Luxembourg..	97	84	0	0
Portugal .....	73	86	28	0
Spain .....	94	100	6	0
Germany.....	86	97	14	0
Austria.....	74	99	27	0

Source: European Commission.

redenominated upon entry. Only lottery bonds are issued as paper-based debt certificates. Redenomination of the central government's lottery bonds may impose unnecessary costs, probably with only moderate benefit. Moreover the central government does no longer issue lottery bonds.

Already in connection with the commencement of the third stage of EMU the redenomination of the central government's external debt was considered. The central government's external debt consists of a number of loans with relatively moderate outstanding amounts. The securities are only rarely traded. It was found that in the light of the negligible liquidity of the bonds the benefits of redenomination would not exceed the costs of the actual implementation of redenomination. Therefore foreign issues were not redenominated. Adoption of the euro does not change this evaluation.

Like the central government, local government and other public authorities will be required to issue in euro should Denmark adopt the euro. This is an argument for local governments to redenominate their domestic issues.

The Danish market for mortgage-credit bonds is one of the largest in the world. The mortgage-credit institutes intend to redenominate all series. This creates the basis for a large market for euro-denominated Danish mortgage-credit bonds, which will contribute to enhancing market liquidity and reducing borrowing costs. Redenomination of all series will also have certain consumer-policy benefits. The customers of the mortgage-credit institutes may find it important to the cost of re-mortgaging whether the bonds purchased to redeem existing loans are denominated in kroner or euro. Redenomination of all series will ensure uniform conditions for all borrowers.

It is up to the individual issuer to decide whether corporate bonds should be redenominated. This depends on the advantages versus the drawbacks of redenominating the bond in question. In Denmark the market for corporate bonds is relatively modest and unlike government bonds and mortgage-credit bonds there are no outright advantages of redenomination. On the other hand, redenomination may draw more interest from abroad.

Corporate bonds which may be redenominated once a Danish Redenomination Act has been introduced must be issued in accordance with Danish law and in Danish kroner or any other currency which will be replaced by the euro.

The working group did not assess the need for redenomination of mortgage deeds or other securities not traded on the official stock exchanges. Neither did the working group discuss the implementation of the redenomination of such paper, should this be required. Non-residents' interest in mortgage deeds and similar paper is limited compared to their interest in government bonds and mortgage-credit bonds. Since mortgage deeds are securities with small outstanding amounts with varying credit risk and limited liquidity, this market will probably continue to be a purely national phenomenon should Denmark join the euro. There are therefore certain arguments in favour of not redenominating such claims.

## 7 The practical implementation of redenomination

The actual redenomination of bonds in circulation will be the responsibility of the Danish Securities Centre (Værdipapircentralen/VP), which is the central register of Danish securities, cf. Box 3. At the Danish Securities Centre each individual portfolio of the various bonds will be converted from kroner to euro and rounded to the nearest eurocent. Data on the converted portfolios will then be forwarded to the account-holding credit institutions, issuing institutions and the connected securities centres abroad. Furthermore, the bond holders will be informed of the conversion of their portfolios.

### *Box 3: Registration, clearing and settlement of securities*

The Danish Securities Centre (VP) has two main functions: registration of securities and clearing and settlement of securities transactions.

In Denmark the largest proportion by far of shares and bonds are dematerialised, i.e. registered electronically in the VP (Securities Centre) system. Each bond is identified by a securities code or ISIN code. Unlike a number of other countries VP also registers at a detailed level, i.e. each investor's holdings of individual bonds are registered, rather than solely registering the account-holding credit institutions' total holdings, leaving the detailed registration to these credit institutions. This provides for central redenomination of safekeeping accounts. However, the VP system also includes pooled accounts. The detailed booking of the individual investors' portfolios is handled by the custodian of such accounts.

The VP system is a net settlement system. The trading parties report trades to the VP system on an ongoing basis. The settlement period for a securities trade is in principle t+3, i.e. the trade is settled 3 days after its conclusion. At certain times of the day VP calculates the net position of the individual participants in terms of both securities and monetary amounts. The net positions are then exchanged – in the VP system as regards securities and on accounts with the Nationalbank as regards monetary amounts.

In 1999 the volume registered in VP was around kr. 3,100 billion compiled at market value distributed on 2,372 bond series and 693 shares, unit trusts, etc. 3.6 million transactions were completed. The market value of the settled transactions was kr. 27,940 billion. This corresponds to a daily turnover of approximately kr. 100 billion. There were 2.5 million individual accounts.

The conversion of the individual bond portfolios and subsequent transfer of data make high demands of the capacity of the computer systems of especially the Danish Securities Centre and the account-holding credit institutions. The capacity requirements will be many times greater than was the case in the present euro area member states. The reason is that the Danish Securities Centre registers the bonds held by each investor, while the securities centres of a number of euro area member states register the securities held by each account-holding credit institution. As a result, the redenomination of Danish bonds will require a considerably higher volume of data transmission between the Danish Securities Centre and the credit institutions than was the case in the present euro area member states.

The present 11 euro area member states all chose to redenominate on the commencement of the third stage of EMU on 1 January 1999. The redenomination took place over the long weekend around the turn of the year. This meant that the redenomination process had to be completed within a period of 3½ days from the fixing and publication of the exchange rates between the national currencies and euro at 12.00 noon on Thursday, 31 December 1998, until the trading systems opened on Monday, 4 January.

The working group evaluated the options for achievement of redenomination in Denmark on the basis of various assumptions concerning the timing of Denmark's joining the euro area. In all scenarios redenomination can be initiated at the earliest when the conversion rate between krone and euro has been published.

The basic view is that all redenomination should take place at the same time. The working group finds that the redenomination of government securities and mortgage-credit bonds at one and the same time will entail a number of benefits for all parties involved.

## **7.1 If Denmark joins around a year-end**

If Denmark adopts the euro around a year-end the financial sector will be busy with annual closing procedures, which itself require vast computer resources. The Danish Securities Centre also handles the

drawing of and interest payments on a large proportion of the benchmark mortgage-credit bonds.

A simultaneous redenomination of all bond series requires one or more extraordinary closing days to be introduced for the Securities Centre (VP) system. Such extraordinary closing days will be decided by the Danish Securities Centre, subject to the approval of the Danish Financial Supervisory Authority. The closing of the VP system will also affect the rest of the financial sector. While the Danish Securities Centre is closed, the banks will be unable to provide collateral for liquidity vis-à-vis Danmarks Nationalbank.

Should it prove impossible to close down the VP system extraordinarily for one or more days, the redenomination of government bonds and mortgage-credit bonds will have to be implemented in two stages.

As described in section 3, the continued issue in open series by the central government and other public authorities is conditional on the redenomination of government bonds upon joining the euro area. On the other hand, non-government issuers, including mortgage-credit institutes, are not obliged to issue in euro for as long as the Danish krone still exists as legal tender. In accordance with EU legislation non-government issuers in the present euro area member states were not able to redenominate until the general-government sector had redenominated all or part of its debt. It is assumed that similar rules will apply should Denmark join the euro area.

If circumstances require the division of the redenomination process into several stages, the first stage should naturally comprise the redenomination of government bonds. Technically, it will be possible to include the most important mortgage-credit securities in the first stage. Nevertheless if a division of the redenomination process is called for the mortgage-credit sector and the banking sector from an administrative standpoint prefer the redenomination of all mortgage-credit securities simultaneously as quickly as possible after government bonds have been redenominated.

## **7.2 If Denmark joins at a time other than a year-end**

The working group finds that it will be possible to redenominate all bonds simultaneously during a weekend or a period of public holidays provided that redenomination does not take place at a time when the Danish Securities Centre and the account-holding credit institutions are engaged in annual or monthly closing procedures.

Should Denmark join on a business day which is not followed by a weekend or a period of public holidays, simultaneous redenomination will require the introduction of extraordinary closing days for the Danish Securities Centre.

## **7.3 Redenomination of corporate bonds, etc.**

It is up to individual issuers to decide on the redenomination of corporate bonds. Not all issuers of corporate bonds can be expected to have made the final decision on redenomination before adoption of the euro, should Denmark decide to join. A certain period for redenomination of corporate bonds will be needed after the redenomination by government issuers and the mortgage-credit sector. Further guidelines in this respect will be laid down by the Danish Securities Centre in cooperation with the rest of the sector.

## **8 Taxation issues in connection with redenomination**

The redenomination of bonds requires clear stipulation of whether such redenomination is to be regarded as sale of the securities from a taxation aspect. If redenomination is considered a sale of an existing paper and purchase of another, the Capital Gains Tax Act will apply to the treatment of capital gains and losses. In such case redenomination will have taxation consequences for the holders of the relevant bonds.

A decision of 19 January 1999 (98-620-69) of the Ministry of Taxation stipulates that redenomination to euro of a euro area member state's securities is not equated with redemption/sale and the establishment of a new asset.

Since this decision concerns securities issued in the present euro area member states, a statement is required of whether a similar interpretation will apply to a situation where Danish bonds are redenominated in connection with the adoption of the euro in Denmark.

## **9 Adjustments at the Copenhagen Stock Exchange**

The switch to mathematical drawing with effect from 8 February 2001 entails that the Copenhagen Stock Exchange must decide whether to give access to trading in uneven amounts shown by decimals (i.e. amounts denominated in kroner and øre) in the Stock Exchange's trading systems. It can thus be expected that in the event of Denmark's adoption of the euro a decision will already have been taken concerning access to trade the rounded amounts (spikes) arising from the conversion of individual investors' bond portfolios. Moreover, redenomination will entail a need for adjustments to minimum amounts and price hops.

The Copenhagen Stock Exchange must also decide on the treatment of FUTOP contracts based on securities which are redenominated.

## **10 Preparation for redenomination should Denmark decide to adopt the euro**

The preparations for the possible redenomination of Danish bonds are related primarily to the adjustment of the IT systems of the Danish Securities Centre, the account-holding credit institutions and the bond issuers, or their computer centres. The adjustment of IT systems e.g. concerns the conversion of customer and securities registers, design of trading and settlement systems and development of communication facilities to handle the data volumes to be transmitted between the Danish Securities Centre, the account-holding credit institutions and the issuing credit institutions at the time of redenomination.

Other preparations in connection with possible redenomination include the preparation and adoption of relevant EU Council regulations and national legislation as the basis for redenomination.

One of the objectives of this report is to create the necessary agreement and clarification concerning the method of redenomination, so that the IT preparations can be initiated without having to await specific legislation. Several of the present euro area member states did not adopt their national legislation on redenomination until the last months of 1998, i.e. shortly before the transition to the third stage of EMU. Once the method had been established, IT systems could be prepared simultaneously with the legislative work.

## **Annex**

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