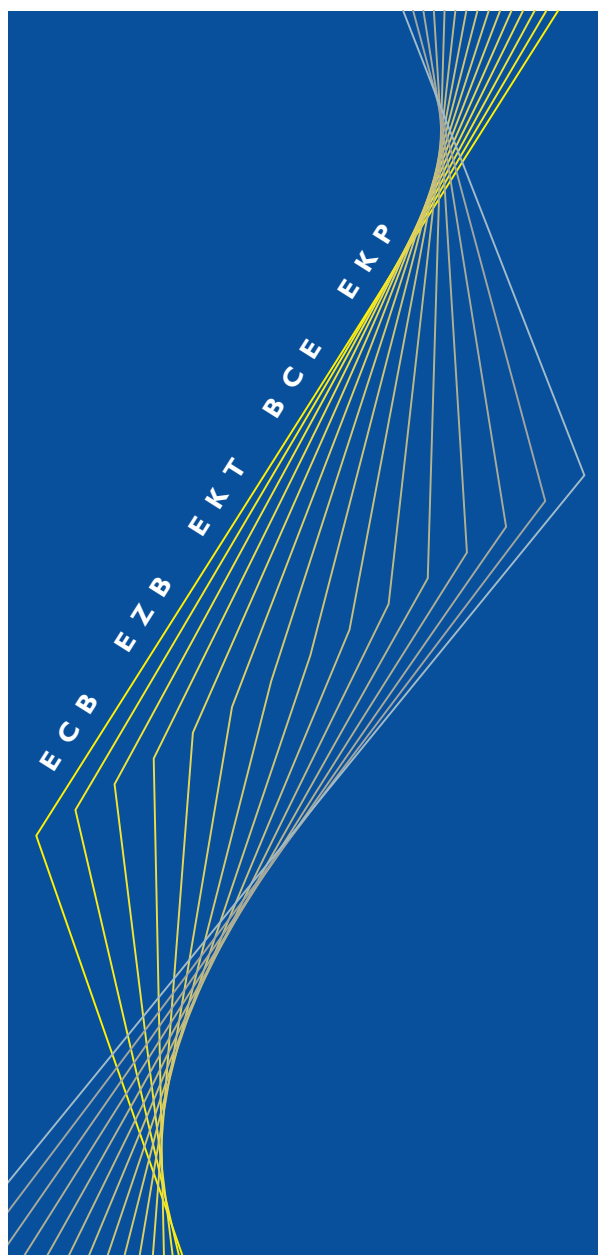




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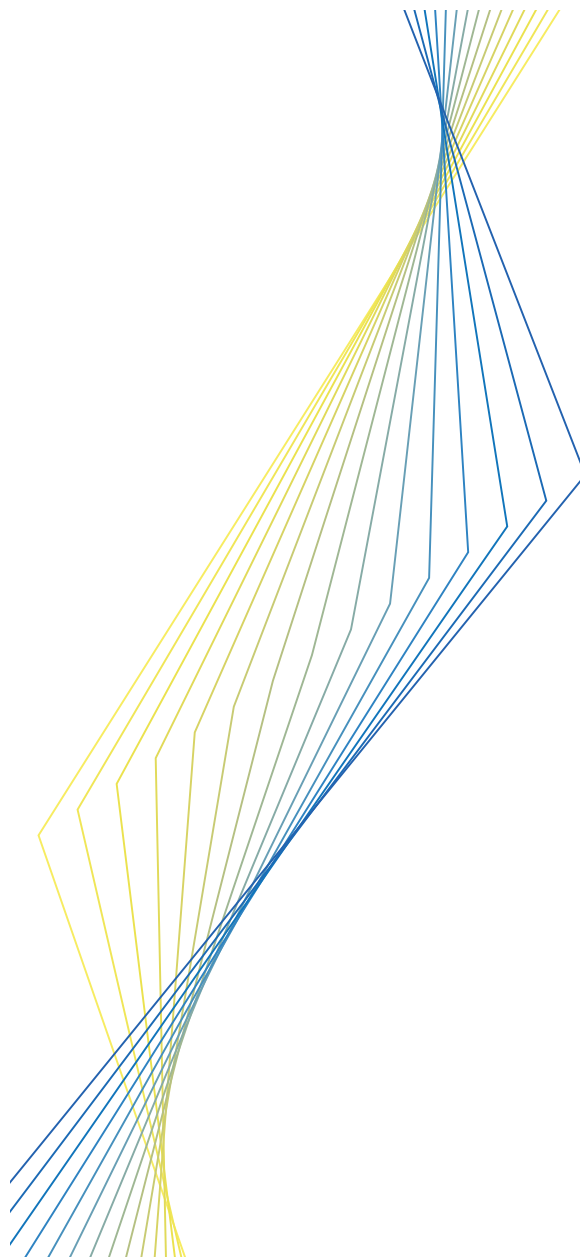
**MANUAL  
ON MFI INTEREST RATE  
STATISTICS**

**REGULATION ECB/2001/18**

October 2003



EUROPEAN CENTRAL BANK



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ISBN 92-9181-371-0 (print)

ISBN 92-9181-372-9 (online)

# Table of contents

|   |           |
|---|-----------|
| <b>1. Aim of this manual</b>  | <b>7</b>  |
| <b>2. Scope and uses of MFI interest rate statistics</b>                                    | <b>8</b>  |
| <b>3. Basic definitions</b>   | <b>10</b> |
| <b>4. Types of interest rate</b>  | <b>12</b> |
| 4.1 Nominal versus effective interest rates   | 12        |
| 4.2 Annualised agreed rate  | 13        |
| 4.2.1 Definition and annualised agreed rate formula   | 13        |
| 4.2.2 Clarification of variable n in the annualised agreed rate formula                     | 14        |
| 4.2.3 Treatment of exceptional repayments of principal                                      | 15        |
| 4.2.4 The annualised agreed rate formula for indefinite loans                               | 16        |
| 4.2.5 The annualised agreed rate formula applied to bank overdrafts                         | 16        |
| 4.2.6 The annualised agreed rate formula for one-off deposits                               | 16        |
| 4.2.7 Treatment of disagio  | 17        |
| 4.2.8 Treatment of agio   | 17        |
| 4.3 Narrowly defined effective rate   | 18        |
| 4.4 Annualising variable interest rates   | 21        |
| 4.5 Treatment of taxes, subsidies and regulatory arrangements                               | 21        |
| 4.5.1 Taxes, subsidies and favourable rates   | 21        |
| 4.5.2 Special national practices including regulatory arrangements                          | 23        |
| 4.5.3 The annualised agreed rate formula for subsidised loans                               | 23        |
| 4.6 Annual percentage rate of charge  | 24        |
| 4.6.1 Definition and link to the Consumer Credit Directive                                  | 24        |
| 4.6.2 Indicator for other loan charges  | 26        |
| 4.6.3 Charges to be taken into account at national level                                    | 27        |
| 4.6.4 Period of fixation in the calculation of the APRC                                     | 27        |
| 4.6.5 Treatment of subsidies in the APRC  | 28        |
| 4.6.6 Treatment of non-profit institutions serving households in the APRC                   | 29        |
| <b>5. Business coverage</b>   | <b>30</b> |
| 5.1 Interest rates on outstanding amounts   | 30        |
| 5.1.1 Definition of outstanding amounts   | 30        |
| 5.1.2 Bad loans and loans for debt restructuring below market conditions                    | 30        |
| 5.2 Interest rates on overnight deposits, deposits redeemable at notice and bank overdrafts | 31        |
| 5.2.1 The balance at the time reference point as indicator for new business                 | 31        |
| 5.2.2 Determining the interest rate on an overnight deposit                                 | 32        |
| 5.2.3 Combined deposit and loan facilities  | 33        |
| 5.2.4 Regular savings on a deposit redeemable at notice                                     | 34        |
| 5.3 Interest rates on new business  | 35        |
| 5.3.1 Definition of new business  | 35        |
| 5.3.2 New business on deposits with agreed maturity   | 35        |
| 5.3.3 Matured deposit with agreed maturity  | 36        |
| 5.3.4 Regular savings on a deposit with agreed maturity                                     | 37        |
| 5.3.5 New lending with fixed interest rate and with initial rate fixation                   | 38        |
| 5.3.6 Top-up loans  | 40        |
| 5.3.7 Conversion of a bank overdraft into another type of loan                              | 40        |
| 5.3.8 Loan taken out in tranches  | 41        |
| 5.3.9 The definition of new business for variable interest rates                            | 42        |

|            |   |           |
|------------|---|-----------|
| 5.3.10     | Choice of money market index  | 43        |
| 5.3.11     | Money market index with floor and ceiling   | 43        |
| 5.3.12     | Change in the value of a currency as external index   | 44        |
| 5.3.13     | Timing differences  | 44        |
| 5.3.14     | 'Cooling off' period  | 45        |
| 5.3.15     | Loan offer and preliminary offer  | 45        |
| 5.3.16     | Loans for debt restructuring in the context of new business   | 46        |
| 5.3.17     | Moratorium on a loan  | 46        |
| <b>6.</b>  | <b>Time reference point</b>   | <b>47</b> |
| 6.1        | Time reference point for interest rates on outstanding amounts, overnight deposits, deposits redeemable at notice and bank overdrafts | 47        |
| 6.2        | Time reference point for interest rates on new business   | 48        |
| <b>7.</b>  | <b>Instrument categories</b>  | <b>49</b> |
| 7.1        | Summary tables of indicators  | 49        |
| 7.2        | General provisions  | 51        |
| 7.3        | Foreign currency deposits and loans   | 53        |
| 7.4        | Breakdown by sector   | 53        |
| 7.5        | Breakdown by type of instrument   | 55        |
| 7.5.1      | Types of deposits   | 55        |
| 7.5.2      | Types of loans  | 56        |
| 7.6        | Breakdown by amount category  | 57        |
| 7.7        | Breakdown by original maturity, period of notice period and initial rate fixation   | 58        |
| 7.7.1      | Time bands  | 58        |
| 7.7.2      | Original maturity and period of notice  | 58        |
| 7.7.3      | Period of maturity for a loan taken out in tranches   | 59        |
| 7.7.4      | Initial period of fixation of the interest rate   | 59        |
| <b>8.</b>  | <b>Treatment of credit card credit</b>  | <b>62</b> |
| 8.1        | Credit card linked to an overnight deposit account  | 62        |
| 8.2        | Credit card linked to a loan account  | 63        |
| 8.3        | Credit card not linked to any account   | 63        |
| <b>9.</b>  | <b>Specific national products</b>   | <b>65</b> |
| 9.1        | Step-up (step-down) deposits and loans  | 65        |
| 9.2        | Savings plan for housing loans  | 66        |
| 9.3        | Interest rate on zero-coupon-bond-like savings bond   | 66        |
| 9.4        | Split of loan into two parts  | 67        |
| 9.5        | Option of converting the deposit into equity shares   | 68        |
| 9.6        | Interest rate linked to share price   | 69        |
| 9.7        | Treatment of deposit comprising two components  | 69        |
| 9.8        | Purchase of mortgage loans by a credit institution  | 72        |
| 9.9        | Securitisation of mortgage loans by a credit institution  | 73        |
| <b>10.</b> | <b>Aggregation of the data and reporting obligations</b>  | <b>74</b> |
| 10.1       | Overview  | 74        |
| 10.2       | Statistical information at the level of the reporting agents  | 74        |
| 10.3       | National weighted average interest rates  | 75        |
| 10.4       | Aggregated results for the euro area  | 76        |

|   |            |
|---|------------|
| <b>11. Selection of the reporting agents</b>              | <b>77</b>  |
| 11.1 Selection of the actual reporting population         | 77         |
| 11.2 Census versus sampling approach                      | 78         |
| 11.3 Stratification of the potential reporting population | 79         |
| 11.4 Minimum national sample size                         | 82         |
| 11.4.1 Definition   | 82         |
| 11.4.2 Theoretical background                             | 85         |
| 11.4.3 Assumptions and data availability                  | 87         |
| 11.4.4 Sample size and maximum random error               | 88         |
| 11.5 Special provisions in the case of group reporting    | 90         |
| 11.6 Allocation of the sample across strata               | 91         |
| 11.7 Estimation of total new business volume              | 92         |
| 11.8 Maintenance of the sample                            | 95         |
| 11.9 Further sampling issues                              | 97         |
| 11.10 Description of the euro area sample                 | 98         |
| <b>Index of terms</b>                                     | <b>101</b> |



## I Aim of this manual

On 20 December 2001, the Governing Council of the European Central Bank (ECB) adopted Regulation ECB/2001/18 concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations (hereinafter 'the Regulation'). The Regulation was published in the Official Journal of the European Communities on 12 January 2002<sup>1</sup> and came into force on 31 January 2002. It defines the statistical standards according to which *MFI interest rates* are collected and compiled in the European Union (EU). The Regulation is binding on the Member States participating in monetary union.

This manual contains no additional requirements and has no binding legal status. Instead it aims to further clarify and illustrate the requirements laid down in the Regulation, mainly through the use of extended definitions, explanations of the underlying concepts and examples. It also brings together detailed transcriptions from other legal acts referred to in the Regulation. A clear and consistent understanding of the statistical requirements contained in the Regulation by the statisticians in the national central banks (NCBs) of the European System of Central Banks (ESCB) and also in the accession countries is essential for the production of harmonised monetary financial institution

(MFI) interest rate statistics. The information in the manual may also interest reporting agents and users of the statistics.

The manual is composed of 11 chapters. *Chapter 2* sets out the scope of MFI interest rate statistics with special emphasis on the use of these statistics for monetary policy purposes. *Chapter 3* defines the main terms contained in the Regulation. *Chapter 4* discusses the types of interest rate compiled under the Regulation. *Chapter 5* concerns MFI interest rates on new business and on outstanding amounts and *Chapter 6* explains the time reference point for these two main kinds of statistics. *Chapter 7* provides an overview of the indicators available at the euro area and at the national level. *Chapters 8 and 9* give guidance on the treatment of specific deposit and loan products. *Chapter 10* summarises the steps needed to aggregate the individual data to obtain euro area results. *Chapter 11* sets out the method of selecting the reporting agents for MFI interest rate statistics. It tackles a full range of sampling issues, including the stratification procedure, the definition of the minimum sample size, the way of allocating the sample across strata and the maintenance of the sample over time.

<sup>1</sup> OJ L 10, 12.1.2002, p.24; also available at [www.ecb.int](http://www.ecb.int).



## 2 Scope and uses of MFI interest rate statistics

Since January 1999, statistics comprising a set of 10 euro area retail interest rates<sup>2</sup> have been published on a monthly basis in the ECB Monthly Bulletin. These statistics are compiled according to a *short-term approach*, using existing national interest rate statistics. While this approach has ensured that some retail interest rate statistics were available as from the start of monetary union, it has serious limitations. The underlying data are not harmonised and the results have had to be used with caution, with the focus on the development of the interest rates over time rather than their level. Hence, the short-term approach has provided only the minimum initial data that the ECB required for monetary policy purposes.<sup>3</sup>

Work on the development of a *steady-state approach* started in summer 1999 with the aim of compiling a set of euro area interest rates on retail deposit and lending business that is harmonised, complete, detailed, and able to cope with financial innovation. To avoid invoking a potentially misleading contrast between ‘retail’ and ‘wholesale’ interest rates, expressions that can carry different meanings, the statistics developed under the steady-state approach are referred to as ‘MFI interest rate statistics’.

The scope of *euro area MFI interest rate statistics*<sup>4</sup> is all interest rates that MFIs resident in the euro area apply to euro-denominated deposits and loans vis-à-vis non-financial sectors (other than government) resident in the euro area, i.e. vis-à-vis households and non-financial corporations of any size. In practice, mainly credit institutions need to report MFI interest rate statistics.<sup>5</sup> The statistics are compiled for the euro area as a whole and individually for each Member State in order to give information about the level and development of interest rates both at euro area and at national level.

MFI interest rate statistics are collected at *monthly* frequency. The first data is collected

for the reference month January 2003. The statistics have three main uses:

- MFI interest rate statistics are needed to analyse the *monetary transmission mechanism*, as monetary policy is transmitted through the economy via the change in interest rates. First, the statistics give the possibility of studying the pass-through of changes in official rates and market interest rates to lending and deposit interest rates faced by households and non-financial corporations. Information about the speed and extent of the pass-through is essential to understand the effect of monetary policy on the economy. Second, changes in MFI interest rates affect the cost of capital and so influence investment decisions and substitution between current and future consumption. MFI interest rate statistics are therefore vital for any economic analysis over time. Third, the statistics allow income effects to be analysed, as changes in MFI interest rates affect the interest paid or received by households and non-financial corporations and hence the disposable income of these sectors. Finally, MFI interest rate statistics enable users to analyse the credit channel of monetary policy, in particular the cost spread between self-financing and credit, the so-called external finance premium.

<sup>2</sup> Euro area statistics are provided for interest rates on overnight deposits, deposits with agreed maturity up to one year, deposits with agreed maturity up to two years, deposits with agreed maturity over two years, deposits redeemable at notice up to three months, deposits redeemable at notice over three months, loans to enterprises up to one year, loans to enterprises over one year, consumer loans, and housing loans to households. More information on these series and the actual data are available at [www.ecb.int](http://www.ecb.int).

<sup>3</sup> In accordance with European Monetary Institution, *Statistical requirements for Monetary Union, 1996*.

<sup>4</sup> The scope of MFI interest rate statistics in a non-participating Member State is all interest rates that MFIs resident in that Member State apply to deposits and loans in national currency vis-à-vis non-financial sectors (other than government) resident in the Member State, i.e. vis-à-vis households and non-financial corporations of any size.

<sup>5</sup> More detailed definitions and further explanations are given in Chapter 3.

**Figure 1**  
**Use of the reported indicators for monetary policy purposes**

|  | SCOPE OF ANALYSIS              |                                     |               |                          |                   |               |                                      |
|--|--------------------------------|-------------------------------------|---------------|--------------------------|-------------------|---------------|--------------------------------------|
|  | MONETARY TRANSMISSION          |                                     |               |                          | MONETARY ANALYSIS |               | FINANCIAL STABILITY                  |
|  | Interest rate channel          |                                     |               | Credit channel           | Money demand      | Credit demand | Bank competition, bank profitability |
|  | Pass-through of interest rates | Cost of capital substitution effect | Income effect | External finance premium |                   |               |                                      |
| Interest rates on outstanding amounts <sup>6</sup> |                                |                                     | X             |                          | X                 | X             | X                                    |
| Interest rates on new business                     | X                              | X                                   |               | X                        | X                 | X             | X                                    |

- MFI interest rate statistics enhance the *monetary analysis* in the euro area. Ideally, prices and quantities are analysed together. Information on the remuneration of M3 and its components is one essential factor to explain monetary growth and to assess its effects on price stability. For example, the own rate of M3 could be compared to the rate of return of alternative assets to explain portfolio shifts between monetary and non-monetary assets. Similarly, detailed MFI interest rates allow the development of loans to the private sector to be analysed.
- MFI interest rate statistics allow the monitoring of *structural developments* in the banking and financial system and the analysis of *financial stability issues*. Users may study the development of banks' interest rate margins and changes in their profitability, and potentially adverse developments that may damage financial stability, such as how quickly banks' interest rate margins react to external developments or how the interest burden changes for households and non-financial corporations.

In conclusion, MFI interest rate statistics are essential to well-informed monetary policy decision making. Monetary authorities need to be frequently and rapidly informed of the changes in these interest rates, so as to assess the reach, scope or delayed effect of monetary decisions and their change over time. MFI interest rate statistics are designed to meet these needs.

<sup>6</sup> Where outstanding amounts consist of a significant part of variable rate business, the related rates may also provide information on the pass-through of interest rates.

### 3 Basic definitions<sup>7</sup>

In order to ensure the comparability of MFI interest rate statistics with other macro-economic statistics produced at European level, the Regulation relies to the extent possible on existing frameworks such as the European System of Accounts (ESA) 1995<sup>8</sup> and the ECB's MFI balance sheet statistics.<sup>9</sup> The Regulation therefore uses a number of expressions that are common to European and in particular to euro area statistics, but also terminology that is specific to MFI interest rates. The main terms are defined in Article 1 of the Regulation. In the following these definitions are explained in more detail.

A *participating Member State*<sup>10</sup> (Article 1(1)) is a country that has adopted the single currency in accordance with the Treaty establishing the European Community. The Regulation only refers to 'participating Member State(s)'. For simplicity this manual uses 'euro area' to signify 'participating Member States' even though, strictly, the euro area is broader than the participating Member States. It also comprises some territories or countries associated with participating Member States that have been authorised to adopt the euro as their legal currency and in which the single monetary policy of the ECB is conducted (as in the case of Monaco and the French overseas territories of Saint-Pierre-et-Miquelon and Mayotte).

An entity is regarded as a *resident* of or *residing*<sup>11</sup> in a Member State (Article 1(1)) when it has a centre of economic interest in the territory of that Member State, i.e. when it has engaged for a year or more in economic activity in that territory, or when it has registered or indicated an intention to operate permanently in that territory. For MFI interest rate statistics, the interest rates and weights refer to deposits by and loans to customers resident in the euro area.<sup>12</sup> No distinction is made for customers between domestic residents and residents of the other euro area Member States. For example, the Bank of Greece collects interest rates applying to the banking business of credit institutions

and other institutions resident in Greece for customers resident in Greece and in the other participating Member States, but not for customers resident outside the euro area.<sup>13</sup> Customers resident outside the euro area are in principle faced with the same interest rates for their deposits and loans as customers resident in the euro area. However, customers resident outside the euro area might prefer different types of instrument than customers resident in the euro area. Hence, if customers resident outside the euro area were covered by MFI interest rate statistics, MFIs would need to apply different weighting schemes to calculate average interest rates on business for all (resident and non-resident) customers of credit institutions and other institutions. This might lead to different results.

The reporting scheme defined in the Regulation applies only to MFIs other than central banks and money market funds, i.e. to *credit institutions and other institutions* (Article 1(3)) included in the 'list of MFIs'<sup>14</sup>. E-money institutions are credit institutions, and so they are covered by MFI interest rate statistics. In principle, money market funds should be covered by MFI interest rate statistics.

<sup>7</sup> This chapter refers mainly to Article 1 of the Regulation.

<sup>8</sup> See Annex A to Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community, OJ L 310, 30.11.1996, p. 1, as last amended by Regulation (EC) No 359/2002 of the European Parliament and of the Council, OJ L 58, 28.2.2002, p. 1.

<sup>9</sup> Regulation ECB/2001/13 of 22 November 2001 concerning the consolidated balance sheet of the monetary financial institutions sector, OJ L 333, 17.12.2001, p. 1, as amended by Regulation ECB/2002/8 of 21 November 2002, OJ L 330, 6.12.2002, p. 29.

<sup>10</sup> Defined in Article 1 of Council Regulation (EC) No 2533/98 of 23 November 1998 concerning the collection of statistical information by the European Central Bank, OJ L 318, 27.11.1998, p. 8.

<sup>11</sup> Defined in Article 1 of Regulation (EC) No 2533/98.

<sup>12</sup> For non-participating Member States, this should read here and in the rest of the document 'resident in the same Member State as the reporting MFI'.

<sup>13</sup> For non-participating Member States, the principle is the 'residency in the same Member State as the MFI'. For example, Denmark's Nationalbank collects interest rates referring to the banking business of credit institutions and other institutions resident in Denmark vis-à-vis customers resident in Denmark.

<sup>14</sup> A comprehensive list of all MFIs in the EU is produced and published by the ECB. Further information and the list are available at [www.ecb.int](http://www.ecb.int).

However, as their business is not to receive deposits or grant loans, money market funds do not pay interest on their liabilities or receive interest on their assets in the same way as credit institutions and other institutions. Therefore, a different method of data collection will have to be developed. The ECB will also consider in due course the extension of the reporting population to other financial intermediaries, except pension funds and insurance companies, and to central government and insurance corporations.

*MFI interest rate statistics* (Article 1(4)) cover interest rates that resident credit institutions and other institutions apply to euro-denominated<sup>15</sup> deposits and loans vis-à-vis non-financial sectors other than government resident in the euro area. Non-financial sectors other than government are *households* and *non-financial corporations* (Article 1(2)) of any size. *Non-profit institutions serving households* (NPISHs) are indistinguishably included with households as they are not very important for the purposes of MFI interest rate statistics at euro area level and in nearly all Member States.<sup>16</sup> The sectoral classification follows the principles established in Regulation ECB/2001/13 and in Chapter 2 of the ESA 95.<sup>17</sup>

The definition of the *potential reporting population* (Article 1(5)) follows from the definition of the scope of MFI interest rate statistics. In each Member State, the potential reporting population comprises all resident credit institutions and other institutions which take euro-denominated deposits from and/or grant euro-denominated loans to households and/or non-financial corporations resident in the participating Member States. This means that the customers may be resident anywhere in the euro area, not necessarily in the same

Member State as the reporting credit institution or other institution. As explained above, the Regulation does not require a distinction between domestic residents and residents of the other euro area Member States and does not apply to central banks and money market funds.

NCBs select the *reporting agents* (Article 1(1)) for MFI interest rate statistics from the potential reporting population, which for each NCB comprises only resident entities. All reporting agents together constitute the *actual reporting population*.<sup>18</sup> Reporting agents are the legal and natural persons that are subject to the ECB's statistical reporting requirements. They include the entities that, according to the national law of their Member State of residence, are neither a legal person nor a collection of natural persons, but can be subject to rights and obligations. The persons legally representing these entities must fulfil their reporting obligations.

<sup>15</sup> For non-participating Member States, this should read here and in the rest of the document 'national currency'.

<sup>16</sup> In a few Member States, loans to NPISHs are a not negligible part of 'other loans to households'.

<sup>17</sup> See also ECB 'Money and Banking Statistics – Sector Manual – Guidance for the statistical classification of customers', second edition, November 1999. The sectoral breakdown is further discussed in Chapter 7.4. For the treatment of NPISHs see also Chapter 4.6.6.

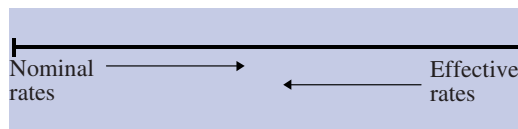
<sup>18</sup> Further discussed in Chapter 11.1.

## 4 Types of interest rate<sup>19</sup>

### 4.1 Nominal versus effective interest rates

The terms *nominal* and *effective* interest rate have a range of different meanings depending on the Member State and the context. This is illustrated in the following graphic.

**Figure 2**  
Type of rate



Two definitions on the extremes of this range of meaning are *advertised nominal rate* on the left and *annual percentage rate of charge* on the right:

- *Advertised nominal rates* are interest rates that are shown as the headline rates<sup>20</sup> by the credit institutions or other institutions in the windows of their branches, their leaflets, advertisements, newspapers, other journals, etc. These rates give customers an indication of the current interest rate level for different banking products. The advertised nominal rates might be applied to highly standardised deposits and loan products, but are not necessarily the rates the credit institution or other institution actually pays to or charges its customers. Households and non-financial corporations might be able to negotiate better terms than those advertised. The advertised nominal rates might also be *prime rates* that the credit institution offers to its most creditworthy customers. In this case the actually applied rate on a deposit or loan might be less favourable than the advertised nominal rate.
- The *annual percentage rate of charge (APRC)* is an effective lending rate that covers the total costs of the credit to the consumer, i.e. the interest payments as well as all other related charges. The concept of 'total costs for the consumer' was designed for

the purposes of consumer protection. The compilation of the APRC is defined in Council Directive 87/102/EEC<sup>21</sup> and further explained in Chapter 4.6.1.

In view of the range of different meanings of the terms nominal and effective, it is not possible to say in general which type of rates MFI interest rates in fact are. What is possible instead is to describe briefly the main features of these rates and to leave it to the individual user of the statistics to then call MFI interest rates nominal or effective:

- MFI interest rates are *agreed rates*: The data collected refers to the interest rate that is individually agreed between a credit institution or other institution and its customer. MFI interest rates are hence distinct from advertised nominal rates, because households and non-financial corporations might be able to negotiate with the credit institution or other institution better terms and conditions than those advertised.
- MFI interest rates are *annualised*: They are converted to an annual basis and quoted in percentages per annum. This means that MFI interest rates take into account the frequency of interest payments. *Ceteris paribus*, the more frequent the interest payments, the higher the MFI interest rate recorded in the statistics.<sup>22</sup> Two possibilities exist for annualising interest rates: either an algebraic formula leading to the annualised agreed rate discussed in Chapter 4.2.1, or successive approximation resulting in the narrowly defined effective rate discussed in Chapter 4.3.

<sup>19</sup> This chapter refers mainly to Part I of Annex II to the Regulation.

<sup>20</sup> Together with the advertised nominal rate, the corresponding effective interest rate might be published but usually in small print rather than as the headline rate.

<sup>21</sup> Council Directive 87/102/EEC of 22 December 1986 for the approximation of the laws, regulations and administrative provisions of the Member States concerning consumer credit, OJ L 42, 12.2.1987, p. 48, as last amended by Directive 98/7/EC of the European Parliament and of the Council, OJ L 101, 1.4.1998, p. 17.

<sup>22</sup> See also Equations 2 and 3 below.

- 43 out of the 45 MFI interest rates *exclude charges*: For deposits MFIs pay interest to the customer but might also charge fees. Analogously, for loans the customer has to pay an amount comprising an interest rate component and a component made up of other related charges. All but two MFI interest rates refer only to the interest rate component and exclude all charges. The exceptions are the two additional series collected for consumer credit and loans to households for house purchases, where in addition to a rate without charges the APRC is also required that covers the interest rate component and the component of other charges.

## 4.2 Annualised agreed rate<sup>23</sup>

### 4.2.1 Definition and annualised agreed rate formula

The *annualised agreed rate* is defined in paragraph 1 of Annex II to the Regulation as ‘the interest rate that is individually *agreed* between the reporting agent and the household or non-financial corporation for a deposit or loan, converted to an annual basis and quoted in percentages per annum. The annualised agreed rate shall cover all interest payments on deposits and loans, but no other charges that may apply. Disagio, defined as the difference between the nominal amount of the loan and the amount received by the customer, shall be considered as an interest payment at the start of the contract (time  $t_0$ ) and shall therefore be reflected in the annualised agreed rate.’

An annualised agreed rate is distinct from an advertised nominal rate, as the customer might be able to negotiate with the credit institution or other institution better terms and conditions than those advertised. An annualised agreed rate reflects the creditworthiness and other qualities of the customer (in respect of loans) and the solvency and other qualities of the credit institution as determined by the customer (in respect of deposits). The annualised agreed

rate is influenced by the budget, capital or other constraints faced by the credit institution in granting loans and taking deposits, including competition with other types of financial institution and product. It is a result of the demand and supply conditions in the deposit and loan markets.

Paragraph 2 of Annex II to the Regulation provides the formula for annualising the agreed interest rate, i.e. for converting interest payments that are due at regular intervals within a year to a yearly basis. It is applied in cases where the interest payments that are agreed between the credit institution or other institution and the customer are capitalised at regular intervals within a year, for example per month or quarter, rather than per annum:

$$x = \left(1 + \frac{r_{ag}}{n}\right)^n - 1 \quad \text{[Equation 1]}$$

Meaning of letters and symbols:

x Annualised agreed rate,

$r_{ag}$  Interest rate per annum that is agreed between the reporting agents and the household or non-financial corporation for a deposit or loan where the dates of the interest capitalisation of the deposit and all the payments and repayments of the loan are at regular intervals in the year, and

n Number of interest capitalisation periods for the deposit and ~~(re)payment periods~~ <sup>for<sup>24</sup></sup> the loan per year, i.e. 1 for yearly payments, 2 for semi-annual payments, 4 for quarterly payments, and 12 for monthly payments.

For example, a customer and a credit institution agree on a five-year loan at 10% per annum (p.a.) for the entire maturity, where the interest is paid at the end of each quarter and the principal repaid at the end of

<sup>23</sup> See also paragraphs 1 and 2 of Annex II to the Regulation.

<sup>24</sup> The text in strikethrough is included in the Regulation. However, the application of the formula is clearer without it. See also Chapter 4.2.2.



the fifth year. The annualised agreed rate for this loan is then 10.3813% p.a. and calculated as follows:

$$x = \left(1 + \frac{r_{ag}}{n}\right)^n - 1 = \left(1 + \frac{0.10}{4}\right)^4 - 1 = 0.10381289$$

[Equation 2]

If, in the same example, the interest payments were at monthly frequency, then the annualised agreed rate would be slightly higher at 10.4713% p.a. and calculated as follows:

$$x = \left(1 + \frac{r_{ag}}{n}\right)^n - 1 = \left(1 + \frac{0.10}{12}\right)^{12} - 1 = 0.10471307$$

[Equation 3]

In the case of daily interest capitalisation,  $n = 365$  should be used in Equation 1 following the convention of a standard year of 365 days as specified in paragraph 12 of Annex II to the Regulation.<sup>25</sup> In the above loan example, the annualised agreed rate for monthly interest payments would be 10.5156% p.a. and calculated as follows:

$$x = \left(1 + \frac{r_{ag}}{n}\right)^n - 1 = \left(1 + \frac{0.10}{365}\right)^{365} - 1 = 0.1051558$$

[Equation 4]

Equation 1 may also be used to derive the annualised agreed rate, for example in the case of a deposit of EUR 10,000 that is placed for two years where EUR 11,000 is paid out to the customer at maturity. During the two years, the customer earns 10%. The annualised agreed rate is 4.8809% and calculated as follows:

$$x = \left(1 + \frac{r_{ag}}{n}\right)^n - 1 = \left(1 + \frac{0.10}{\frac{2}{1/2}}\right)^{\frac{1}{2}} - 1 = 0.0488084$$

[Equation 5]

#### 4.2.2 Clarification of variable $n$ in the annualised agreed rate formula

*Question:*

Which value should variable  $n$  take in the annualised agreed rate formula (Equation 1) when the interest payments and the repayment of a loan occur at different but regular intervals?

**Case A:** A customer and a credit institution agree on a two-year loan at 10% p.a. with monthly interest payments. The principal is repaid at the end of the second year. Should variable  $n$  in Equation 1 be:

- a) equal to 12 (based on the frequency of interest payments), or
- b) equal to  $\frac{1}{2}$  (based on the repayment frequency)?

**Case B:** A customer and a credit institution agree on a five-year loan at 10% p.a. for the entire maturity, where the interest should be paid at the end of each quarter and the principal should be paid back in tranches on a monthly basis. Should  $n$  in Equation 1 be:

- a) equal to 4 to only reflect quarterly interest payments, or
- b) equal to 12 to also include the repayments?

*Answer:*

As a general rule, for MFI interest rate statistics the value of variable  $n$  in Equation 1 is determined by the *frequency of the interest payments* and not by the repayment periods of the principal. If this rule is followed, the annualised agreed rate coincides with the narrowly defined effective rate (NDER)<sup>26</sup> whenever the interest payments are *more frequent or equally frequent* than the repayments of the principal. This includes all cases where the principal is repaid at the end of the contract. An overview of possible combinations of interest payment and repayment frequencies is given in the following matrix.

<sup>25</sup> If 360 days were used in the formula as a standard year instead of the convention of 365 days, a different result would be achieved. The size of the difference depends on the level of the agreed interest rate  $r_{ag}$ .

<sup>26</sup> Further discussed in Chapter 4.3.

**Figure 3**

|                                     |                      | Frequency of interest payments |                |             |
|-------------------------------------|----------------------|--------------------------------|----------------|-------------|
|                                     |                      | Monthly (.M)                   | Quarterly (.Q) | Yearly (.Y) |
| Frequency of repayment of principal | Monthly (M.)         | M.M                            | M.Q            | M.Y         |
|                                     | Quarterly (Q.)       | Q.M                            | Q.Q            | Q.Y         |
|                                     | Yearly (Y.)          | Y.M                            | Y.Q            | Y.Y         |
|                                     | End of contract (E.) | E.M                            | E.Q            | E.Y         |

It is expected that in general the frequency of the interest payments is higher or equal to the repayment frequency of the principal (light grey boxes in Figure 3) and that hence the annualised agreed rate and the NDER coincide. An example is Case A, where variable  $n$  in Equation 1 is equal to 12 reflecting the number of interest payments per year. As the interest payments are at regular monthly intervals and the principal is repaid in full at the end of the contract, i.e. situation E.M in Figure 3, Equation 1 provides for  $n = 12$  the same result as the NDER, i.e. an interest rate of 10.4713%.

In the remaining cases, where the frequency of the interest payments is lower than the repayments of the principal (dark grey boxes in Figure 3), the annualised agreed rate deviates from the NDER. The NDER then represents the mathematically correct calculation and the annualised agreed rate a close approximation, which is in line with the Regulation. An example is Case B, where variable  $n$  in Equation 1 is equal to 4 reflecting the quarterly interest payments. Since the repayments of the principal are at monthly frequency, the annualised agreed rate differs

from the NDER, i.e. situation M.Q in Figure 3. The annualised agreed rate is 10.3813% and the NDER is 10.3795%.

The annualised agreed rates and the NDERs for a 5-year loan at 10% p.a., with the combinations of interest payment and repayment frequencies as given in Figure 3, are summarised in Figure 4:

#### 4.2.3 Treatment of exceptional repayments of principal

*Question:*

Is it in line with the Regulation to apply the annualised agreed rate formula (Equation 1) to financial contracts with regular interest capitalisation, for example quarterly interest payments, which provide the option to the customer to have exceptional repayments ?

*Answer:*

Repayments of the principal whether regular or irregular only influence the level of the annualised agreed rate and NDER if the

**Figure 4**

|                                     |                      | Frequency of interest payments |      |                        |         |                        |        |
|-------------------------------------|----------------------|--------------------------------|------|------------------------|---------|------------------------|--------|
|                                     |                      | Monthly (.M)                   |      | Quarterly (.Q)         |         | Yearly (.Y)            |        |
|                                     |                      | Annualised agreed rate         | NDER | Annualised agreed rate | NDER    | Annualised agreed rate | NDER   |
| Frequency of repayment of principal | Monthly (M.)         | 10.4713                        |      | 10.3813                | 10.3795 | 10.0000                | 9.0022 |
|                                     | Quarterly (Q.)       | 10.4713                        |      | 10.3813                |         | 10.0000                | 9.0331 |
|                                     | Yearly (Y.)          | 10.4713                        |      | 10.3813                |         | 10.0000                |        |
|                                     | End of contract (E.) | 10.4713                        |      | 10.3813                |         | 10.0000                |        |



repayments are more frequent than the interest payments. This is analogous to the issue discussed in Chapter 4.2.2. For example, in the case of monthly interest payments and exceptional repayments of the principal that are not more frequent than monthly, the annualised agreed rate and the NDER coincide with  $n = 12$  in Equation 1 reflecting the frequency of interest payments per year. Likewise, if the interest is paid quarterly and the possibility for exceptional repayments of the principal occurs not more frequently than quarterly, the annualised agreed rate and the NDER coincide with  $n = 4$  in Equation 1.

It is assumed that in general the interest is paid more frequently than exceptional repayments take place. Hence, the variable  $n$  in Equation 1 is determined by the frequency of the interest payments and the possibility of exceptional repayments can be ignored. If exceptional repayments occur more frequent than the interest payments, then the annualised agreed rate deviates from the NDER. In that case the NDER represents the mathematically correct calculation and the annualised agreed rate a close approximation, which is in line with the Regulation.

#### **4.2.4 The annualised agreed rate formula for indefinite loans**

*Question:*

Can the annualised agreed rate formula (Equation 1) also be applied to loans that have been granted to customers indefinitely but still have regular interest payments?

*Answer:*

The variable  $n$  in Equation 1 refers not to the maturity of the loan but to the frequency of the interest payments. Hence, Equation 1 can be applied.

#### **4.2.5 The annualised agreed rate formula applied to bank overdrafts**

*Question:*

What should  $n$  be in the annualised agreed rate formula (Equation 1) for bank overdrafts<sup>27</sup> that are characterised by having irregular, rather than pre-defined, periods of utilisation and/or repayment, and interest payments that are based on the daily outstanding amount? Should  $n$  be equal to 365?

*Answer:*

The use of  $n = 365$  in Equation 1 assumes that the interest is *paid* on a daily basis as in Equation 4. In this example, however, the interest is *computed* (*ex post*) by using the daily outstanding amount, but the interest is paid at the end of the month. In the case of monthly interest payments variable  $n$  is equal to 12, in the case of quarterly interest payments it is equal to 4.

#### **4.2.6 The annualised agreed rate formula for one-off deposits**

*Question:*

Should the annualised agreed rate formula (Equation 1) be applied in the case of a one-off deposit with an agreed maturity of three months?

*Answer:*

For a one-off deposit with an agreed maturity of three months, two cases can be distinguished. If the interest is paid at the end of each month, variable  $n$  in Equation 1 is equal to 12. If the interest is paid at the end of the three months, then  $n$  is equal to 4. For example if 10% is agreed for the 3-month deposit, then the annualised agreed rate for  $n = 12$  is 10.47% and for  $n = 4$  it yields 10.38%.

<sup>27</sup> Defined in Chapter 7.5.2.

#### 4.2.7 Treatment of disagio

##### Question:

The last sentence in paragraph I of Annex II to the Regulation states: 'Disagio, defined as the difference between the nominal amount of the loan and the amount received by the customer, shall be considered as an interest payment at the start of the contract (time  $t_0$ ) and shall therefore be reflected in the annualised agreed rate.' How should the following cases of disagio be treated in the annualised agreed rate?

Case A: Disagio in the sense that the agreed monthly interest payments are made at the end of the previous period.

Case B: Disagio in the sense that the agreed monthly interest payments are made at the end of the previous period, with a different interest rate for the first period.

Case C: Disagio in the sense of a payment at the beginning of the contract that has no link with the subsequent interest payments, which are based on the outstanding amount of the loan in the previous period.

##### Answer:

In Cases A, B and C, the correct interest rate can be given by the NDER. In Cases A and B, it might be possible to reflect the advance payment for the first period as disagio in Equation I. However, this formula ignores for all other periods that the interest is paid in advance and not at the end of the period. For such a complex product, only the NDER will yield the correct result.

#### 4.2.8 Treatment of agio

##### Question:

How should the annualised agreed rate be determined when the financial contract

includes an agio defined as the 'inverse' of a disagio,<sup>28</sup> i.e. the price being higher than the nominal amount of the loan or non-negotiable debt security? Should the agio be incorporated at all? An example is the following purchase of a (borrowers') note loan (*Schuldscheindarlehen*), where the agio is included in the purchase price of the note loan:

Purchase of note loan on 6 March 2003,  
nominal: EUR 5,112,918.81  
Value date: 10 March 2003  
Interest rate: 7.60 %  
Original maturity: 25 March 2001 –  
25 March 2004  
Purchase price: EUR 5,403,332.60  
Agio (included in purchase price):  
EUR 5,403,332.60 – EUR 5,112,918.81 =  
EUR 290,413.79

##### Answer:

The (secondary) purchase of this note loan on 6 March 2003 is not considered to be *new business*<sup>29</sup> because no new funds are being granted to the borrower and no new terms and conditions are negotiated for the borrower. The (secondary) purchase is simply a change in ownership of the note loan. New business would only occur in the case of a (primary) issue of the note loan by a credit institution or other institution, where at the time of issue the borrower receives money through the issuance of a financial instrument, which according to the ECB's MFI balance sheet statistics is classified as a loan rather than as debt security. If this primary issue involves an agio, it would be reflected in the MFI interest rate.

The agio is reflected in the MFI interest rate statistics on *outstanding amounts*,<sup>30</sup> irrespective of whether the note loan or non-negotiable debt security is initially issued or subsequently acquired by the credit institution or other institution. The agio results in a reduction of

<sup>28</sup> See also Chapter 4.2.7.

<sup>29</sup> See also Chapter 5.3.1.

<sup>30</sup> See also Chapter 5.1.

the interest rate. The rate was 7.6% on EUR 5,112,918.81, which results in an interest payment of EUR 388,581.83. This amount applied to the now higher purchase price of EUR 5,403,332.60 is equivalent to an interest rate of 7.1915%. The latter is, from 6 March 2003 onwards, reflected in the MFI interest rate statistics on outstanding amounts.

The same holds true for the (primary) issue and (secondary) purchase of any other non-negotiable debt security, which according to MFI balance sheet statistics is to be classified as a loan.

### 4.3 Narrowly defined effective rate<sup>31</sup>

Instead of the annualised agreed rate, NCBs may require their reporting agents to implement the NDER for all or some deposit or loan instruments referring to new business and outstanding amounts. The NDER refers to an annual basis and is defined as the interest rate that equalises the present value of all commitments other than charges (deposits or loans, payments or repayments, interest payments), future or existing, agreed by the credit institution or other institutions and the household or non-financial corporation. The NDER is equivalent to the interest rate component of the APRC<sup>32</sup> i.e. it does not take into account the component of other charges. Hence, the basic formula for the APRC in Annex II of Directive 98/7/EC<sup>33</sup> applies, which is given as Equation 7 in Chapter 4.6.1, but without the references to other charges. This Equation 7 is equivalent to the formula proposed by the International Securities Markets Association for the exponential interest rate calculation for all maturities. Hence, in the case when years are presumed to have 365 days and the amount of the deposit or loan is placed or paid out in one amount, the following applies:

$$A = \sum_{n=1}^N \frac{CF_n}{(1+i)^{\frac{D_n}{365}}} = \sum_{n=1}^N \left( CF_n * (1+i)^{-\frac{D_n}{365}} \right) \quad \text{[Equation 6]}$$

Meaning of letters and symbols:

- i Interest rate
- CF<sub>n</sub> Cash flow n, from the perspective of the investor in the case of deposits and from the point of view of the credit institution in the case of loans
- N Number of cash flows associated with the financial instrument
- A Amount of the deposit (loan) initially placed (paid out)
- D<sub>n</sub> Timing of the cash flow n, expressed in days after the first cash flow (in general, the date of investment of the deposit or valuation of the loan).

The only difference between the NDER and the annualised agreed rate is the underlying method for annualising interest payments. The NDER uses successive approximation and can be applied to any type of deposit or loan. The annualised agreed rate uses the algebraic formula in Equation 1 and is only applicable to deposits and loans where the dates of interest capitalisation are at regular intervals.

Both types of rates, the NDER and the annualised agreed rate, may be reported for the purposes of MFI interest rate statistics. The reason is that for products with regular capitalisation periods, where interest payments occur more frequently or equally frequently than the repayments of the principal, including all cases where the principal is repaid in full at the end of the contract, the annualised agreed rate and the NDER coincide.<sup>34</sup> One formula can be derived from the other. This applies also to products with irregular or exceptional repayments of the principal as long as these do not occur

<sup>31</sup> See also paragraph 3 of Annex II to the Regulation.

<sup>32</sup> Further discussed in Chapter 4.6.1.

<sup>33</sup> Directive 98/7/EC of the European Parliament and of the Council of 16 February 1998 amending Directive 87/102/EEC for the approximation of the laws, regulations and administrative provisions of the Member States concerning consumer credit, OJ L 101, 1.4.1998, p. 17.

<sup>34</sup> See also Chapter 4.2.2.

more frequently than the interest payments.<sup>35</sup> Hence, for the majority of retail products the NDER and the annualised agreed rate lead to the same result. For products with complex cash flow, however, only the NDER gives the mathematically correct result. The annualised agreed rate provides a close approximation, which is in line with the Regulation. It is assumed that the difference in results is small especially since MFI interest rate statistics use the convention of a standard year of 365 days, as specified in paragraph 12 of Annex II to the Regulation, i.e. ignoring the effect of an additional day in leap years. The choice between the annualised agreed rate and the NDER does not therefore compromise the quality of the euro area statistics or the comparability across countries.

Equation 2 gives an annualised agreed rate of 10.3813% p.a. for a five-year loan at 10% where the interest is paid at the end of each quarter and the principal repaid at maturity. The same result is achieved with Equation 6 for the NDER, if the calculation refers to a standard year of 365 days ignoring that 2004 is a leap year. This is shown in Figure 5, where  $t = 365$  days per year,  $365/12$  days per month are assumed and 365 is used in the discount factor  $(1 + \text{NDER})^{-(t/365)}$ .<sup>36</sup>

<sup>35</sup> See also Chapter 4.2.3.

<sup>36</sup> The same result may be achieved by using 360 days consistently in the calculation of the NDER. Consistently means that  $t = 360$  days per year and 30 days per month are assumed and also 360 is used in the discount factor  $(1 + \text{NDER})^{-(t/360)}$ .

**Figure 5**

| 5-year loan, quarterly interest rate payments, repayment of principal in 2005, standard year of 365 days: |                |                       |                       |                      |                            |           |   |                               |                 |
|---|----------------|-----------------------|-----------------------|----------------------|----------------------------|-----------|---|-------------------------------|-----------------|
|   | t              | Outstand-<br>ing loan | Interest<br>rate p.a. | Interest<br>payments | Repayments<br>of principal | Cash flow | Discount factor =<br>$(1 + \text{NDER})^{-(t/365)}$ | Present value<br>of cash flow | NDER            |
| 15/11/2000  | 1.00           | 10,000                |                       |                      |                            | -10,000   |   |                               |                 |
| 14/02/2001  | 91.25          | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.98  | 243.90                        | <b>0.103813</b> |
| 16/05/2001  | 182.50         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.95  | 237.95                        | <b>0.103813</b> |
| 15/08/2001  | 273.75         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.93  | 232.15                        | <b>0.103813</b> |
| <b>15/11/2001</b>   | <b>365.00</b>  | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.91  | 226.49                        | <b>0.103813</b> |
| 14/02/2002  | 456.25         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.88  | 220.96                        | <b>0.103813</b> |
| 16/05/2002  | 547.50         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.86  | 215.57                        | <b>0.103813</b> |
| 15/08/2002  | 638.75         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.84  | 210.32                        | <b>0.103813</b> |
| <b>15/11/2002</b>   | <b>730.00</b>  | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.82  | 205.19                        | <b>0.103813</b> |
| 14/02/2003  | 821.25         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.80  | 200.18                        | <b>0.103813</b> |
| 16/05/2003  | 912.50         | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.78  | 195.30                        | <b>0.103813</b> |
| 15/08/2003  | 1003.75        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.76  | 190.54                        | <b>0.103813</b> |
| <b>15/11/2003</b>   | <b>1095.00</b> | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.74  | 185.89                        | <b>0.103813</b> |
| 14/02/2004  | 1186.25        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.73  | 181.36                        | <b>0.103813</b> |
| 15/05/2004  | 1277.50        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.71  | 176.93                        | <b>0.103813</b> |
| 14/08/2004  | 1368.75        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.69  | 172.62                        | <b>0.103813</b> |
| <b>14/11/2004</b>   | <b>1460.00</b> | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.67  | 168.41                        | <b>0.103813</b> |
| 13/02/2005  | 1551.25        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.66  | 164.30                        | <b>0.103813</b> |
| 15/05/2005  | 1642.50        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.64  | 160.29                        | <b>0.103813</b> |
| 14/08/2005  | 1733.75        | 10,000                | 10%                   | 250                  | 0                          | 250       | 0.63  | 156.38                        | <b>0.103813</b> |
| <b>14/11/2005</b>   | <b>1825.00</b> | 10,000                | 10%                   | 250                  | 10,000                     | 10,250    | 0.61  | 6,255.28                      | <b>0.103813</b> |
|   |                |                       |                       | 5,000                | 10,000                     | 5,000     |   | 10,000.00                     |                 |

The interest rate would be slightly lower, in this example at 10.3759% p.a., if it was recognised that 2004 is a leap year with 366 days. This is shown in Figure 6.

**Figure 6**

**5-year loan, quarterly interest rate payments, repayment of principal in 2005, 2004 is leap year:**

|                   | t              | Outstand-<br>ing loan | Interest<br>rate p.a. | Interest<br>payments | Repayments<br>of principal | Cash flow | Discount factor =<br>(1+NDER) <sup>^(-t/365)</sup> | Present value<br>of cash flow | NDER            |
|-------------------|----------------|-----------------------|-----------------------|----------------------|----------------------------|-----------|--|-------------------------------|-----------------|
| 15/11/2000        | 1.00           | 10,000                |                       |                      |                            | -10,000   |  |                               |                 |
| 14/02/2001        | 91.25          | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.98   | 243.91                        | <b>0.103759</b> |
| 16/05/2001        | 182.50         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.95   | 237.96                        | <b>0.103759</b> |
| 15/08/2001        | 273.75         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.93   | 232.16                        | <b>0.103759</b> |
| <b>15/11/2001</b> | <b>365.00</b>  | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.91   | 226.50                        | <b>0.103759</b> |
| 14/02/2002        | 456.25         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.88   | 220.98                        | <b>0.103759</b> |
| 16/05/2002        | 547.50         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.86   | 215.59                        | <b>0.103759</b> |
| 15/08/2002        | 638.75         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.84   | 210.33                        | <b>0.103759</b> |
| <b>15/11/2002</b> | <b>730.00</b>  | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.82   | 205.21                        | <b>0.103759</b> |
| 14/02/2003        | 821.25         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.80   | 200.20                        | <b>0.103759</b> |
| 16/05/2003        | 912.50         | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.78   | 195.32                        | <b>0.103759</b> |
| 15/08/2003        | 1003.75        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.76   | 190.56                        | <b>0.103759</b> |
| <b>15/11/2003</b> | <b>1095.00</b> | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.74   | 185.92                        | <b>0.103759</b> |
| 14/02/2004        | 1186.25        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.73   | 181.38                        | <b>0.103759</b> |
| 16/05/2004        | 1278.50        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.71   | 176.91                        | <b>0.103759</b> |
| 15/08/2004        | 1369.75        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.69   | 172.60                        | <b>0.103759</b> |
| <b>15/11/2004</b> | <b>1461.00</b> | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.67   | 168.39                        | <b>0.103759</b> |
| 14/02/2005        | 1552.25        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.66   | 164.29                        | <b>0.103759</b> |
| 16/05/2005        | 1643.50        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.64   | 160.28                        | <b>0.103759</b> |
| 15/08/2005        | 1734.75        | 10,000                | <b>10%</b>            | 250                  | 0                          | 250       | 0.63   | 156.38                        | <b>0.103759</b> |
| <b>15/11/2005</b> | <b>1826.00</b> | 10,000                | <b>10%</b>            | 250                  | 10,000                     | 10,250    | 0.61   | 6,255.12                      | <b>0.103759</b> |
|                   |                |                       |                       | 5,000                | 10,000                     | 5,000     |  | 10,000.00                     |                 |

Equation 5 gives an annualised agreed rate of 4.8809% p.a. for a deposit of EUR 10,000 that is placed for two years, where the customer receives EUR 11,000 from the credit institution at maturity. The NDER for this example leads to the same result; the calculation is shown in Figure 7.

**Figure 7**

**Deposit with agreed maturity of two years, interest rate payment at end of second year:**

|            | t   | Outstand-<br>ing deposit | Interest<br>rate | Reinvested<br>interest | Interest<br>payments | Payments<br>of<br>principal | Cash<br>flow | Discount factor =<br>(1+NDER) <sup>^(-t/365)</sup> | Present<br>value of<br>cash flow | NDER           |
|------------|-----|--------------------------|------------------|------------------------|----------------------|-----------------------------|--------------|--|----------------------------------|----------------|
| 15/11/2001 | 1   | 10,000                   |                  |                        |                      |                             | -10,000      |  |                                  |                |
| 15/11/2002 | 365 | 10,000                   |                  | 0                      | 0                    | 0                           | 0            | 0.95   | 0                                | <b>4.8809%</b> |
| 15/11/2003 | 730 | 10,000                   | <b>10%</b>       | 0                      | 1,000                | 10,000                      | 11,000       | 0.91   | 10,000                           | <b>4.8809%</b> |
|            |     |                          |                  |                        | 1,000                | 10,000                      | 1,000        |  | 10,000                           |                |

#### 4.4 Annualising variable interest rates

Question:

In March 2003, a customer and a credit institution agree on a two-year loan with a variable interest rate. The contract specifies the lending rate as a certain spread over an underlying index. The value of the interest rate for the first month, i.e. March 2003, is 10%. In March 2003 there is no information regarding the future development of the interest rate for the loan as it will rise and fall based on the movement of the underlying index. In which way would the reporting agent calculate the annualised agreed rate or NDER in March 2003? Would it assume that the interest rate is 10% for the remaining periods?

Answer:

For the statistics on *new business*,<sup>37</sup> the interest rate that is taken into account in the calculation of the annualised agreed rate or NDER is 10%. In general, for variable rates it is assumed that the interest rate remains constant at the level on the date of agreement on the contract, in this example at 10%. This is the same as assuming that the future unknown development of the interest rate is not taken into account. Hence, if the variable rate is agreed and paid per annum, the annualised agreed rate or NDER to be recorded as new business in March 2003 is 10%. If the variable rate is to be paid per month or quarter, the interest rate needs to be annualised. The annualised agreed rate and NDER would then be 10.4713% and 10.3813% respectively.

The interest rate that is recorded for new business is also reflected in the statistics on *outstanding amounts*<sup>38</sup> as the first reporting in March 2003. The subsequent reporting on outstanding amounts reflects the interest rate applied by the reporting institution at the time of the calculation of MFI interest rates and hence shows the variability of the interest rate over time.

#### 4.5 Treatment of taxes, subsidies and regulatory arrangements<sup>39</sup>

##### 4.5.1 Taxes, subsidies and favourable rates

The annualised agreed rate and the NDER reflect what the reporting agent pays on deposits and receives for loans. If the amount paid by one party and received by the other differs, the *point of view of the reporting agent* determines the interest payment covered by MFI interest rate statistics. Following this principle, MFI interest rates:

- are recorded on a gross basis before tax, since the pre-tax interest rates reflect what reporting agents pay on deposits and receive for loans,
- do not take into account *subsidies* granted to households or non-financial corporations by *third parties* such as government, because these subsidies are not paid or received by the reporting agent,
- reflect *favourable rates* that reporting agents apply to their employees. Favourable rates do not include a subsidy granted by a third party but are actually applied by the reporting agent.

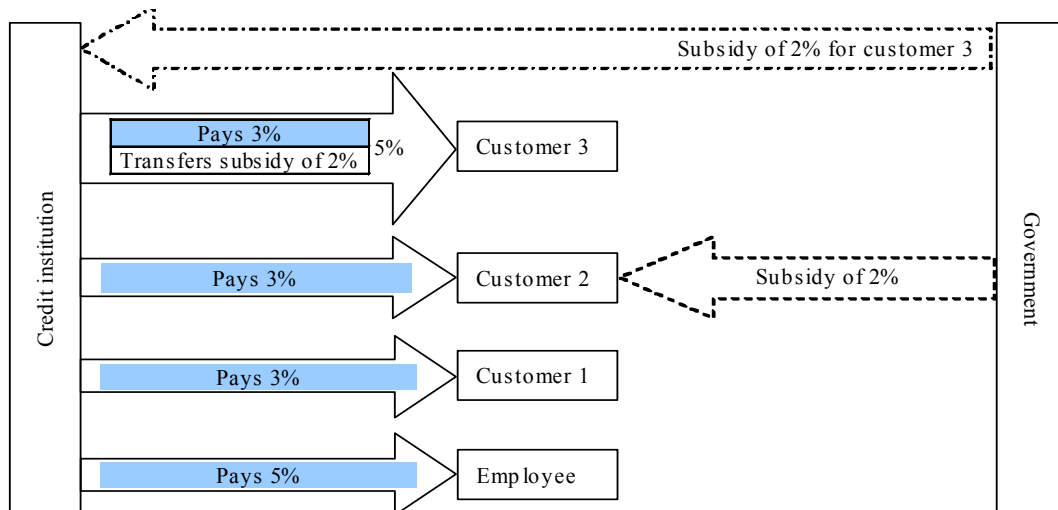
Therefore, in the case of *deposits*, MFI interest rate statistics capture what the credit institution or other institution pays but not what the household or non-financial corporation receives in terms of interest payments. For example, if a customer receives 5% p.a. on a deposit where 3% is actually paid by the reporting agent and the other 2% is a subsidy by a third party, which is transferred to the customer via the reporting agent, then the 3% p.a. is covered by MFI interest rate statistics. Further examples are given in Figure 8. The deposit interest rates covered by MFI interest rate statistics are shaded, i.e. the 3% on the deposits of customers 1, 2 and 3 and the 5% for the employee.

<sup>37</sup> See also Chapter 5.3.1.

<sup>38</sup> See also Chapter 5.1.

<sup>39</sup> See also paragraphs 4 to 8 of Annex II to the Regulation.

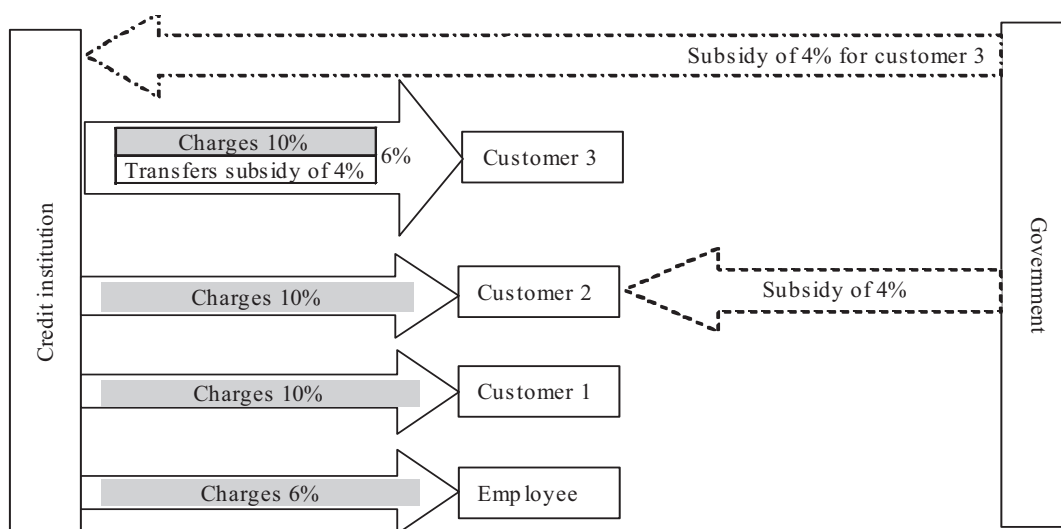
**Figure 8**  
Subsidies and favourable rates on deposits



Analogously in the case of *loans*, MFI interest rate statistics capture what the credit institution or other institution charges in terms of interest rates but not what the household or non-financial corporation pays. For example, if a customer pays 6% p.a. for a loan where 10% is actually charged by the reporting agent but a third party deducts a

4% subsidy from this interest rate, and this is transferred to the customer via the reporting agent, the 10% p.a. is covered by MFI interest rate statistics. Further examples are given in Figure 9. The lending interest rates reflected in MFI interest rate statistics are shaded, i.e. the 10% for the loans of customers 1, 2 and 3 and the 6% for the loan of the employee.

**Figure 9**  
Subsidies and favourable rates on loans





#### **4.5.2 Special national practices including regulatory arrangements**

Where national *regulatory arrangements* affect interest payments, for example direct subsidies on certain types of instruments or interest rate ceilings, these are reflected in MFI interest rate statistics. Any change to the regulatory arrangements, for example an increase (decrease) in the level of administered interest rates, is shown in the statistics as an increase (decrease) of the respective MFI interest rate.

In addition to national regulatory arrangements, the level and development of MFI interest rates may also be influenced by *special national practices* that are not legally binding. These can include national conventions, institutional arrangements and specific deposit or lending products offered at national level:

- *National conventions* cover usual banking practices which give rise to lower or higher than usual interest rates, which are not necessarily due to legal acts, for example a general but not legally enforced 0% remuneration on overnight deposits.
- *Institutional arrangements* are similar to national conventions but affect only a specific group of institutions. The legal status of these arrangements is irrelevant for the purpose of analysing the MFI interest rate statistics.
- *Specific national products* may, as a result of their special features, carry unusually high or low interest rates compared with other products falling into the same instrument category. The treatment of some specific products is defined in paragraphs 74 to 82 of Annex II to the Regulation. Additional specific products are included in Chapter 9 of this document.

All special national practices, comprising regulatory arrangements, national conventions, institutional arrangements and

specific products, that are important because they have a *significant* influence on the level and/or development of the deposit and lending rates set by MFIs, are documented in *methodological notes* prepared by the ECB. The aim of these is not to provide a complete overview of existing regulatory arrangements and specific national products but rather to cover those phenomena that are relevant for a correct analysis and interpretation of MFI interest rate statistics. For example, the following are covered: direct subsidies on certain types of instruments, interest rate ceilings, 0% remuneration on overnight deposits, deposits placed at (close to) 0% interest, loans granted at (close to) 0% interest, and unusually high interest rates offered on specific national products.

#### **4.5.3 The annualised agreed rate formula for subsidised loans**

*Question:*

How should the annualised agreed rate be calculated for a subsidised loan, where the credit institution receives interest payments from its customer and the subsidy from the government at different frequencies? For example, the credit institution receives 6% interest for a subsidised loan, 4% directly from the customer and 2% from the government. The interest payments by the customer take place monthly, whereas those by the government are made only twice a year. Hence, no single value exists for the variable  $n$  in the annualised agreed rate formula (Equation 1):  $n$  would be 12 for the interest paid by the customer and 2 for the interest paid by the government.

*Answer:*

In this example of a subsidised loan at 6% p.a. where the customer pays 4% p.a. at monthly frequency and the government pays the subsidy of 2 % p.a. every six months, the rate recorded in MFI interest rate statistics is 6.1416% calculated as NDER.



Equation 1 cannot derive this result. This simple formula allows either the use of  $n = 12$ , which gives 6.17%, assuming that both customer and government pay monthly or, alternatively, it permits the division of the loan into two parts: one at 4% with  $n = 12$  and one at 2% with  $n = 2$ , leading to 6.08% in total. Both results are incorrect. Equation 1 can be applied as long as there is only one frequency for all the payments but does not deliver correct results for more complex products. NCBs are free to adjust Equation 1 to make it fit to more complex national products. Alternatively, NCBs may ask the reporting agents to calculate the NDER for complex products.<sup>40</sup>

## 4.6 Annual percentage rate of charge<sup>41</sup>

### 4.6.1 Definition and link to the Consumer Credit Directive

The APRC is defined in Article 1a(1)(a) of Directive 87/102/EEC<sup>42</sup> (hereinafter the 'Consumer Credit Directive') as 'that rate, on an annual basis which equalizes the present value of all commitments (loans, repayment and charges), future or existing, agreed by the creditor and the borrower, [and] shall be calculated in accordance with the mathematical formula set out in Annex II'. Annex II gives the following basic equation expressing the equivalence of loans on the one hand and repayments and charges on the other: "

$$\sum_{K=1}^{K=m} \frac{A_K}{(1+i)^{t_K}} = \sum_{K'=1}^{K'=m'} \frac{A'_{K'}}{(1+i)^{t_{K'}}$$

[Equation 7]

Meaning of letters and symbols:

$K$  Number of a loan

$K'$  Number of a repayment or a payment of charges

$A_K$  Amount of loan number  $K$

$A'_{K'}$  Amount of repayment number  $K'$

$m$  Number of the last loan

$m'$  Number of the last repayment or a payment of charges

$t_K$  Interval, expressed in years and fractions of a year, between the date of loan 1 and those of subsequent loans 2 to  $m$

$t_{K'}$  Interval, expressed in years and fractions of a year, between the date of loan 1 and those of repayments or payments of charges 1 to  $m'$

$i$  Percentage rate that can be calculated (either by algebra, by successive approximations, or by a computer programme) where the other terms in the equation are known from the contract or otherwise.

Remarks:

(a) The amounts paid by both parties at different times shall not necessarily be equal and shall not necessarily be paid at equal intervals.

(b) The starting date shall be that of the first loan.

(c) Intervals between dates used in the calculation shall be expressed in years or in fraction of a year. A year is presumed to have 365 days or 365.25 days or (for leap years) 366 days, 52 weeks or 12 equal months. An equal month is presumed to have 30.41666 days (i.e. 365/12).

(d) The result of the calculation shall be expressed with an accuracy of at least one decimal place.<sup>43</sup> When rounding to a particular decimal place the following rule

<sup>40</sup> This is analogous to countries that have to take into account the disagio. The Regulation requires in paragraph 1 of Annex II that the disagio is reflected in MFI interest rates as if it were an interest rate payment. This is not possible by means of the annualised agreed rate formula as given in Equation 1. NCBs of Member States that use the annualised agreed rate and have disagio need to adjust Equation 1 accordingly, which is further discussed in Chapter 4.2.7.

<sup>41</sup> See also paragraphs 9 to 11 of Annex II to the Regulation.

<sup>42</sup> See footnote 21.

<sup>43</sup> This is a direct quote from Directive 87/102/EEC and only included here to illustrate the requirements of the Directive. Paragraph 69 of Annex II to the Regulation specifies that 'NCBs shall provide the MFI interest rates on outstanding amounts and on new business to the ECB with a detail of four decimal places. This shall be without prejudice to the decision taken by the NCBs on the level of detail at which they wish to collect the data. The published results shall not contain more than two decimal places.' Hence it is up to the NCB to define the level of detail at which the reporting agents submit the data to the NCB.

shall apply: if the figure at the decimal place following this particular decimal place is greater than or equal to 5, the figure at this particular decimal place shall be increased by one.

- (e) Member States shall provide that the methods of resolution applicable give a result equal to that of the examples presented in Annex III of Directive 98/7/EC (where examples of calculation are provided).”

The repayment amounts refer to the ‘total costs of the credit to the consumer’.<sup>44</sup> These are ‘all the costs, including interest and other charges, which the consumer has to pay for the credit. The following charges are excluded:

- (i) charges payable by the borrower for non-compliance with any of his commitments laid down in the credit agreement;
- (ii) charges other than the purchase price which, in purchase of goods and services, the consumer is obliged to pay whether the transaction is paid in cash or by credit;
- (iii) charges for the transfer of funds and charges for keeping an account intended to receive payments towards the reimbursement of the credit the payment of interest and other charges except where the consumer does not have reasonable freedom of choice in the matter and where such charges are abnormally high; this proportion shall not, however, apply to charges for collection of such reimbursements or payments, whether made in cash or otherwise;
- (iv) membership subscriptions to associations or groups and arising from agreements separate from the credit agreement, even though such subscriptions have an effect on the credit terms;
- (v) charges for insurance or guarantees: included are, however, those designed to ensure payment to the creditor, in the event of the death, invalidity, illness or unemployment of the consumer, of a sum equal to or less than the total amount of the credit together with relevant interest

and other charges which have to be imposed by the creditor as a condition for credit being granted.”

The repayment amount comprises an interest rate component and a component made up of other (related) charges. The composition of the component of other charges varies across countries because the definitions in the Consumer Credit Directive are applied differently and because national financial systems and the procedure for securing credits differ. No positive list of charges to be taken into account in the calculation of the APRC exists. For the purposes of MFI interest rate statistics, the definition of the component of other charges has *not* been further harmonised than what is already laid down in the Consumer Credit Directive. If this Directive is revised, the changes will also affect the APRC collected for MFI interest rate statistics.

Although significant charges might be applied in all lending categories, the Regulation requires the compilation of an APRC only for consumer credit and loans to households for house purchases (indicators 30 and 31 in Figure 21). For these two lending categories, EU legislation already obliges or recommends creditors to provide consumers in the case of new loans with the APRC:

- Under the Consumer Credit Directive, creditors are obliged to inform consumers in writing about the APRC for all new consumer loans.<sup>45</sup>
- The Commission Recommendation of 1 March 2001 on pre-contractual information to be given to consumers by lenders offering home loans<sup>46</sup> gives guidance on

<sup>44</sup> Article 1(d) of Directive 87/102/EEC.

<sup>45</sup> Further information available at [http://europa.eu.int/comm/consumers/policy/developments/cons\\_cred/index\\_en.html](http://europa.eu.int/comm/consumers/policy/developments/cons_cred/index_en.html).

<sup>46</sup> OJ L 69, 10.3.2001, p. 23.

the information that should be provided to consumers in the case of domestic and cross-border home loans. A home loan is defined as 'a credit to a consumer for the purchase or transformation of the private immovable property he owns or aims to acquire, secured either by a mortgage on immovable property or by a surety commonly used in a Member State for that purpose'. Consumers should be given a 'European standard information sheet' that covers the APRC. The guidelines incorporated in the Commission Recommendation were agreed in the form of a Voluntary Code of Conduct between the mortgage-lending industry and consumer groups. Member States and all lenders offering home loans in the EU, regardless of whether they are members of the EU associations and federations which negotiated the Code of Conduct, are invited to comply with the Commission Recommendation by 30 September 2002. If compliance is unsatisfactory, the Commission may consider proposing a binding legal instrument.<sup>47</sup>

The Consumer Credit Directive and the Commission Recommendation capture the large majority of loans to households and require information about the APRC. The exceptions are consumer loans backed by a mortgage guarantee and non-secured housing loans. These cases are expected to be covered by the forthcoming revision of the Consumer Credit Directive.

#### **4.6.2 Indicator for other loan charges**

In general, MFIs pay interest on deposits to their customers but also charge fees. Analogously, MFIs usually receive payments for the loans granted from their customers comprising an interest rate component and a component of other related charges. Both components may have an impact on the monetary transmission mechanism.

The annualised agreed rates and NDERs collected for the purposes of MFI interest

rate statistics provide extensive information about the interest paid on deposits and charged for loans by credit institutions and other institutions. The APRCs collected for consumer credit and loans to households for house purchases incorporate indistinguishably information about the interest rate and related fees charged by the same institutions. Hence, the APRC can change from one month to another as a result of changes in the interest rate component or the component of other charges or both.

Since there are no methodological differences between the annualised agreed rate and the NDER on the one hand and the APRC on the other hand, the APRC should not be lower than the annualised agreed rate (or NDER) because it includes charges in addition to the interest rate. The mathematical difference between the APRC and the annualised agreed rate (or NDER) therefore represents the component of other charges applied to loans. Indeed, the main aim of collecting the APRC for the purposes of MFI interest rate statistics is to construct an indicator of *other loan charges* applied to consumer credit and loans to households for house purchases, which allows monitoring the development of loan charges over time.

Significant charges might be applied in all lending categories. However, MFI interest rate statistics provide data only on charges on consumer credit and loans to households for house purchases. In order to limit the reporting burden on credit institutions and other institutions, the Regulation requires no information related to charges for bank overdrafts, loans to households for other purposes and loans to non-financial corporations. For deposits, charges are assumed to be less significant than for loans, hence no data are collected.

<sup>47</sup> Further information available at [http://europa.eu.int/comm/internal\\_market/en/finances/consumer/homeloans-en.pdf](http://europa.eu.int/comm/internal_market/en/finances/consumer/homeloans-en.pdf).

#### **4.6.3 Charges to be taken into account at national level**

##### *Question:*

The transposition of the Consumer Credit Directive into national law may require the calculation of the APRC with respect to loans to households for house purchases based on assumptions that are not identical with those in the Directive. In particular, the national legislation in one Member State requires the exclusion of mortgage protection insurance as a relevant charge from the APRC. In this Member State, mortgage protection insurance is compulsory for the vast majority of housing loans. However, the credit institution or other institution does not always know the amount of the mortgage protection premium applicable to the individual borrower, as the insurance policy may be arranged through an insurance intermediary other than the lender. Accordingly, under national law the costs of such insurance are not included in the APRC for housing loans. Should the national definition of the APRC be followed in this case for the purposes of MFI interest rate statistics?

##### *Answer:*

Paragraph 11 of Annex II to the Regulation acknowledges that the composition of the fees to be taken into account in the APRC may differ across countries, because the Consumer Credit Directive is differently applied. Hence, if national legislation on the APRC provides that mortgage protection insurance should not be considered as a relevant charge in the calculation of the APRC, the reporting agents in that Member State may exclude such mortgage protection from the calculation of the interest rate.

#### **4.6.4 Period of fixation in the calculation of the APRC**

##### *Question:*

The transposition of the Consumer Credit Directive into national law may require the

calculation of the APRC with respect to loans to households for house purchases based on assumptions that are not identical with those in the Directive. In particular, in one Member State the legislator took the view that undue emphasis should not be placed on the initial interest rate, which applies only for a short period relative to the full term of the loan. Therefore, the national legislation requires the calculation of the APRC based on the assumption that the fixed interest rate at the beginning of the contract applies only for the period specified and that the interest rates applicable to other periods of the contract are the current variable rates. Should the national definition of the APRC be followed in this case for the purposes of MFI interest rate statistics?

##### *Answer:*

The initial period of fixation is discussed in detail in Chapter 7.7.4. In general, MFI interest rates on new business only reflect the interest rate that is agreed for the initial period of fixation at the start of the contract or after renegotiations of the loan. If, after this initial period of fixation, the interest rate automatically changes to a variable interest rate, which might be at a very different level, this is not reflected in new business statistics but in the statistics on outstanding amounts. For example, if a 10-year loan is granted where it is agreed at time  $t_0$  that for the first 12 months the interest is fixed at 10% and then automatically adjusted to EURIBOR plus  $x$  basis points, then the MFI interest rate on new business captures the 10%. The changes in the interest rate over time, i.e. the change from 10% to EURIBOR plus  $x$  basis points and then the movements of EURIBOR over time, are only captured in the MFI interest rates on outstanding amounts.

In general, this approach should be followed for *all* contracts with initial rate fixation. However, if according to the national legislation the calculation of the APRC warrants a different treatment for certain products with initial rate fixation, then the same treatment should also be applied for

these products to calculate the interest rate without charges. The reason for using the same method of calculation for the interest rate with and without charges is that the difference between them should serve as an indicator for loan charges as discussed in Chapter 4.6.2.

In this example, the national legislation requires that the APRC for loans to households for house purchases should be based on the assumption that the fixed rate applies for only the period specified and that the interest rates applicable to other periods of the contract are the current variable rates. If the reporting agents follow this approach for calculating the APRC for the purposes of MFI interest rate statistics, this is reflected in the new business indicator 31 in Figure 21 referring to loans to households for house purchases. The difference between indicator 31 and the interest rate for loans to households for house purchases without charges, i.e. the weighted average of new business indicators 16 to 19 in Figure 20, should only be the charges. Hence, the assumption for the initial fixed rate that is applied to indicator 31 also needs to be applied for new business indicators 16 to 19 referring to loans to households for house purchases with variable rate and up to one year initial rate fixation, over one and up to five years initial rate fixation, over five and up to ten years initial rate fixation, and over ten years initial rate fixation. As a consequence, the NDER needs to be compiled for new business indicators 16 to 19 in this Member State, because the annualised agreed rate could only take into account the fixed rate at the beginning of the contract.

The alternative is that the credit institutions ignore the national legislation regarding the APRC and report for the purposes of MFI interest rate statistics the fixed rate including charges as the APRC and the fixed rate without charges as annualised agreed rate.

#### 4.6.5 Treatment of subsidies in the APRC

Question:

The transposition of the Consumer Credit Directive into national law may require that the APRC reflects the total costs for a loan from the *point of view of the customer*. For example, a credit institution grants a loan at 10% p.a., where the customer pays 6% and the government transfers the remaining 4% as a subsidy directly to the credit institution. In this case, the APRC calculated according to national legislation would reflect the 6% p.a. paid by the customer plus any charges. Should the national definition of the APRC be followed in this case for the purposes of MFI interest rate statistics?

Answer:

The treatment of subsidies is discussed in detail in Chapter 4.5. In general, MFI interest rate statistics take the *point of view of the reporting agent* and not of the customer. This means that in the above example, MFI interest rate statistics would reflect what the credit institution charges in terms of interest rate, i.e. the 10%, but not the 6% interest that the customer pays.

As explained in Chapter 4.6.2, there should be no methodological differences between the APRC and the annualised agreed rate (or NDER). The APRC should not be lower than the annualised agreed rate (or NDER) and the difference between them solely attributable to the existence of other charges applied to loans. It is therefore essential that subsidies are treated in the same way in the annualised agreed rate (or NDER) and the APRC, as otherwise the indicator of other loan charges cannot be interpreted.<sup>48</sup> As a consequence, when calculating the APRC for the purposes of MFI interest rate statistics the point of view of the reporting agent needs to be taken and the national legislation regarding the treatment of subsidies ignored. Therefore,

<sup>48</sup> This is analogous to the argumentation for the treatment of the initial rate fixation in Chapter 4.6.4.

in the above example, both the annualised agreed rate (or NDER) and the APRC need to reflect the 10% interest rate that is charged by the credit institution. If national legislation was followed for the calculation of the APRC, depending on the size of the related charges, the APRC could be lower than the annualised agreed rate (or NDER) because the interest rate component would only reflect the 6% interest paid by the consumer.

In theory it would also be imaginable to apply in this Member State, for all types of rates, the treatment of subsidies as specified in the national legislation, i.e. to take the point of view of the consumer. However, this would not be in line with paragraph 4 of Annex II to the Regulation and would moreover counteract the comparability of MFI interest rate statistics for the euro area.

#### **4.6.6 Treatment of non-profit institutions serving households in the APRC**

As non-profit institutions serving households (NPISHs) are 'not very important' customers for MFIs in terms of deposits placed and loans taken as compared to households and non-financial corporations, following the ESA 95 principle the household sector includes NPISHs for the purposes of MFI interest rate statistics in general.<sup>49</sup> However, for the APRC on loans to households for consumption and for house purchases (indicators 30 and 31 in Figure 21), NCBs may grant a derogation to reporting agents regarding such loans to NPISHs.<sup>50</sup> The reason is that loans to NPISHs may not be covered by the national legislation referring to the calculation of the APRC. It is expected that loans to NPISHs for consumption or house purchase are negligible. If they were not negligible, however, the exclusion of loans to NPISHs from the APRC for consumer credit and loans to households for house purchases and their inclusion in the annualised agreed rate or NDER would lead to a distortion of the indicator for other loan charges.<sup>51</sup>

*Question:*

If an NCB grants the derogation to its reporting agents, this implies that all loans to NPISHs are excluded from the calculation of the APRC. Therefore, the APRC does not cover the *interest rates* on new consumer credit and new loans for house purchases granted to NPISHs. The question is whether, in the calculation of the APRC, NCBs should also exclude the *amount* of new loans granted to NPISHs?

*Answer:*

In order to calculate the APRC as a weighted average rate, the Regulation assumes that it is possible to use the new business volumes that are provided for the calculation of the annualised agreed rate (or NDER).<sup>52</sup> However, these new business volumes includes the amount of new business in respect of loans to households *and* NPISHs, whereas if the derogation is applied, the weighted interest rate to be calculated refers only to households, i.e. excluding NPISHs. Hence, if the derogation is applied, reporting agents and NCBs require additional data to calculate the APRC.

As the reporting agents apply the derogation, it can be assumed that they are in a position to distinguish between households and NPISHs. Therefore, NCBs should ask reporting agents to calculate the APRC with weights covering only households, i.e. excluding NPISHs, and to supply the NCB with additional series for the *amount* of such loans to households. The additional series on the amount of loans to households for consumption excluding NPISHs, i.e. indicator 30, and loans to households for house purchases excluding NPISHs, i.e. indicator 31, need to be transmitted to the ECB. The amounts might not be significant but this is not necessarily known for certain in advance.

<sup>49</sup> See also Chapters 3 and 7.4.

<sup>50</sup> See footnote 1 to paragraph 9 in Annex II to the Regulation.

<sup>51</sup> See also Chapter 4.6.2.

<sup>52</sup> Further discussed in Chapters 10.3 and 10.4.



## 5 Business coverage<sup>53</sup>

### 5.1 Interest rates on outstanding amounts<sup>54</sup>

#### 5.1.1 Definition of outstanding amounts

MFI interest rate statistics on outstanding amounts give information about the interest paid and received by households and non-financial corporations, which allows the analysis of any changes in the disposable income of these sectors and their interest burden. From the point of view of the credit institution or other institution, the statistics also refer to the interest paid or received, which allows the exploration of changes in interest rate margins and banks' profitability. Interest rates on outstanding amounts are furthermore needed to calculate the own rate of return on M3 and its components. A more exhaustive list of uses is given in Chapter 2.

*Outstanding amounts* are defined as the stock of all deposits placed by customers, i.e. households and non-financial corporations, with credit institutions or other institutions, and the stock of all loans granted by credit institutions or other institutions to their customers.

An interest rate on outstanding amounts reflects the weighted average<sup>55</sup> interest rate level applied to the stock of deposits or loans in the relevant instrument category as at the time reference point:<sup>56</sup>

- Interest rates on outstanding *deposits* cover all deposits placed and not yet withdrawn by customers in all the periods up to and including the reporting date.
- Interest rates on outstanding *loans* cover all loans withdrawn and not yet repaid by customers in all the periods up to and including the reporting date; this excludes bad loans and loans for debt restructuring at rates below market conditions.

MFI interest rates on outstanding amounts are therefore statistics on the interest rates *actually applied* to all 'open' deposits and loans.

### 5.1.2 Bad loans and loans for debt restructuring below market conditions

Interest rates on *bad loans* and *loans for debt restructuring* below market conditions are not collected for the purposes of MFI interest rate statistics. As these loans in general receive little or no interest payment, their inclusion would distort the results. Although the *interest rates* on bad loans and loans for debt restructuring below market conditions are excluded from MFI interest rate statistics, their *amounts* are included in the weighting information used for aggregating MFI interest rates. The reason is that the amounts outstanding are taken from MFI balance sheet statistics and these cover bad loans and loans for debt restructuring.

No harmonised definitions for bad loans and loans for debt restructuring apply. To the extent possible, NCBs should use existing national definitions. It is recognised that these definitions may differ across countries. The ECB does not recommend any (common) definitions. However, the ECB monitors that the applied national definitions exclude *all* bad loans and loans for debt restructuring below market conditions from MFI interest rates. Moreover, the ECB monitors that the national definitions do *not* exclude loans below market conditions that are not bad loans or loans for debt restructuring, as for example favourable interest rates offered by credit institutions to employees. As explained in Chapter 4.5.1, favourable rates are included in MFI interest rate statistics.

<sup>53</sup> This chapter refers mainly to Part 2 of Annex II to the Regulation.

<sup>54</sup> See also paragraphs 14 to 16 of Annex II to the Regulation.

<sup>55</sup> Aggregations are discussed in Chapter 10.

<sup>56</sup> The time reference point is discussed in Chapter 6.1. Paragraph 15 of Annex II to the Regulation states that interest rates on outstanding amounts cover all outstanding contracts that have been agreed in all the periods up to and including the reporting date. This might be misleading. For example, if a loan is agreed in March 2003 but the first money only withdrawn in April 2003, then the loan appears in the statistics on outstanding amounts for the first time in April 2003. See also the treatment of a loan in tranches in Chapter 5.3.8.

## 5.2 Interest rates on overnight deposits, deposits redeemable at notice and bank overdrafts<sup>57</sup>

### 5.2.1 The balance at the time reference point as indicator for new business

The general concept of interest rates on outstanding amounts is subject to Chapter 5.1. Interest rates on new business are explained in Chapter 5.3. Three instrument categories, i.e. overnight deposits, deposits redeemable at notice and bank overdrafts,<sup>58</sup> form a separate group for which the interest rates on outstanding amounts and new business coincide. The MFI interest rates for overnight deposits, deposits redeemable at notice and bank overdrafts are designed to measure new business in each of the three instrument categories. They are therefore included as new business indicators 1, 5, 6, 7, 12 and 23 in Figure 20. The method for compiling these indicators is, however, the same as for interest rates on outstanding amounts. This is reflected by means of Figure 19, which presents the new business indicators 1, 5, 6, 7, 12 and 23 next to the MFI interest rates on outstanding amounts in Figure 18.

Overnight deposits, deposits redeemable at notice (in particular non-transferable sight saving deposits<sup>59</sup>) and bank overdrafts form a separate group because they experience a large number of inflows and outflows throughout the month. The increases and decreases in the amount on these accounts arise from receipts and payments related to the customer's economic activity, and are therefore related to transactions rather than to the autonomous investment decisions of the customer. Also, the greater part of the deposit or bank overdraft is usually turned over during the period. The *balance at the time reference point*<sup>60</sup> is considered to be the most appropriate indicator for new business:

- For overnight deposit and deposit redeemable deposits, the balance at the time reference point reflects the amount the customer has chosen to leave on this

type of deposit instead of placing the money elsewhere.

- For bank overdrafts, the balance at the time reference point reflects the amount the customer has chosen to leave as a debit balances on a current or chequing account instead of borrowing the money elsewhere.

By leaving a 'net' (debit/credit) balance on the overnight deposit<sup>61</sup> or deposit redeemable at notice the customer has implicitly agreed to the terms and conditions of the account, which is a precondition for new business. The customer adjusts this balance as part of his or her portfolio management. The balance at the time reference point is in fact the outstanding amount at the time reference point, which means in other words that the concept of new business is extended to the whole stock in the case of overnight deposits, deposits redeemable at notice, and bank overdrafts.

In addition to these conceptual considerations, there are also several practical reasons for using the balance at the time reference point as an indicator for new business on overnight deposits, deposits redeemable at notice and bank overdrafts. If instead the definition of new business were based on increases in the amount on existing deposit or loan accounts, this would lead to a heavy reporting burden on credit institutions and other institutions due to the large number of inflows and outflows throughout the month. Also, the weight based on all inflows and outflows would overestimate the amount of new business on these accounts.

<sup>57</sup> See also paragraphs 17 to 19 of Annex II to the Regulation.

<sup>58</sup> All defined in Chapter 7.5.

<sup>59</sup> Non-transferable sight savings deposits, which although legally redeemable on demand are subject to significant penalties, have features that are very close to overnight deposits and are offered by credit institutions in some Member States. According to Regulation ECB/2001/13, they are classified as deposits redeemable at up to three months' notice.

<sup>60</sup> The time reference point is further discussed in Chapter 6.1.

<sup>61</sup> The overnight deposit becomes a bank overdraft in the case of a debit balance; see also Chapter 7.5.2.



Analogous to the interest rates on outstanding amounts discussed in Chapter 5.1, the MFI interest rates for overnight deposits, deposits redeemable at notice and bank overdrafts reflect the weighted average interest rate level applied to the stock of deposits or loans in the relevant instrument category as at the time reference point:

- The interest rates for overnight deposits and deposits redeemable at notice cover all amounts placed and not yet withdrawn by customers in all the periods up to and including the reporting date.
- The interest rates on bank overdrafts cover all amounts withdrawn and not yet repaid by customers in all the periods up to and including the reporting date.

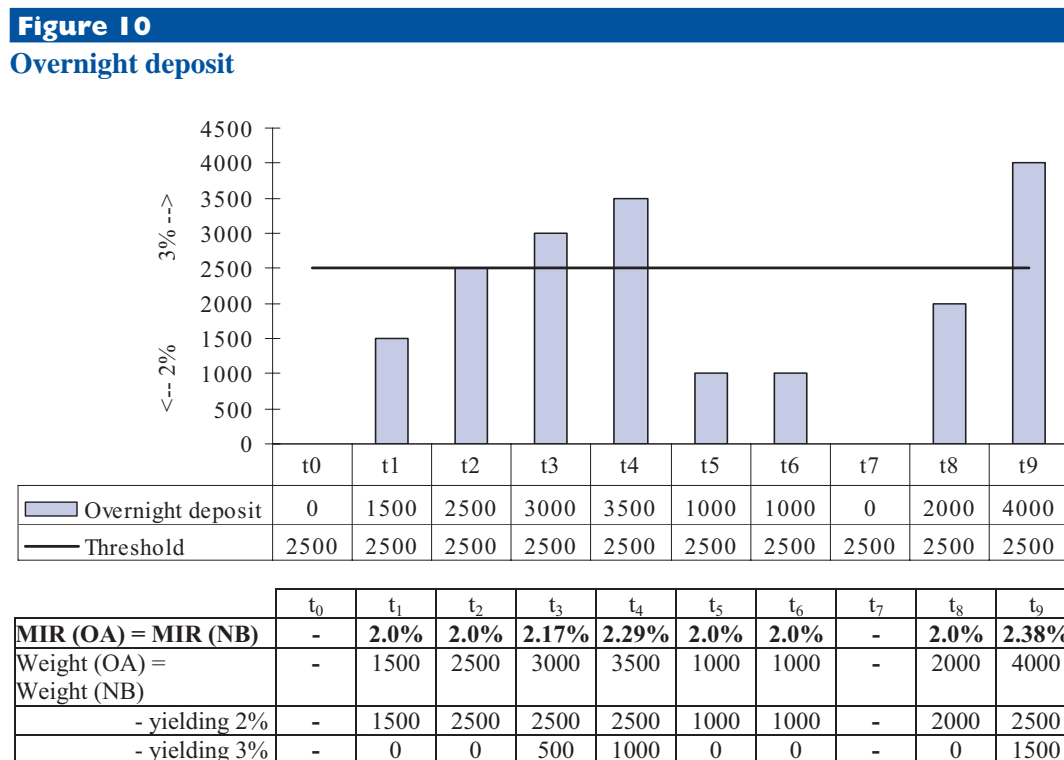
exceeding EUR 2,500. The same figure could also represent a non-transferable sight saving deposit or a bank overdraft. In the latter case the account would not 'yield' but 'cost' interest.

In this manual, *MIR (OA)* indicates the MFI interest rate on outstanding amounts and *MIR (NB)* the MFI interest rate on new business. *Weight (OA)* and *weight (NB)* show the weighting information that would be applied to the interest rates on outstanding amounts and new business respectively in aggregations with values for other comparable accounts in this or other reporting agents.<sup>62</sup> As a result of extending the definition of new business for overnight deposits to the whole stock, the interest rates and weights for new business and outstanding amount coincide in Figure 10.

### 5.2.2 Determining the interest rate on an overnight deposit

Figure 10 shows an example of an overnight deposit yielding 2% p.a. for an amount up to EUR 2,500 and 3% p.a. for any amount

<sup>62</sup> Aggregations are discussed in Chapter 10.



Each of the periods  $t_0$  to  $t_9$  represent one month. In this example, the MFI interest rates are calculated as a snapshot of end-month observations.<sup>63</sup> Hence, the amount and interest rate observations in Figure 10 are end-month values. For example, at the end of the first month  $t_1$  an amount of EUR 1,500 is available on the overnight deposit yielding 2% interest and, therefore, the MFI interest rate on this account at time  $t_1$  is 2.0%. At time  $t_3$ , EUR 3,000 is available on this deposit, where EUR 2,500 yields 2% and EUR 500 yields 3% interest. Hence, the MFI interest rate for  $t_3$  is calculated as  $(0.02 * 2500 + 0.03 * 500) / 3000 = 2.17\%$ . At time  $t_9$ , the MFI interest rate is calculated as  $(0.02 * 2500 + 0.03 * 1500) / 4000 = 2.38\%$ . These interest rates reflect a snapshot of the deposit at the time of data collection. They may of course differ from the actual amount of interest earned during the month, the latter being covered by implicit rates.

can either be a deposit or a loan, such as for example for overnight deposits and bank overdrafts? Reporting agents do not know in advance whether the account will be a deposit or turn into a loan in the coming period.

Answer:

MFI interest rates are determined *ex post*, i.e. for the month prior to the reporting date. To calculate the MFI interest rate for a combined deposit and loan facility, periods where the account was a (positive) overnight deposit have to be distinguished from periods where the account was a (negative) bank overdraft. For analytical reasons, it would not be appropriate to compute an average interest rate combining (low) overnight deposit rates and (high) bank overdraft rates. An example for a combined deposit and loan facility is given in Figure 11.

For combined deposit and loan facilities, two compilation methods need to be distinguished:<sup>64</sup>

**5.2.3 Combined deposit and loan facilities**

Question:

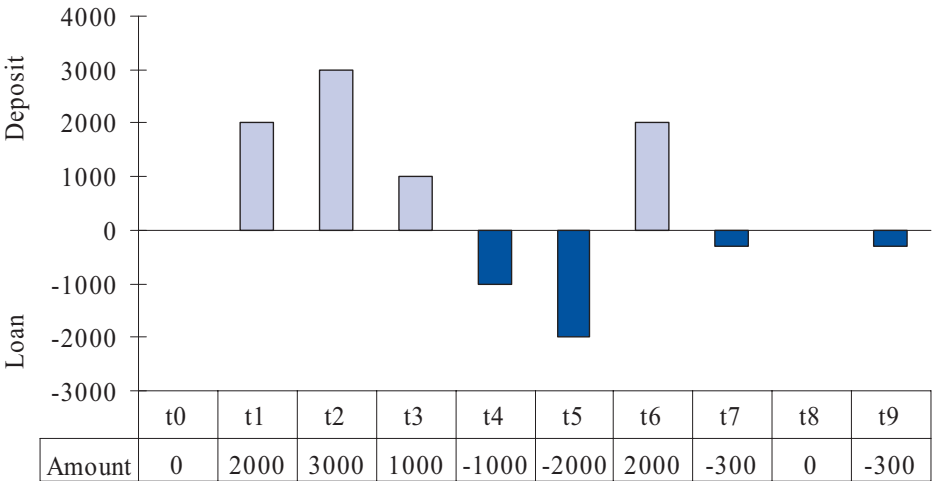
How should the annualised agreed rate or NDER be calculated for financial products on accounts that, depending on their balance,

63 Further discussed in Chapter 6.1. An alternative calculation based on implicit rates is possible but shall not be demonstrated here.

64 The time reference point and hence the two compilation procedures are further discussed in Chapter 6.1.

**Figure 11**

**Combined deposit and loan facility**



- If the interest rate is compiled as a *snapshot of end-month observations*, only one balance during the month is taken into account to decide whether the account in the reference month is an overnight deposit or a bank overdraft. This balance is a snapshot at a certain point in time on the last day of the month.
- If the interest rate is calculated as an *implicit rate referring to the average of the month*, for each *daily* balance the reporting agent needs to assess whether the account is a deposit or a loan. The reporting agent then calculates an average of the daily credit balances and the daily debit balances to derive the average monthly stocks for the denominator of the implicit rate. Also, for the flows in the numerator the accrued interest payable on deposits and receivable on loans need to be distinguished.

If in Figure 11 each of the periods  $t_0$  to  $t_3$  represents one *month*, then  $t_1$ ,  $t_2$ ,  $t_3$  and  $t_6$  are recorded as overnight deposits and  $t_4$ ,  $t_5$ ,  $t_7$  and  $t_9$  as bank overdrafts. If each of the periods  $t_0$  to  $t_9$  represents one *day* and  $t_9$  the reporting day, then a bank overdraft is reported if the method of end-period observations is chosen, because only the situation at the time of data collection is relevant.

#### 5.2.4 Regular savings on a deposit redeemable at notice<sup>65</sup>

Question:

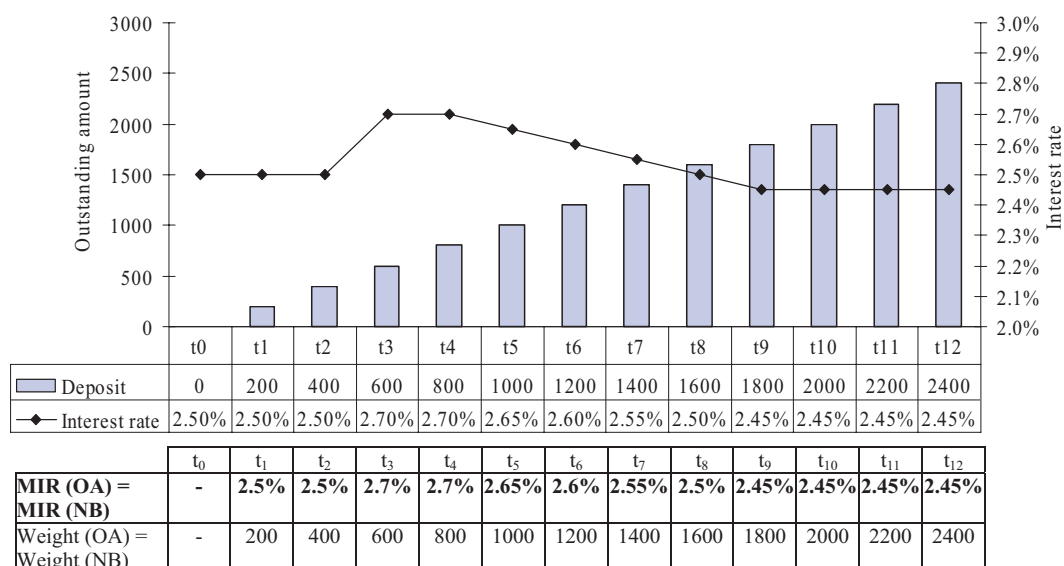
A deposit redeemable at notice is subject to regular savings of EUR 200 per month for five years. What should be reflected in the statistics on new business and outstanding amounts?

Answer:

For deposits redeemable at notice the concept of new business is extended to the whole stock. Hence, the credit balance, i.e. the amount outstanding at the time reference point, is used as an indicator for new business. In this example, the initial savings of EUR 2,000 and all subsequent savings of EUR 200 are reflected in the amount outstanding on the account and hence in MFI interest rate statistics. An example for the first year is given in Figure 12.

<sup>65</sup> See also regular savings on deposits with agreed maturity explained in Chapter 5.3.4.

**Figure 12**  
Deposit redeemable at notice



### 5.3 Interest rates on new business<sup>66</sup>

#### 5.3.1 Definition of new business

MFI interest rate statistics on new business are statistics on the interest rates laid down in new agreements. They reflect the demand and supply conditions in the deposit and loan markets at the time of the agreement, including competition with other types of financial institution and product. These statistics are needed to analyse the pass-through of changes in official rates and market interest rates to lending and deposit interest rates faced by households and non-financial corporations. They provide information about the cost of capital and the cost spread between self-financing and credit. MFI interest rates on new business allow the study of prices and quantities together which helps for example to explain portfolio shifts. They also show how quickly banks' interest rate margins react to external developments.

*New business* in these instrument categories is defined as any new agreement between the customer and the credit institution or other institution. *New agreements* are:

- all financial contracts, terms and conditions that specify for the *first* time the interest rate of the deposit or loan, and
- all *new negotiations* of existing deposits and loans.

Prolongations of existing deposit and loan contracts that occur *automatically*, i.e. without any active involvement of the customer, and do not involve any renegotiations of the terms and conditions of the contract, including the interest rate, are *not* new business.

An interest rate on new business reflects the weighted average<sup>67</sup> interest rate level that has been agreed for all new deposits or loans in the relevant instrument category during the reference month. Interest rates on new business cover all new agreements during the whole month<sup>68</sup> prior to the reporting date.

MFI interest rate statistics on new business are distinct from MFI interest rates on outstanding amounts that, as explained in Chapter 5.1, reflect the interest rates actually applied to the stock of deposits and loans. In the extreme case, an interest rate laid down in a new agreement may never actually be applied to any deposit or loan. For example, a customer and a credit institution might agree on an interest rate for a certain amount of money but the customer might in the end choose not to place any deposit with this institution or analogously decide not to withdraw any of the money granted as a loan. As a consequence, both the agreed interest rate and amount would be reflected in the MFI interest rate statistics on new business at the time of agreement, but never appear in the MFI interest rate statistics on outstanding amounts.

#### 5.3.2 New business on deposits with agreed maturity

For most deposits with agreed maturity, i.e. classic time deposits where a fixed sum is placed for a predefined period of time, new business only arises when a new account is opened for the first time, at which point the deposit amount and the interest rate are agreed. *Normally*, for deposits with agreed maturity no further new business occurs until maturity. An exception to this rule is discussed in Chapter 5.3.4. The treatment of maturing deposits is subject to Chapter 5.3.3.

Figure 13 illustrates the calculation of MFI interest rates on outstanding amounts and new business in an example involving three *separate* deposits with agreed maturity:

- a) at time  $t_1$  EUR 2,000 is placed at 4% p.a. with an agreed maturity of two years;
- b) at time  $t_2$  EUR 2,000 is deposited at 5% p.a. also with an agreed maturity of two years; and

<sup>66</sup> See also paragraphs 20 to 25 of Annex II to the Regulation.

<sup>67</sup> Aggregations are discussed in Chapter 10.

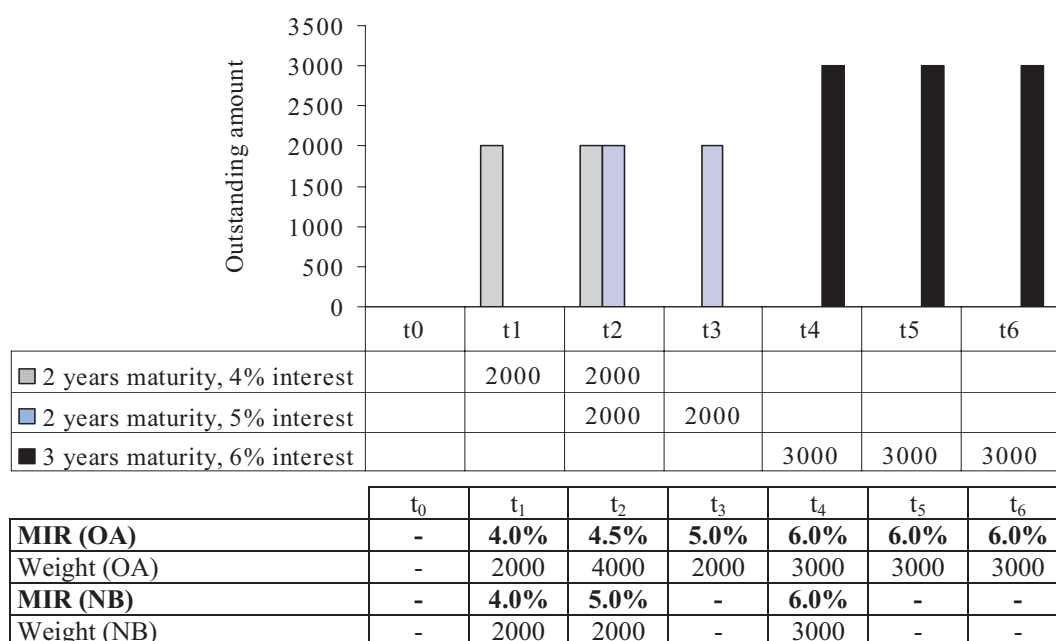
<sup>68</sup> Further discussed in Chapter 6.2.

c) at time  $t_4$  EUR 3,000 is paid in at 6% p.a. with an agreed maturity of three years.

In this example, at time  $t_1$ , an amount of EUR 2,000 is placed as a new deposit. At that time, the MFI interest rate on new business MIR (NB) and on outstanding amounts MIR (OA) is 4.0%, which is indicated in Figure 13. At time  $t_2$ , EUR 2,000 is still on the first

deposit yielding 4% and EUR 2,000 is newly paid into the second deposit yielding 5%. Hence, at time  $t_2$  the MFI interest rate on outstanding amounts comprising both deposits is calculated as  $(0.04 * 2000 + 0.05 * 2000) / 4000 = 0.045 = 4.5\%$ , while the MFI interest rate on new business at time  $t_2$  is 5% referring solely to the new second deposit.

**Figure 13**  
Deposit with agreed maturity



### 5.3.3 Matured deposit with agreed maturity

Question:

A customer's deposit with agreed maturity matures. Following the standard procedure, the reporting agent informs the customer that the matured deposit can be withdrawn within a given period of time. In this example, the customer has three options:

- Option 1: withdraw the funds,
- Option 2: inform the credit institution that he or she wants to make a new

deposit on terms and conditions identical to the matured deposit, or

- Option 3: do nothing, in which case the credit institution will automatically renew the deposit, on identical terms.

Would options 2 and 3 constitute new business?

Answer:

The task is to distinguish between new business and an (automatic) prolongation of an existing contract. The key issue is the

*active involvement* of the customer: an (automatic) prolongation without the active involvement of the customer is not new business, whereas a prolongation with active involvement of the customer is new business. An additional aid for identifying new business is given by the terms and conditions laid down in the existing contract, which in general determine what happens when the deposit with agreed maturity reaches maturity.

Option 2 is new business because the customer is involved in new negotiations with the credit institution. Whether the new deposit is on terms and conditions identical to the old deposit or on new terms and conditions is irrelevant for determining whether new business occurs.

Option 3 is not new business because no new negotiations took place.

In general, the contract for a deposit with agreed maturity defines what happens with the money after maturity, if it is not withdrawn. For example, the contract might determine that the deposit is originally placed for one year at EURIBOR plus 50 basis points. If the funds are not withdrawn at maturity, then they are reinvested at the same terms, i.e. at EURIBOR plus 50 basis points. In this case, if the customer says nothing, it is not new business but an (automatic) prolongation of the contract. If the customer rediscusses the external index 'EURIBOR' or the spread 'plus 50 basis points', then the customer is actively involved and the reinvestment constitutes new business.

It is also possible that the customer on placing a deposit with one-month maturity instructs the credit institution to *rollover* the account each month provided the terms and conditions remain unchanged from one month to the next. The customer stipulates that he or she wishes to be notified if there is a change in the terms and conditions attached to the account. The automatic rolling over is not new business. However, if the terms and conditions change, the customer is contacted and engages in new negotiations, this is

recorded as new business, independent of whether the outcome of the negotiations are the old or new terms and conditions.

When the terms and conditions of a maturing deposit with agreed maturity are renegotiated and as a consequence the deposit is classified as new business, then the maturity of that (new) deposit is counted as commencing at the point of the 'new business' classification.

#### **5.3.4 Regular savings on a deposit with agreed maturity<sup>69</sup>**

*Question:*

A company savings plan is linked to a deposit with agreed maturity. In the contract it is agreed that the company makes regular monthly deposits of EUR 2,000 for a period of two years. The first payment is made a few weeks after the contract date.

- a) What is to be considered as new business, the first deposit of EUR 2,000 or all payments during the lifetime of the contract?
- b) What is to be considered as the starting date, the contract date (in which case there is not yet a payment and no amount of new business) or the first payment date?

*Answer:*

*Ceteris paribus* a credit institution or other institution will offer a different interest rate on a deposit that is:

- progressively increasing over time from EUR 2,000 in  $t_0$  to EUR 48,000 in  $t_{24}$ ,
- fixed at EUR 2,000 for two years, and
- fixed at EUR 48,000 for two years.

The company's regular monthly savings in this example lead to a progressive increase in the

<sup>69</sup> See also *regular savings on deposits redeemable at notice* in Chapter 5.2.4.

outstanding amount on the deposit with agreed maturity. This increase is reflected month after month in the MFI interest rate statistics on *outstanding amounts*. In contrast, the MFI interest rate statistics on *new business* capture the deposit only once at the time of agreement. Hence, the new business statistics can either mirror the initially placed EUR 2,000 or the maximum amount of EUR 48,000, but cannot reflect the progressive increase of the amount on the deposit. The treatment of regular savings on deposits with agreed maturity in new business statistics cannot be defined in general, but depends on the agreements laid down in the individual contract:

Case 1: The customer and the credit institution agree that EUR 2,000 has to be placed each month on the account until maturity. The customer's obligation can be enforced by the credit institution in a way that it is sure *ex ante* that at time  $t_{24}$  EUR 48,000 will be accumulated on the account. In this case, the full amount of EUR 48,000 is reflected as new business in MFI interest rate statistics at the time of agreement on the contract. Most likely the level of the interest is linked to the commitment on the part of the customer. For variable interest rates the value of the rate is determined *at the time of the agreement*.<sup>70</sup>

Case 2: The customer and the credit institution agree on a flexible savings plan, which states that EUR 2,000 should be placed each month on the deposit until maturity. The payments can be lower or higher with (or without) a targeted maximum saving of EUR 48,000 at time  $t_{24}$ . In this case, the amount accumulated on the account at maturity is certain only *ex post*. Therefore, the credit institution reports as new business the amount of EUR 2,000 when it is initially placed. For variable interest rates the

value of the rate is determined *at the time the deposit is placed*.<sup>71</sup>

In the absence of any knowledge to the contrary, Case 2 should be assumed, i.e. that the amount accumulated on the account at maturity is certain only *ex post*. Hence the default option is that credit institutions and other institutions report as new business the EUR 2,000 when it is initially placed. In the case of variable interest rates the value of the rate is determined at the time the deposit is placed.

### 5.3.5 New lending with fixed interest rate and with initial rate fixation

Figure 14 shows the example of a loan that is granted for ten years. At time  $t_0$  it is agreed between the customer and the credit institution that the interest is fixed at 10% p.a. for the first four years, (up to  $t_4$ ) and that after this initial period of fixation a new interest rate level will be agreed for the remaining maturity of the loan.<sup>72</sup> This new interest rate might be fixed for another period or variable, but is in any case unknown at time  $t_0$ . As an example, in Figure 14 the result of the new negotiations at time  $t_4$  is a fixed rate of 8% p.a. for the remaining six years of the loan. The MFI interest rate statistics on new business capture at time  $t_0$  the interest rate of 10% agreed for the first four years and at time  $t_4$  the interest rate which is the result of the new negotiations.

<sup>70</sup> This treatment is analogous to a loan in tranches discussed in Chapter 5.3.8, where it is also the agreement that determines the amount and the time of recording as new business. However, the difference between the savings plan and the loan in tranches is that for the savings plan the interest rate is linked to the increase in the amount and for the loan to the full amount stated in the contract.

<sup>71</sup> This treatment is analogous to the savings plans for housing loans described in paragraph 81 of Annex II to the Regulation and the plan d'épargne-logement defined in paragraph 82. See also Chapter 9.1.

<sup>72</sup> The original maturity of this loan is 10 years with an initial period of fixation of four years. See also Chapter 7.7.4.

**Figure 14**

**10-year loan renegotiated after four years**

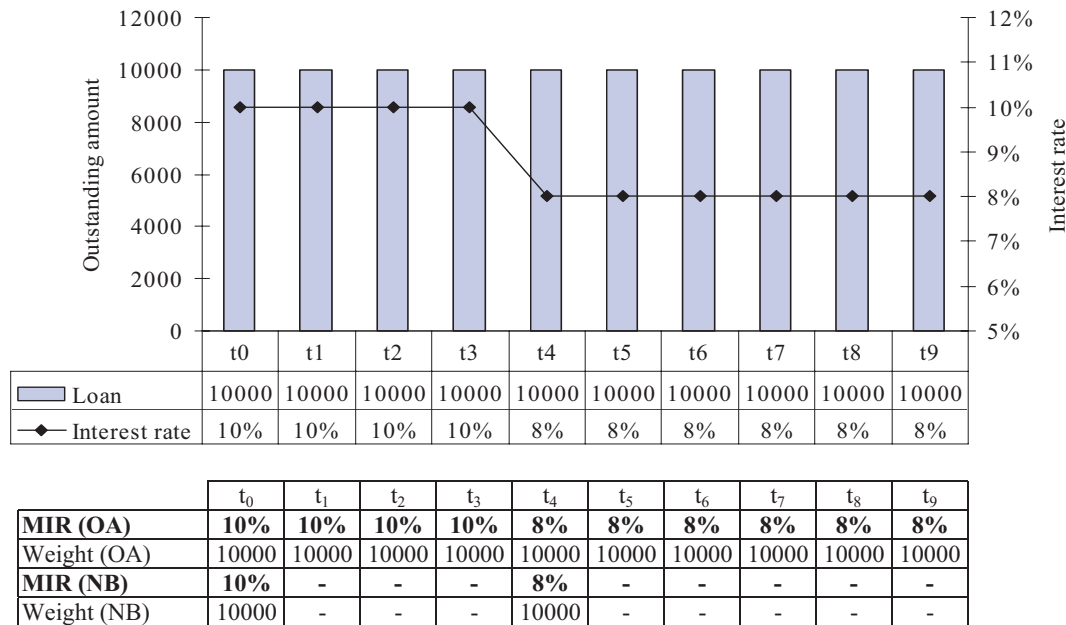


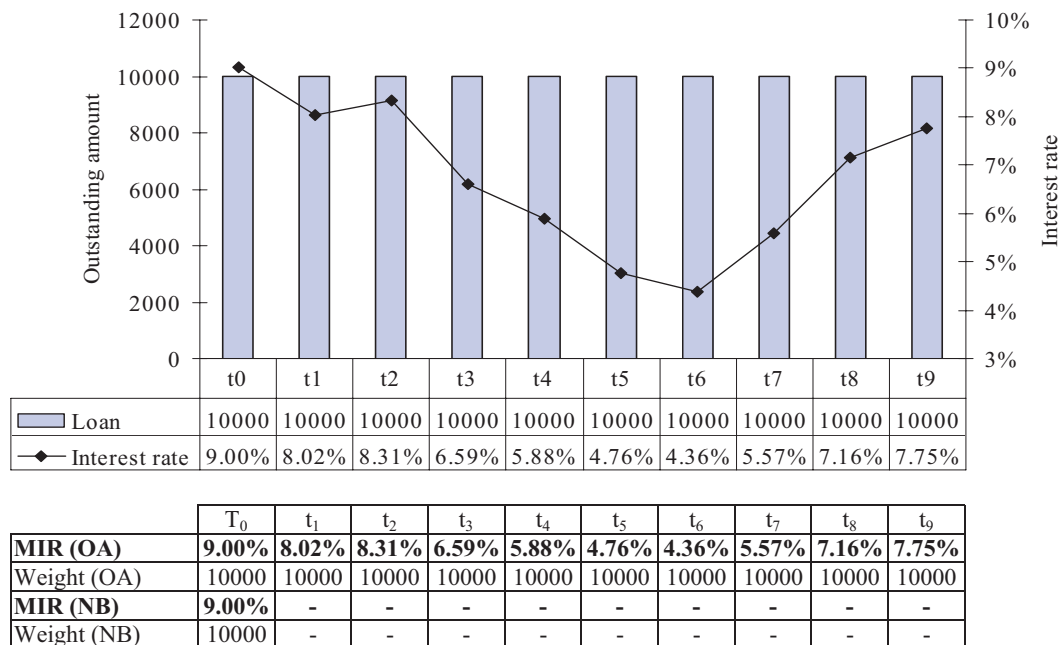
Figure 15 provides another example of a 10-year loan. In this example, at time  $t_0$  the customer and the credit institutions agree that the interest is fixed at 9% p.a. for the first 12 months, and that after this initial period of fixation the interest rate *automatically adjusts* to EURIBOR plus x basis points.<sup>73</sup> This rate is then applied for the next 12 months, after which it will again automatically adjust to EURIBOR plus x basis points. Only the interest rate of 9% for the first year is considered as new business at time  $t_0$ . Neither the switch to variable rates nor the associated automatic adjustments are reflected in the statistics on new business. They are not new agreements but part of the terms and conditions of the loan laid down at time  $t_0$ . In contrast to the previous example, in this example the customer and the credit institution agreed on the variability mechanism for the entire maturity of the loan

at  $t_0$ , i.e. the day of the signature of the loan contract. A change from fixed to variable interest rates or vice versa during the course of the contract, which has been agreed at the start of the contract (time  $t_0$ ), is not a new agreement but part of the terms and conditions of the loan laid down at time  $t_0$ . These changes in the interest rate over time are only captured in the MFI interest rate on outstanding amounts.

<sup>73</sup> The original maturity of the loan is ten years with an initial period of fixation of one year. This example is different to the case where the initial period of fixation is very short as compared to the whole maturity of the loan and the interest rate offered during this period is significantly below market conditions. See also Chapter 7.7.4.



**Figure 15**  
**10-year loan with fixed interest rate for the first year**



### 5.3.6 Top-up loans

Question:

A customer has an outstanding consumer credit of EUR 10,000 at 9% and asks the credit institution to lend a further EUR 5,000. How should this *top-up loan* be treated in MFI interest rate statistics?

Answer:

If an agreement is reached for the *incremental* amount, then only this agreement is new business, i.e. the new loan of EUR 5,000. The additional loan could be at the same interest rate of 9% as the outstanding loan of EUR 10,000, but also at a higher or lower rate.

If the *whole* loan is renegotiated, i.e. the EUR 15,000, then the amount of EUR 15,000 is new business. The interest rate recorded as new business is then the one agreed in the new negotiations between the customer and

the credit institution, which can be 9% as for the old loan, or higher or lower.

### 5.3.7 Conversion of a bank overdraft into another type of loan

Question:

A customer incurred a bank overdraft of EUR 10,000 on which the interest rate is 15% p.a. In agreement with the credit institution, the customer transforms this bank overdraft into a consumer credit on which the interest rate is 10% p.a. Does the conversion represent new business?

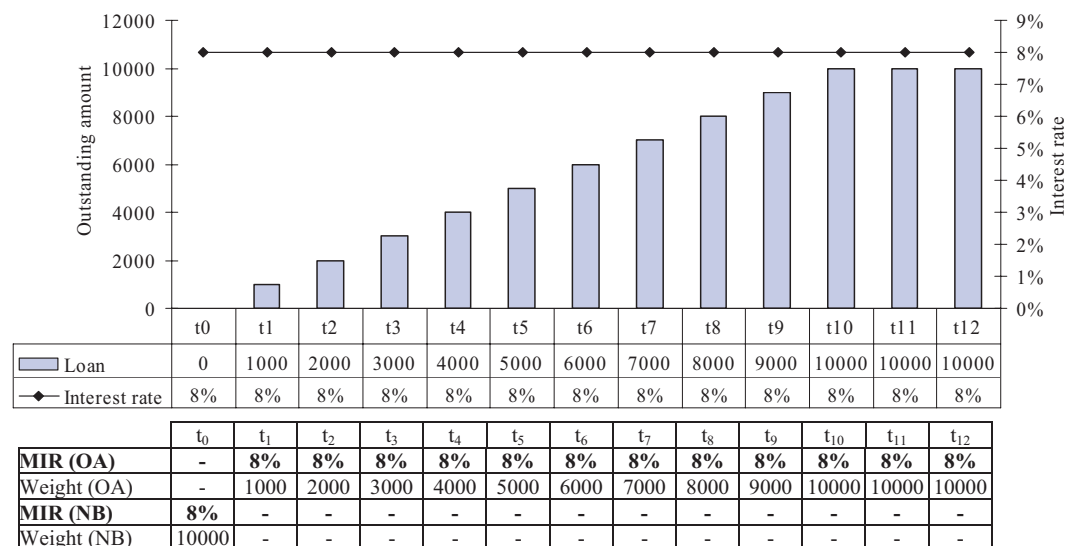
Answer:

The conversion of a bank overdraft into a consumer credit constitutes new business. It requires a new agreement between the credit institution and the customer. Both parties are actively involved in new negotiations.

### 5.3.8 Loan taken out in tranches<sup>74</sup>

**Figure 16**

**Loan in tranches**



A household or non-financial corporation is normally expected to take out a loan – other than a bank overdraft – in full at the start of the contract (time  $t_0$ ). In some cases, however, it may be agreed that the customer takes out the loan in tranches at times  $t_1$ ,  $t_2$ ,  $t_3$ , etc. instead of withdrawing the full amount at time  $t_0$ . Figure 16 shows the first year of a 10-year loan in tranches. In this example, a loan of EUR 10,000 is granted at time  $t_0$  for 10 years fixed at 8% p.a. The customer takes out the first tranche of EUR 1,000 at time  $t_1$  and then further tranches of EUR 1,000 in each of the following nine months.

For MFI interest rate statistics on *new business*, the fact that the loan is taken out in tranches is irrelevant. These statistics capture the *agreement* between the customer and the credit institution at time  $t_0$ , i.e. the full amount of the loan granted at time  $t_0$  and the interest rate agreed in relation to this full amount. New business is therefore the interest rate of 8% for an amount of EUR 10,000 at time  $t_0$ . For fixed and variable rates, the risk premium included in the interest rate depends on the amount of the loan and the economic conditions. These facts can only be captured consistently by recording the interest rate

and the full amount of the loan at time  $t_0$  in MFI interest rates on new business. As explained in Chapter 5.3.1, MFI interest rates on new business are statistics on agreements not on the actually withdrawn credit.

In contrast, the MFI interest rates on *outstanding amounts* are statistics on the actual *withdrawn credit* at any point in time. They reflect the interest rates applied and the amount of the loan actually outstanding<sup>75</sup> at the time of data collection, i.e. the interest rate is 8% for an amount of EUR 1,000 in  $t_1$ , 8% for an amount of EUR 2,000 in  $t_2$ , ..., and finally 8% for an amount of EUR 10,000 in  $t_{10}$  until maturity. No interest rate on outstanding amounts is recorded at time  $t_0$  as no money has yet been withdrawn.

The credit institution or other institution granting the loan in tranches, for example for financing the building of a house, may charge *interest on the amount granted but not yet*

<sup>74</sup> Loans in tranches that fall into the instrument categories consumer credit, loans to households for house purchases and loans to non-financial corporations are covered. Bank overdrafts, which follow the treatment explained in Chapter 5.2.1, are not covered. Umbrella contracts, which are dealt with in Part 6 of Annex II to the Regulation, are also excluded.

<sup>75</sup> Derived from MFI balance sheet statistics.

withdrawn.<sup>76</sup> In this example of an agreed lending rate of 8% for the loan in tranches, the credit institution could ask for an additional 3% on the amount it has agreed to lend but the borrower has not yet taken out. The 3% is *not* covered by MFI interest rate statistics, neither as new business nor as outstanding amounts. The 3% is not considered part of the lending interest rate: it is a related charge that might be covered in the APRC according to national conventions, but not in the annualised agreed rate or the NDER.

### 5.3.9 The definition of new business for variable interest rates

A rise or fall of a variable interest rate in the sense of an *automatic* adjustment of the interest rate performed by the credit institution or other institution is *not* a new agreement and therefore *not* new business. Such changes or movements in variable interest rates over time are not captured by MFI interest rates on new business but by MFI interest rates on outstanding amounts.

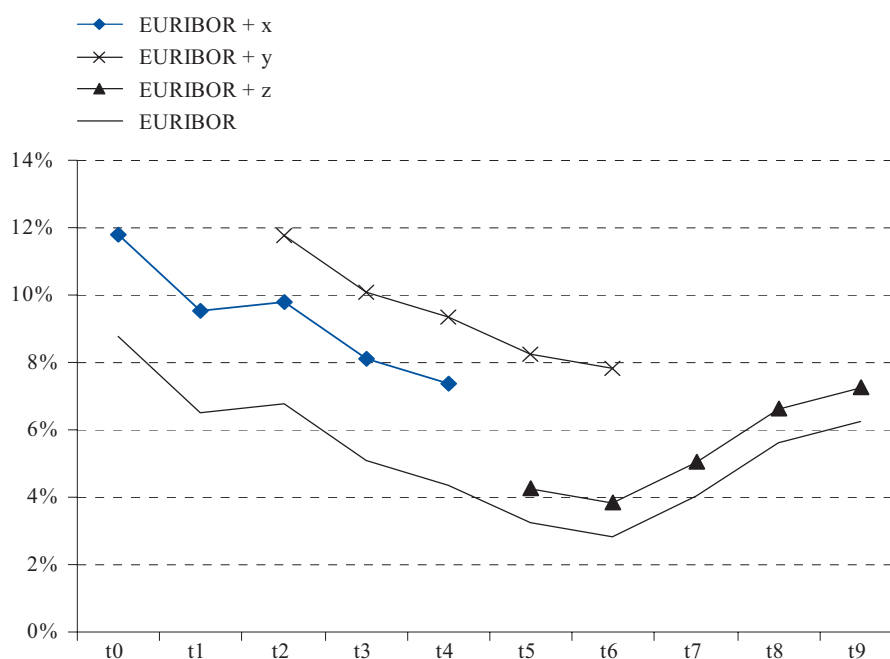
A change from a fixed to a variable interest rate or vice versa during the course of the

contract is *not* a new agreement, if the possibility of such a change is an agreed part of the terms and conditions of the deposit or loan. When the change occurs this is not new business. However, a change from a fixed to a variable interest rate or vice versa *is* new business, if the possibility of the change was not laid down in the initial contract. The change is therefore the result of negotiations between the customer and the credit institution and constitutes new business.

MFI interest rate statistics on outstanding amounts and new business lead to different results not only for deposits and loans with initially fixed or fully fixed interest rates, but also for deposits and loans to which fully variable interest rates apply. Since MFI interest rate statistics reflect the interest rates that are actually agreed between the customer and the credit institution or other institution, interest rates on outstanding amounts and new business only coincide for that part of the interest rate that reflects the external index, i.e. in this example EURIBOR. The spread over this external index might differ across customers but also for the same customer over time.

<sup>76</sup> In Belgium this is referred to as 'commission de non utilisation', in Germany as 'Bereitstellungszinsen'.

**Figure 17**  
Variable interest rates



For example, in Figure 17 at time  $t_0$  a four-year loan at EURIBOR plus  $x$  basis points is agreed. The creditworthiness of the customer, his or her scope for negotiating the interest rate and market conditions vary over time. Hence, at time  $t_2$  the same customer might only reach agreement on a four-year loan at EURIBOR plus  $y$  basis points, but achieve EURIBOR plus  $z$  basis points at time  $t_5$ , with  $z < x < y$ .

Contracts might be agreed between customers and reporting agents that contain very flexible terms and conditions including the level that the variable interest rate may take. In some cases, certain conventions are needed in order to determine the level of the variable interest rate that should be recorded as new business in MFI interest rate statistics. As not all possibilities can be covered in this manual, the examples in Chapters 5.3.10 to 5.3.13 are intended to provide general guidance.

### 5.3.10 Choice of money market index

*Question:*

A loan of EUR 10 million is agreed, which is taken out in tranches.<sup>77</sup> The contract specifies that at the time the withdrawals are being made the customer may choose which of the following interest rates applies: one-month, three-month, six-month or 12-month LIBOR plus 50 basis points. According to paragraph 25 of Annex II to the Regulation, this loan in tranches is new business at the time the contract is agreed for the total amount of EUR 10 million. At that time, however, it is unknown which interest rate the customer will choose for the first and each of the following withdrawals. Which interest rate should be reported as new business?

*Answer:*

For a loan contract that provides the customer with a choice of money market rates as an external index a convention is needed for determining the value of the new

business rate. By convention, MFI interest rate statistics on *new business* record as the value of the variable interest rate either one-month, three-month, six-month or 12-month LIBOR plus 50 basis points, whatever gives the *lowest value* at the time the contract is agreed. The rationale for this convention is that *ceteris paribus* the lowest rate is what the customer would most likely have chosen, if he or she withdrew the whole or a part of the amount at the day of agreement.

For determining the annualised value of the variable rate it is assumed that the interest rate stays the same for the life of the contract.<sup>78</sup> For example, if at the time of agreement on the contract 1-month LIBOR plus 50 basis points is 4% p.a. and as such the lowest interest rate, then the annualised agreed rate or NDER is determined based on the 4% and taking into account the frequency of interest rate payments.

The interest rates on *outstanding amounts* reflect the actual interest rate the customer chooses at each withdrawal, the development of the variable rate over time and also the actual amount of the loan which has been withdrawn.

### 5.3.11 Money market index with floor and ceiling

*Question:*

A customer agrees to place a deposit with a credit institution that has an agreed maturity of one year receiving interest of 12-month LIBOR plus 40 basis points with a floor of 2% and a ceiling of 6%. The interest rate floor and ceiling are *not* derivative contracts, which may or may not be exercised by the customer or the credit institution as described in paragraph 78 of Annex II to the Regulation. Instead, the floor and ceiling constitute a corridor for the possible interest rates. What

<sup>77</sup> See also Chapter 5.3.8.

<sup>78</sup> This is in line with Chapter 4.4.

interest rate should be reported as new business?

Answer:

The treatment is in principle the same as for any other variable interest rate but taking into account the floor and ceiling for the possible value. Hence, *new business* is the value of 12-month LIBOR plus 40 basis points at the time of agreement on the contract taking into account that the interest rate cannot fall below 2% and cannot exceed 6%. For example, if at the time of agreement 12-month LIBOR is 1.5%, then 2% is recorded as new business, because 1.5 plus 0.4 is below the agreed floor. If at the time of agreement 12-month LIBOR is 4.5%, then 4.5 plus 0.4 = 4.9% is the new business rate. If at the time of agreement 12-month LIBOR is 5.9%, then 6% is captured, because 5.9 plus 0.4 is above the agreed ceiling.

The annualised agreed rate or NDER on *outstanding amounts* covers the interest rate applied by the reporting agent at the time of the calculation of MFI interest rates, i.e. it is based on the value of 12-month LIBOR at the time of data collection. The floor and ceiling are taken into account in the same way as for new business.

### 5.3.12 Change in the value of a currency as external index

Question:

A customer agrees with a credit institution on a deposit with agreed maturity of one year where the interest rate is linked to the percentage change in the value of a currency with a floor of 2% and a ceiling of 6%, i.e. the interest rate is always positive. The percentage change in the value of the currency is not known at the time of agreement  $t_0$ , but only at the time of maturity. What interest rate should be reported as new business?

Answer:

In contrast to the example in Chapter 5.3.11, where a value can be given for 12-month LIBOR at the time of the agreement on the contract, the percentage change in the price of a currency is only known *ex post* at the time of maturity. Predictions for the value of the currency at maturity could be made to determine a value for the (potential) percentage change of the currency at the time of agreement. However, this is difficult and not consistent with the method of determining the value of a variable rate that is linked to a money market or bond market index, where no predicted future value, but rather the current value of the index at the time of agreement, is used. Hence, the only interest rate that can be included in the statistics on *new business* is the agreed floor, i.e. 2%, as this is known with certainty by the customer and the reporting agent at time  $t_0$ .<sup>79</sup>

The annualised agreed rate or NDER on *outstanding amounts* covers the interest rate applied by the reporting agent at the time of the calculation of MFI interest rates. Hence, it is based on the percentage change in the price of the currency at the time of data collection. The agreed floor and ceiling are taken into account in the same way as in Chapter 5.3.11.

### 5.3.13 Timing differences

Question:

A customer and a credit institution agree on a housing loan with a variable interest rate. The interest rate may be explicitly referenced to an external index, e.g. EURIBOR, or it may be subject to change at the discretion of the lender. As the contractual rate is variable, the value of this rate may vary (within the

<sup>79</sup> If no floor is agreed and no minimum return at all guaranteed, then a convention is needed for determining the level of the interest rate on new business. In this case, by convention the annualised agreed rate or NDER on new business captures an interest rate of 0% for the deposit. See also Chapters 9.6 and 9.7.

terms of the contract) at any point from the receipt of the letter of offer through to acceptance or withdrawal of the loan and then during the life of the contract. For contracts with variable rates that have been agreed, but where funds have not yet been withdrawn, some institutions record in their IT system the prevailing rate for that *product type* rather than the interest rate for the *specific contract*. It is the view of these institutions that reporting the interest rate for the product type is both more accurate and more efficient as this obviates the need for an additional significant data capture exercise. Furthermore, reporting the interest rate for the product type will allow institutions to provide data on the reporting data for contracts that have been signed by the borrower but for which the institution has not yet received the completed forms, which are in transit via post etc.

*Answer:*

The prevailing rate for the product type and the rate quoted in the individual contract might differ because the customers have different creditworthiness. MFI interest rate statistics on new business cover the actual rate in the individually agreed contract. The value of the variable rate is determined based on the value of the external index at the time of agreement on the contract. If the customer signs first and then the credit institution, agreement is reached when the credit institution signs. If the credit institution signs first and then the customer, which is unusual, then the contract is accepted when the customer signs. There might be a transmission time for the contract back to the credit institution and the new business might therefore be recorded with a delay of some days. As MFI interest rate statistics on new business capture the average interest rate over the month, this delay will only be apparent at the end-month, in the sense that a new business on 30<sup>th</sup> March might only be recorded on 1<sup>st</sup> April because of the transmission delay. This is accepted for MFI interest rate statistics.

#### **5.3.14 'Cooling off' period**

*Question:*

Laws for consumer protection might require a "cooling off" period for consumer credit, thus necessitating for example a period of at least 10 days between the conclusion of the agreement and the withdrawal of the funds. In practice, greater delays can occur. What is the new business?

*Answer:*

The 'cooling off' period and hence the possibility that a customer steps back from the contract has no influence on MFI interest rate statistics on new business. MFI interest rates on new business reflect the conditions, i.e. the interest rate and the amount of the loan, as laid down in the contract at the time of agreement on the contract. The actual day of the withdrawal of the funds is irrelevant for interest rates on new business but shown only in the statistics on outstanding amounts.<sup>80</sup>

#### **5.3.15 Loan offer and preliminary offer**

*Question:*

Before looking for a new house, a customer may have already acquired a loan offer from a credit institution or other institution. In the loan offer, the credit institution promises to grant a loan to the customer at specified, agreed terms in the event that the customer finds a house. The advantage for the customer is that he or she can make a bid for a house without having to consult the credit institution first. The final loan contract is signed once the customer has found the house. In some Member States, lenders *must* issue preliminary offers before granting loans.

<sup>80</sup> This treatment is analogous to the loan in tranches, where it is also the agreement that determines the amount and the time of recording as new business. The withdrawal of the first and all following tranches is reflected only in the statistics on outstanding amounts. See also Chapter 5.3.8.

The preliminary offer specifies the terms and conditions of the loan, which cannot be changed by the lender if the customer finally agrees them. The offer stands for a given period of time, the length of which is established by national law. During this time, the customer will generally look for competing offers from other lenders. Do loan offers constitute new business?

*Answer:*

A loan offer is not new business. People may attempt to buy houses that are worth less than the credit institution is willing to accept. In this case, a credit institution may either withdraw the offer or lower the amount it is willing to lend. New business therefore only arises when on the basis of the loan offer the final loan contract has formally been signed. Only when the customer signs the legally binding contract does it constitute new business.

### **5.3.16 Loans for debt restructuring in the context of new business**

*Question:*

Bad loans and loans for debt restructuring at rates below market conditions are not included in the weighted average interest rate on outstanding amounts.<sup>81</sup> Do new loans for debt restructuring constitute new business?

*Answer:*

A loan for debt restructuring at rates below market conditions could be seen as a renegotiation of an existing loan contract or even as a new loan contract. Indeed, throughout the process of loan restructuring both parties, the credit institution or other institution and the household or non-financial corporation, are actively involved in (re)negotiating the terms and conditions of

the contract. Nevertheless, loans for debt restructuring at rates below market conditions are *not* considered as new business. The reason is that the interest rate agreed for a loan for debt restructuring is not the result of the general demand and supply conditions in the loan market at the time of the agreement but rather what the indebted customer is able to pay. Hence, interest rates on loans for debt restructuring at rates below market conditions are, like other bad loans, not the type of interest rate that is supposed to be covered as an *agreed rate* by MFI interest rate statistics.<sup>82</sup>

### **5.3.17 Moratorium on a loan**

*Question:*

If a customer temporarily stops the repayments on a loan and starts again sometime later, does the restart constitute new business? Does the treatment depend on whether the bank had started to classify this loan as a bad debt? Does it depend on whether the customer signs a new agreement with the bank?

*Answer:*

New business occurs only if the customer signs a new agreement. The restart of loan repayments after a moratorium is *per se* not new business. If the loan is considered as a bad loan during the moratorium, it is taken out of the interest rates on outstanding amounts, but is reincluded when the customer restarts to pay the interest.<sup>83</sup>

<sup>81</sup> See also Chapter 5.1.2.

<sup>82</sup> See also Chapter 4.2.1.

<sup>83</sup> See also Chapter 5.1.2.



## 6 Time reference point<sup>84</sup>

### 6.1 Time reference point for interest rates on outstanding amounts, overnight deposits, deposits redeemable at notice and bank overdrafts<sup>85</sup>

MFI interest rates on outstanding amounts,<sup>86</sup> i.e. indicators I to I4 in Figure 18, may be compiled as a snapshot of end-month observations or as implicit rates referring to the average over the month:

- As a *snapshot of end-month observations*, they are calculated as weighted averages<sup>87</sup> of the interest rates applied to the stock of deposits and loans at a certain point in time on the last day of the month. At that point in time, the reporting agents collect the interest rates and the amounts involved for all outstanding contracts relevant for MFI interest rate statistics. As end-month observations, the MFI interest rates on outstanding amounts have the same time reference point as MFI balance sheet statistics. Hence, the amounts needed for weighting the interest rates may be taken from MFI balance sheet statistics. By means of the collected interest rates and amounts, the reporting agents then compile a weighted average interest rate for each instrument category.
- As *implicit rates referring to the average of the month*, interest rates on outstanding amounts are calculated as quotients. The numerator is the accumulated flow of interest during the reference month, i.e. the accrued interest payable on deposits and receivable on loans, and the denominator is the average monthly stock. At the end of the reference month, for each instrument category the reporting agent needs to report the accrued interest payable or receivable during the month and the stock of deposits and loans on average during the same month. The NCB then calculates from these data the monthly implicit interest rate per instrument category. As averages of the month, these

implicit rates on outstanding amounts have the same time reference point as the MFI interest rates on new business, which is subject to Chapter 6.2.

As explained in Chapter 5.2.1, overnight deposits, deposits redeemable at notice and bank overdrafts experience a large number of inflows and outflows throughout the month. Therefore, the balance at the time reference point is taken as an indicator for the amount the customer has chosen to leave on the overnight deposit or the deposit redeemable at notice, or has chosen to take out as a bank overdraft instead of placing or borrowing the money elsewhere. Hence, for indicators I, 5, 6, 7, 12 and 23 in Figure 19 and Figure 20 the compilation procedure and the time reference point is exactly the same as for the interest rates on outstanding amounts. The choice between a snapshot of end-month observations and an implicit rate referring to the average of the month has the following implications:

- In a *snapshot of end-month observations*, only one balance, i.e. the balance at a certain point in time on the last day of the month, is taken into account when computing the MFI interest rate. In the case of combined deposit and loan facilities<sup>88</sup> it is sufficient to look at this balance to decide whether the account in the reference month is an overnight deposit or a bank overdraft.
- The denominator in an *implicit rate referring to the average of the month* is based on the average of the daily balances on the overnight deposit, deposit redeemable at notice or bank overdraft. Therefore, in the case of combined deposit and loan facilities *each day* the reporting agent needs to assess whether the account is a deposit or a loan. The reporting agent then calculates

<sup>84</sup> This chapter refers mainly to Part 3 of Annex II to the Regulation.

<sup>85</sup> See also paragraphs 26 to 31 of Annex II to the Regulation.

<sup>86</sup> Outstanding amounts are defined in Chapter 5.1.

<sup>87</sup> See also Chapter 10.

<sup>88</sup> Further discussed in Chapter 5.2.3.



an average of the daily credit balances and the daily debit balances to derive the average monthly stocks for the denominator of the implicit rate. Also, for the flows in the numerator of the implicit rate accrued interest payable on deposits and receivable on loans need to be distinguished. Reporting agents shall not report weighted average interest rates combining (low) overnight deposit rates and (high) bank overdraft rates.

It is up to each NCB to decide which of the two methods, i.e. a snapshot of end-period observations or implicit rates referring to period averages, is more appropriate in the national context. The ECB strongly recommends *not* mixing both approaches at national level, as this makes the interpretation of the national data more difficult. However, if there are very good reasons to mix both approaches because the type of institutions and their offered products require a different treatment, then this is accepted.

Basing the interest rates and the weights only on the last day of the month, as in the case of a snapshot, is less accurate than referring to the average stock during the month, as required for implicit rates. For example, day-of-the-month effects might distort the end-month results. However, these distortions are expected to be small as a result of the number of accounts covered. Indeed, MFI interest rates on outstanding amounts cover all deposits placed and not yet withdrawn or all loans withdrawn and not yet repaid by customers in all the periods up to and including the reporting date. A snapshot of end-month observations only covers those contracts that are still outstanding at the time of data collection. In contrast, an implicit rate referring to the average of the month also includes contracts that were outstanding at some time during the month, but are not outstanding at the end of the month.

The main difference between the two methods is, however, the way the data is collected. In the case of a snapshot, interest rates are *directly collected*, whereas in the case

of implicit rates, the interest rates are *derived* as a quotient. Assuming that the profit and loss accounts provide enough detail, the numerator in the quotient derived from these accounts should be of sufficiently high quality. The quality of the resulting implicit interest rates therefore depends on the denominator. Minimum standards for compiling the average monthly stock per instrument category are laid down in the Regulation. The ideal is the average of *daily* stocks over the month, as it ensures a close link between the flow in the numerator and the reference stock in the denominator. If instead the denominator refers to the end-month stock, then the flow in the numerator may include payments for contracts that have already expired at the end of the month, resulting in inaccurate implicit rates. Nevertheless, the ECB accepts approximations for the average of daily stocks if they fulfil the following minimum standards:

- For volatile instrument categories, i.e. at least overnight deposits, deposits redeemable at notice, and bank overdrafts, the average monthly stock needs to be derived from *daily* balances.
- For all other instrument categories, the average monthly stock needs to be derived from *weekly or more frequent* balances.
- For a *transitional period* of not more than two years from the entry into force of the Regulation, for loans with an agreed maturity of over five years, the ECB accepts end-month observations. However, at the latest from January 2004 and also for loans with an agreed maturity of over five years, the average monthly stock must be derived from *weekly or more frequent* balances.

## 6.2 Time reference point for interest rates on new business<sup>89</sup>

As defined in Chapter 5.3.1, MFI interest rates on new business reflect the average interest

<sup>89</sup> See also paragraphs 32 and 33 of Annex II to the Regulation.

rate level applied to deposits and loans in new agreements that have been arranged between customers and credit institutions during the reference month. The time reference point for new business rates is therefore the average of the month. This holds true for all indicators in Figure 20 except 1, 5, 6, 7, 12 and 23, which refer to overnight deposits, deposits redeemable at notice and bank overdrafts.

For each instrument category, reporting agents calculate the new business interest rate as a weighted average of *all* interest rates on

new business operations in the instrument category during the reference month. They then transmit these new business interest rates referring to the average of the month to the NCB of the participating Member State in which they are resident. The transmission includes weighting information on the amount of new business conducted during the reporting month for each instrument category. Reporting agents need to take into account the new business operations conducted during the *entire* month, rather than just a selected period during the month.

## 7 Instrument categories<sup>90</sup>

### 7.1 Summary tables of indicators

MFI interest rate statistics provide detailed monthly information on 45 indicators, of which two-thirds refer to new business and one-third to outstanding amounts. Covered are all essential instrument categories for euro-denominated deposits and loans faced by households and by non-financial corporations. The 45 indicators are in principle required at both euro area level and national level, but national deviations in the number of

indicators exist, which is further discussed in Chapter 7.2.

Figure 18 shows the 14 instrument categories for which MFI interest rates on *outstanding amounts* are collected at euro area level. Depending on the choice of NCBs, the interest rates are either annualised agreed rates or NDERs and compiled either as a snapshot of end-month observations or as implicit rates referring to the average of the month.

**Figure 18**  
Indicators 1 to 14 on outstanding amounts<sup>91</sup>

|                 | Sector                        | Type of instrument              | Original maturity        | Outstanding amount indicator number: |
|-----------------|-------------------------------|---------------------------------|--------------------------|--------------------------------------|
| Deposits in EUR | To households                 | With agreed maturity            | Up to 2 years            | 1                                    |
|                 |                               |                                 | Over 2 years             | 2                                    |
|                 | To non-financial corporations | With agreed maturity            | Up to 2 years            | 3                                    |
|                 |                               |                                 | Over 2 years             | 4                                    |
|                 |                               | Repos                           |                          | 5                                    |
| Loans in EUR    | To households                 | For house purchases             | Up to 1 year             | 6                                    |
|                 |                               |                                 | Over 1 and up to 5 years | 7                                    |
|                 |                               |                                 | Over 5 years             | 8                                    |
|                 |                               | Consumer credit and other loans | Up to 1 year             | 9                                    |
|                 |                               |                                 | Over 1 and up to 5 years | 10                                   |
|                 |                               |                                 | Over 5 years             | 11                                   |
|                 | To non-financial corporations |                                 | Up to 1 year             | 12                                   |
|                 |                               |                                 | Over 1 and up to 5 years | 13                                   |
|                 |                               |                                 | Over 5 years             | 14                                   |

<sup>90</sup> This chapter refers mainly to Part 4, Appendix 1 and Appendix 2 of Annex II to the Regulation.

<sup>91</sup> In the following table 'up to' means 'up to and including' and 'households' include NPISHs.

Figure 19 covers the six MFI interest rates referring to *overnight deposits*, *deposits redeemable at notice* and *bank overdrafts*. Depending on the choice of NCBs, they are either annualised agreed rates or NDERs. Analogous to the MFI interest rates on outstanding amounts in Figure 18, the six indicators are compiled either as a snapshot of end-month observations or as implicit rates

referring to the average of the month. Since the MFI interest rates on overnight deposits, deposits redeemable at notice and bank overdrafts are designed to measure new business, they follow the numbering of the new business indicators in Figure 20. The brackets around indicator numbers 1, 5, 6, 7, 12 and 23 in the two following tables illustrate their special status.

**Figure 19**  
Indicators 1, 5, 6, 7, 12 and 23 on new business<sup>92</sup>

|                 | Sector                        | Type of instrument   | Period of notice      | New business indicator number: |
|-----------------|-------------------------------|----------------------|-----------------------|--------------------------------|
| Deposits in EUR | To households                 | Overnight            |                       | (1)                            |
|                 |                               | Redeemable at notice | Up to 3 months notice | (5)                            |
|                 | Over 3 months notice          |                      | (6)                   |                                |
|                 | To non-financial corporations | Overnight            |                       | (7)                            |
| Loans in EUR    | To households                 | Bank overdraft       |                       | (12)                           |
|                 | To non-financial corporations | Bank overdraft       |                       | (23)                           |

Figure 20 and Figure 21 list the 31 MFI interest rates on *new business* that are collected at euro area level. Indicators 1 to 29 in Figure 20 are, depending on the NCBs' choice, either annualised agreed rates or NDERs and as such reflect only the interest rate paid or charged by credit institutions and other institutions excluding any other related fees. Indicators 30 and 31 in Figure 21 are APRCs and therefore comprise an interest rate component and a component of other

charges. All new business rates other than indicators 1, 5, 6, 7, 12 and 23 are compiled as weighted average interest rates referring to the whole month.

<sup>92</sup> In the following table 'up to' means 'up to and including' and 'households' include NPISHs. For indicators 5 and 6, households and non-financial corporations are merged and allocated to the household sector, since it owns about 98% of the outstanding amount of deposits redeemable at notice in all participating Member States combined.

**Figure 20****Indicators 1 to 29 on new business<sup>93</sup>**

|                 | Sector                                       | Type of instrument                 | Original maturity, period of notice, initial rate fixation | New business indicator number: |
|-----------------|--|------------------------------------|--|--------------------------------|
| Deposits in EUR | To households                                | Overnight                          |  | (1)                            |
|                 |  | With agreed maturity               | Up to 1 year maturity                                      | 2                              |
|                 |  |                                    | Over 1 and up to 2 years maturity                          | 3                              |
|                 |  |                                    | Over 2 years maturity                                      | 4                              |
|                 |  | Redeemable at notice               | Up to 3 months notice                                      | (5)                            |
|                 |  |                                    | Over 3 months notice                                       | (6)                            |
|                 | To non-financial corporations                | Overnight                          |  | (7)                            |
|                 |  | With agreed maturity               | Up to 1 year maturity                                      | 8                              |
|                 |  |                                    | Over 1 and up to 2 years maturity                          | 9                              |
|                 |  |                                    | Over 2 years maturity                                      | 10                             |
|                 |  | Repos                              |  | 11                             |
| Loans in EUR    | To households                                | Bank overdraft                     |  | (12)                           |
|                 |  | For consumption                    | Variable rate and up to 1 year initial rate fixation       | 13                             |
|                 |  |                                    | Over 1 and up to 5 years initial rate fixation             | 14                             |
|                 |  |                                    | Over 5 years initial rate fixation                         | 15                             |
|                 |  | For house purchases                | Variable rate and up to 1 year initial rate fixation       | 16                             |
|                 |  |                                    | Over 1 and up to 5 years initial rate fixation             | 17                             |
|                 |  |                                    | Over 5 and up to 10 years initial rate fixation            | 18                             |
|                 |  |                                    | Over 10 years initial rate fixation                        | 19                             |
|                 |  | For other purposes                 | Variable rate and up to 1 year initial rate fixation       | 20                             |
|                 |  |                                    | Over 1 and up to 5 years initial rate fixation             | 21                             |
|                 |  |                                    | Over 5 years initial rate fixation                         | 22                             |
|                 |  | To non-financial corporations      | Bank overdraft   |                                |
|                 | Other loans up to an amount of EUR 1 million |                                    | Variable rate and up to 1 year initial rate fixation       | 24                             |
|                 |  |                                    | Over 1 and up to 5 years initial rate fixation             | 25                             |
|                 |  |                                    | Over 5 years initial rate fixation                         | 26                             |
|                 | Other loans over an amount of EUR 1 million  |                                    | Variable rate and up to 1 year initial rate fixation       | 27                             |
|                 |  |                                    | Over 1 and up to 5 years initial rate fixation             | 28                             |
|                 |  | Over 5 years initial rate fixation | 29   |                                |

**Figure 21****Indicators 30 and 31 referring to the APRC**

|              | Sector                      | Type of instrument  | New business indicator number: |
|--------------|-----------------------------|---------------------|--------------------------------|
| Loans in EUR | To households <sup>94</sup> | For consumption     | 30                             |
|              |                             | For house purchases | 31                             |

The total of 45 indicators in Figure 18, Figure 20 and Figure 21 provide a balance between the policy and analytical needs of the users and the reporting burden on credit institutions and other institutions.

## 7.2 General provisions<sup>95</sup>

MFI interest rate statistics for the euro area refer to *instrument categories* rather than to *individual products* as is the case with the national statistics on interest rates in many

countries. For example, MFI interest rates refer to consumer credit with 'up to x years' maturity or interest rate fixation, whereas in the United States interest rates are collected

<sup>93</sup> In the following table 'up to' means 'up to and including' and 'households' include NPISHs. Furthermore, 'variable rate' is meant as a synonym for 'floating rate' the latter being the expression used in the Regulation. For indicators 5 and 6, households and non-financial corporations are merged and allocated to the household sector, since it owns about 98% of the outstanding amount of deposits redeemable at notice in all participating Member States combined.

<sup>94</sup> In general including NPISHs, but NCBs may grant derogations in this respect.

<sup>95</sup> See also paragraphs 34 to 37 of Annex II to the Regulation.

for a 48-month new car loan as a typical retail product. It is recognised that interest rates referring to typical retail products might be easier to interpret than interest rates referring to instrument categories and might provide a better comparison with capital market interest rates. In the euro area, however, large *national differences* in the banking business of credit institutions and other institutions exist. It is therefore not possible to define a sufficient number of typical retail products that are representative, or even available, in each Member State.

Also as a result of the national differences in products, deviations exist in the number of indicators compiled per Member State. In some Member States, resident credit institutions and other institutions do not offer deposits or loans in some of the instrument categories listed in Figure 18 and Figure 20 to households and non-financial corporations resident in the euro area. Where inapplicable, the NCBs in these Member States ignore the instrument categories in the data collection from reporting agents and collect less<sup>96</sup> than the required 45 indicators at national level. An instrument category is inapplicable at national level only if resident credit institutions and other institutions do *not at all* offer products belonging to this category to households and non-financial corporations resident in the euro area. Data has to be provided if some business exists, however limited it is.<sup>97</sup>

NCBs need to cover each *instrument category* listed in Figure 18 and Figure 20 that exists in the banking business of resident credit institutions and other institutions with euro area households and non-financial corporations, but not each *product* offered at national level. Covering all products could lead to a near-census situation in some countries with a wide variety of products. However, NCBs cannot exclude a whole instrument category on the grounds that the amounts involved are very small. So if an instrument category is only offered by one institution, then this institution needs to be a reporting institution. Furthermore, once a

credit institution or other institution is selected as a reporting agent, it has to cover for each instrument category *all* interest rates applied to *all* the products that fit this category. This principle implies that it is not up to NCBs to define a set of national products within each instrument category on which reporting agents collect data.

The exception to the rule of covering for each instrument category all interest rates applied to all the products are interest rates on *bad loans* and *loans for debt restructuring*. As already explained in Chapter 5.1.2, bad loans and loans for debt restructuring at rates below market conditions are not covered by MFI interest rate statistics. As these loans receive little or no interest payment, including them would distort the results for MFI interest rate statistics.

If a *new product* belonging to an existing instrument category is created, the reporting institutions cover it with the next reporting, as all reporting agents have to report on all their products. If an instrument category did not exist in a Member State at the time the sample was first drawn, but one institution subsequently creates a new product belonging to this category, this institution needs to be selected into the sample at the time of the next representativity check.<sup>98</sup> The reason is that with the creation of this new product the instrument category is no longer inapplicable at national level.

96 Some NCBs collect more than 45 indicators at national level, because the statistical reporting requirements of the ECB are part of a broader statistical reporting framework which the NCB establishes under its own responsibility.

97 Council Regulation (EC) No 2533/98 concerning the collection of statistical information by the European Central Bank specifies in Article 8 that the ECB and NCBs may collect confidential statistical information for the tasks of the ESCB. The ECB and NCBs have to take all regulatory, administrative, technical and organisational measures to protect confidential statistical information, i.e. it should not be possible to identify reporting agents or any other legal person, natural person, entity or branch, either directly from their name or address or from an officially allocated identification code, or indirectly through deduction.

98 Further discussed in Chapters 11.8 and 11.9.

### 7.3 Foreign currency deposits and loans<sup>99</sup>

MFI interest rate statistics cover the interest rates applied by resident credit institutions or other institutions to *euro-denominated* deposits and loans vis-à-vis households and non-financial corporations resident in the euro area. Data on deposits and loans in other currencies is not required at euro area level by the Regulation. However, in line with the 4<sup>th</sup> recital and Article 3(2) of the Regulation, NCBs may collect data on foreign currency deposits and loans at national level.

Dual currency loans exist where the currency of the interest payments differs from the currency in which the loan is granted. The treatment of dual currency loans follows two principles:

- a) either both the amount lent and the interest rate are covered by MFI interest rate statistics or both are excluded; and
- b) one main use of MFI interest rate statistics is to monitor the transmission of the ECB's monetary policy.

Hence, if the lending rate agreed between the customer and the credit institution or other institution is based on considerations relating to the monetary policy as carried out by the ESCB, then the interest rate and the amount of the loan should be covered by MFI interest rate statistics. If the interest rate agreed for the loan is based on considerations relating to the monetary policy of foreign central banks, then the interest rate and the amount on lent are beyond the scope of MFI interest rate statistics.

### 7.4 Breakdown by sector<sup>100</sup>

MFI interest rate statistics distinguish between interest rates applied in the banking business vis-à-vis households (including NPISHs) and vis-à-vis non-financial corporations. The ESA 95 provides the standard for this sectoral classification:

I *Non-financial corporations* are bodies recognised as independent legal entities which are market producers and whose principal activity is the production of goods and non-financial services (ESA 95, paragraph 2.23). The institutional units covered are the following:

- (i) private and public corporations which are market producers principally engaged in the production of goods and non-financial services;
- (ii) cooperatives and partnerships recognised as independent legal entities which are market producers principally engaged in the production of goods and non-financial services;
- (iii) public producers which by virtue of special legislation are recognised as independent legal entities and which are market producers principally engaged in the production of goods and non-financial services;
- (iv) non-profit institutions or associations serving non-financial corporations, which are recognised as independent legal entities and which are market producers principally engaged in the production of goods and non-financial services;
- (v) holding corporations controlling a group of corporations which are market producers, if the preponderant type of activity of the group of corporations as a whole – measured on the basis of value added – is the production of goods and non-financial services;
- (vi) private and public quasi-corporations which are market producers principally engaged in the production of goods and non-financial services.

II *Households* are individuals or groups of individuals as consumers, and producers of goods and non-financial services exclusively for their own final consumption, and as producers of market goods and non-financial and financial services provided that

<sup>99</sup> See also paragraph 38 of Annex II to the Regulation.

<sup>100</sup> See also paragraphs 39 to 41 of Annex II to the Regulation.

their activities are not those of quasi-corporations. It includes (ESA 95, paragraph 2.76):

- (i) individuals or groups of individuals whose principal function is consumption;
- (ii) persons living permanently in institutions who have little or no autonomy of action or decision in economic matters (e.g. members of religious orders living in monasteries, long-term patients in hospitals, prisoners serving long sentences, old persons living permanently in retirement homes);
- (iii) individuals or groups of individuals whose principal function is consumption and that produce goods and non-financial services for exclusively own final use (services of owner-occupied dwellings and domestic services produced by paid employees);
- (iv) sole proprietorships and partnerships without independent legal status – other than those treated as quasi-corporations – which are market producers;
- (v) non-profit institutions serving households (ESA 95, paragraph 2.87).

In particular, small businesses in the sense of *sole proprietorships and partnerships* are allocated to the household sector or the non-financial corporation sector according to the following principles (ESA 95, paragraph 2.99). Sole proprietorships and partnerships which are market producers but not recognised as independent legal entities:

- (i) are classified as households (see II above) unless they are quasi-corporations.
- (ii) if they are quasi-corporations, i.e. if they keep a complete set of accounts, have no independent legal status, but an economic and financial behaviour that is different from that of their owners and similar to that of corporations (ESA 95, paragraph 2.13 f):

- (1) they are classified as non-financial corporations (see I above), if they are principally engaged in the production of goods and non-financial services;
- (2) they are classified as financial corporations and therefore not covered by MFI interest rate statistics, if they are principally engaged in financial intermediation and financial auxiliary activities.

Indicator 5 in Figure 18 and indicator 11 in Figure 20 refer to *repos*. At euro area level no sectoral breakdown for repos is required, because their remuneration is often, although not in all Member States, independent of the holding sector. Since currently at euro area level about 40% of repos placed by non-financial sectors are held by households and 60% by non-financial corporations, the two sectors are merged for the purposes of MFI interest rates on repos. Indicator 5 in Figure 18 and indicator 11 in Figure 20 therefore indistinguishably refer to both sectors instead of being allocated to either households or non-financial corporations. In line with the 4<sup>th</sup> recital and Article 3(2) of the Regulation, NCBs may ask for a sectoral breakdown for repos at national level.

Indicators 5 and 6 in Figure 20 refer to *deposits redeemable at notice* held by *households*. In the euro area, deposits redeemable at notice are overwhelmingly owned by households, i.e. currently about 98% of all deposits redeemable at notice held with MFIs. Non-financial corporations hold about 2% of these deposits. Since it was found to be more cost-efficient to include households and non-financial corporations indistinguishably in one sector, MFI interest rates are collected for deposits redeemable at notice vis-à-vis both sectors and then entirely allocated to deposits redeemable at notice held by households.



## 7.5 Breakdown by type of instrument<sup>101</sup>

### 7.5.1 Types of deposits

The instrument breakdown by type of deposit for MFI interest rate statistics and the definitions used follow MFI balance sheet statistics and hence Regulation ECB/2001/13. It defines *overnight deposits* as deposits which are 'convertible into currency and/or which are transferable on demand by cheque, banker's order, debit entry or similar means, without significant delay, restriction or penalty. Balances representing prepaid amounts in the context of electronic money, either in the form of 'hardware based' e-money (e.g. prepaid cards) or 'software based' e-money, issued by MFIs, are included under this item. This item excludes non-transferable deposits which are technically withdrawable on demand but which are subject to significant penalties:

- balances (interest-bearing or not) which are transferable by cheque, banker's order, debit entry or the like, without any significant penalty or restriction;
- balances (interest-bearing or not) which are immediately convertible into currency on demand or by close of business on the day following that on which the deposit was made, without any significant penalty or restriction, but which are not transferable;
- balances (interest-bearing or not) representing prepaid amounts in the context of 'hardware-based' or 'software-based' e-money (e.g. prepaid cards);
- loans to be repaid by close of business on the day following that on which the loan was granted.<sup>102</sup>

MFI interest rates on overnight deposits, i.e. indicators 1 and 7 in Figure 20, cover *all* overnight deposits, whether or not they are interest bearing. Zero-interest overnight

deposits influence the transmission mechanism of monetary conditions, the own rate of return on M3, the interest burden on households and non-financial corporations, etc., and are therefore captured by MFI interest rate statistics.

According to Regulation ECB/2001/13 *deposits with agreed maturity* are 'non-transferable deposits which cannot be converted into currency before an agreed fixed term or that can only be converted into currency before that agreed term provided the holder is charged some kind of penalty. This item also includes administratively regulated savings deposits where the maturity related criterion is not relevant (classified in the maturity band 'over two years'). Financial products with roll-over provisions must be classified according to the earliest maturity. Although deposits with agreed maturity may feature the possibility of earlier redemption after prior notification, or may be redeemable on demand subject to certain penalties, these features are not considered to be relevant for classification purposes.' Indicators 1 to 4 in Figure 18 and indicators 2 to 4 and 8 to 10 in Figure 20 follow this definition.

The same Regulation defines *deposits redeemable at notice* as 'non-transferable deposits without any agreed maturity which cannot be converted into currency without a period of prior notice, before the term of which the conversion into cash is not possible or possible only with a penalty. They include deposits which, although perhaps legally withdrawable on demand, would be subject to penalties and restrictions according to national practice (classified in the maturity band 'up to and including three months'), and investment accounts without period of notice or agreed maturity, but which contain restrictive drawing provisions (classified in the

<sup>101</sup> See also paragraphs 42 to 50 of Annex II to the Regulation.

<sup>102</sup> This and the following definitions are found in Part 3 of Regulation ECB/2001/13.



maturity band 'over three months').<sup>103</sup> This definition applies to indicators 5 and 6 in Figure 20.

Also, Regulation ECB/2001/13 defines *repos* as 'counterpart of cash received in exchange for securities/gold sold by reporting agents at a given price under a firm commitment to repurchase the same (or similar) securities/gold at a fixed price on a specified future date. Amounts received by reporting agents in exchange for securities/gold transferred to a third party ('temporary acquirer') are to be classified under 'repurchase agreements' where there is a firm commitment to reverse the operation and not merely an option to do so. This implies that reporting agents retain effective (economic) ownership of the underlying securities/gold during the operation.' Repos vis-à-vis households and non-financial corporations, i.e. indicator 5 in Figure 18 and indicator 11 in Figure 20, are non-advertised products, which implies that their prices cannot necessarily be identified directly from market sources.

### 7.5.2 Types of loans

The instrument breakdown by type of loan for MFI interest rate statistics and the definitions used follows as far as possible MFI balance sheet statistics. Bank overdrafts are included in MFI interest rate statistics as an additional separate type of instrument. The definition is given in the following and the definition of consumer credit and loans to non-financial corporations amended accordingly.

For the purposes of MFI interest rate statistics, *bank overdrafts* (i.e. indicators 12 and 23 in Figure 20) are defined as debit balances on current or chequing accounts. The interest rate on bank overdrafts refers to the rate charged when an overnight deposit 'becomes negative', i.e. the overnight deposit and the bank overdraft are linked to the same account. In contrast to loans to non-financial corporations up to one year and consumer credit and other loans to households up to

one year, bank overdrafts are without a defined maturity and, in general, authorised but taken without giving prior notice to the bank. Usually, the credit institution or other institution defines an upper limit for the size and the maximum period of the bank overdraft the customer can accumulate. All bank overdrafts are covered, whether they are within or beyond the limit agreed between the reporting agent and the household or non-financial corporation. Typically, penalties apply if the overdraft is extended beyond the agreed limit. The penalties may be charged as an interest rate component, a component of other charges, or a combination of both. Penalties on overdrafts applied as a component of other charges, i.e. in the form of special fees, are not covered by the annualised agreed rate or NDER, because these type of rates only cover the interest rate component of loans. If penalties on overdrafts are applied as an interest rate component, i.e. a higher interest rate, this higher interest rate is reflected in MFI interest rate statistics.

Regulation ECB/2001/13 defines *loans* as 'funds lent by reporting agents to borrowers, which are not evidenced by documents or are represented by a single document (even if it has become negotiable)'.

*Loans to non-financial corporations* comprise all loans to non-financial corporations regardless of their size.<sup>103</sup> In the case of outstanding amounts, i.e. for indicators 12 to 14 in Figure 18, loans to non-financial corporations cover bank overdrafts. In contrast, new (other) loans to non-financial corporations, i.e. indicators 24 to 29 in Figure 20, exclude bank overdrafts for the purposes of MFI interest rate statistics. Bank overdrafts to non-financial corporations constitute as indicator 23 a separate instrument category in Figure 20.

According to Regulation ECB/2001/13 loans granted to households in the form of *consumer credit* are 'loans granted for the purpose of

<sup>103</sup> Further discussed in Chapter 7.6.

personal use in the consumption of goods and services'. In the case of outstanding amounts, i.e. for indicators 9 to 11 in Figure 18, consumer credit covers bank overdrafts. In contrast, new loans to households for consumption, i.e. indicators 13 to 15 in Figure 20 and indicator 30 in Figure 21, exclude bank overdrafts for the purposes of MFI interest rate statistics. Bank overdrafts to households are included in Figure 20 as part of a separate instrument category, i.e. indicator 12.

Regulation ECB/2001/13 defines *loans to households for house purchases*<sup>104</sup> as 'credit extended for the purpose of investing in housing, including building and home improvements. [...] Lending for house purchases comprises loans secured on residential property that are used for the purpose of house purchase and, where identifiable, other loans for house purchases made on a personal basis or secured against other forms of assets.' MFI interest rate statistics covers indistinguishably secured and unsecured loans to households for house purchases. In the case of outstanding amounts, i.e. for indicators 6 to 8 in Figure 18, loans to households for house purchases include bank overdrafts, while in the case of new business, i.e. for indicators 16 to 19 in Figure 20 and 31 in Figure 21, bank overdrafts are excluded. Instead, bank overdrafts to households are covered in Figure 20 as part of a separate instrument category, i.e. indicator 12.

*Other loans to households* are defined in Regulation ECB/2001/13 as 'loans granted for purposes such as business, debt consolidation, education, etc.'. In the case of outstanding amounts, i.e. for indicators 9 to 11 in Figure 18, other loans to households include bank overdrafts. In the case of new business, i.e. for indicators 20 to 22 in Figure 20, new loans to households for other purposes exclude bank overdrafts, because they are covered in Figure 20 as part of a separate instrument category, i.e. indicator 12.

For MFI interest rates on *outstanding amounts*, consumer credit, loans to households for

house purchases and other loans to households together cover all loans granted to households by resident credit institutions and other institutions. For MFI interest rates on *new business*, the possible loan types for households are bank overdrafts, consumer credit, loans to household for house purchases and other loans to households.

## 7.6 Breakdown by amount category<sup>105</sup>

Large non-financial corporations have considerable economic significance and account for a substantial share of banking business. The loans granted to large firms will, due to the amounts involved, dominate any weighted average interest rate referring to the non-financial corporations sector as a whole. Small firms, however, may play a special role in the transmission of monetary policy, since they have limited access to capital markets and are therefore more vulnerable to changes in the lending rates offered by MFIs. In general, larger firms are able to negotiate the interest rate and conditions more than small firms so that larger non-financial corporations face less standardised products with interest rates that are closer to (or identical with) market interest rates.

The size of non-financial corporations can be defined on the basis of various measures such as the number of employees or the turnover. Instead of the size of the non-financial corporation, the *size of the loan* is considered to be more relevant for distinguishing banking conditions in broad terms for the purposes of MFI interest rate statistics. Indeed, most Member States confirmed a link between the amount of the loan granted and the interest rate. It should, however, be borne in mind that the amount of a loan is only one of many criteria that are taken into account when negotiating the interest rate. The sum of all criteria may best be summarised by 'credit risk'.

<sup>104</sup> ECB/2001/13 refers to 'lending for house purchases' which is used as a synonym.

<sup>105</sup> See also paragraph 51 of Annex II to the Regulation.

For new (other)<sup>106</sup> loans to non-financial corporations, i.e. indicators 24 to 29 in Figure 20, two size categories for the amount of the loan granted are distinguished, i.e. 'up to and including EUR 1 million' and 'over EUR 1 million'. The amount refers to the *single* loan transaction considered as new business. It does not cover *all* business between the non-financial corporation and the reporting agent.

Amount categories apply only to new business rates vis-à-vis non-financial corporations and only to the instrument category of other loans. No breakdown by amount categories is required for bank overdrafts or for deposits vis-à-vis non-financial corporations. Also no breakdown by amount is requested for deposits and loans vis-à-vis households or for interest rates on outstanding amounts.

The breakdown by amount category for other loans to non-financial corporations increases the comparability of the interest rates on such loans, since the size of the individual loans covered vary widely. As already mentioned at the beginning of this chapter, without amount categories a weighted average interest rate on loans to non-financial corporations would be dominated by the interest rates on the largest loans during the reporting month. This weighted average lending rate might not be representative of most loans to non-financial corporations. The indicators for (other) loans to non-financial corporations of an amount up to and including EUR 1 million are assumed to reflect the interest rates faced by smaller corporations, which are 'price takers' rather than 'price makers'.

## **7.7 Breakdown by original maturity, period of notice period and initial rate fixation<sup>107</sup>**

### **7.7.1 Time bands**

Depending on the type of instrument and whether interest rates on outstanding amounts or new business are being looked at, MFI interest rate statistics provide for a

breakdown by original maturity, period of notice, or initial period of fixation of the interest rate. These breakdowns refer to *time bands* or ranges. For example, an interest rate on a deposit with an agreed maturity of up to two years refers to an average interest rate across all deposits with an agreed original maturity between one day and a maximum of two years. Time bands or ranges are also used in the MFI balance sheet statistics.

The alternative would be to define exact points in time, i.e. interest rates on instruments with a maturity, notice period or rate fixation of 'x years/month'. Advantages and drawbacks of basing statistics on exact products rather than instrument categories are discussed in Chapter 7.2.

### **7.7.2 Original maturity and period of notice**

A breakdown by *original maturity* is applied in Figure 20 to new business on deposits with agreed maturity. In Figure 18, a breakdown by original maturity is required for all lending rates on outstanding amounts and for all deposit rates on outstanding amounts with the exception of repos. For repos, i.e. indicator 5 in Figure 18 and indicator 11 in Figure 20, no maturity breakdown is required at euro area level, as repos are assumed to be predominantly very short-term. At national level, NCBs may ask for a maturity breakdown for repos, which would be in line with the 4<sup>th</sup> recital and Article 3(2) of the Regulation. The definition of (and the breakdown by) original maturity follows Regulation ECB/2001/13, which states that 'maturity at issue (original maturity) refers to the fixed period of life of a financial instrument before which it cannot be redeemed (e.g. debt securities) or before which it can be redeemed only with some kind of penalty (e.g. some types of deposits)'.

The same Regulation defines further that the '*period of notice* corresponds to the time

<sup>106</sup> 'Other' refers to 'other than bank overdrafts'.

<sup>107</sup> See also paragraphs 52 to 57 of Annex II to the Regulation.

between the moment the holder gives notice of an intention to redeem the instrument and the date on which the holder is allowed to convert it into cash without incurring a penalty. Financial instruments are classified according to the period of notice only when there is no agreed maturity.<sup>108</sup> For MFI interest rates a breakdown by period of notice is applied in Figure 20 to new business on deposits redeemable at notice.

### 7.7.3 Period of maturity for a loan taken out in tranches<sup>108</sup>

Question:

A loan is agreed between a credit institution and a customer at  $t_0$ , but the customer takes out the funds only two month later at  $t_1$ . Should the original maturity of this loan be defined as:

- the date of the contract ( $t_0$ ) until the end of the contract ( $t_n$ ), or
- the first value date ( $t_1$ ) until the end of the contract ( $t_n$ )?

Answer:

A household or non-financial corporation will normally take out a loan (other than a bank overdraft) in full at the start of the contract. Hence, in general, the contract date  $t_0$  and the first value date  $t_1$  coincide. It may happen that a household or non-financial corporation decides to take out the loan in tranches at times  $t_1$ ,  $t_2$ ,  $t_3$ , etc. instead of withdrawing the full amount at the start of the contract (time  $t_0$ ). Whatever the pattern of withdrawals, the original maturity of the loan always refers to the agreed original loan period according to the loan contract, i.e. in this example to the period from  $t_0$  to  $t_n$ . However, subject to clarification of the most appropriate definition of 'original maturity' in MFI balance sheet statistics, it is also acceptable in MFI interest rate statistics to define the original maturity as the value date until the end of the contract, i.e. from  $t_1$  to  $t_n$ .

The loan actually appears in the MFI balance sheet statistics only at time  $t_1$ . The same applies for MFI interest rate statistics on *outstanding amounts*. In MFI interest rate statistics on *new business*, the loan is recorded at the time of the agreement on the contract, i.e. at time  $t_0$ .

### 7.7.4 Initial period of fixation of the interest rate

The absence of any reference to fixed and variable interest rates was often considered a drawback of the euro area retail interest rate statistics compiled according to a short-term approach.<sup>109</sup> For the steady-state approach, users therefore expressed a strong need for a distinction between variable and fixed interest rates on loans. In order to implement such a breakdown in a harmonised way across all Member States, *variable* and *fixed* needs to be clearly defined. The definition needs to be unambiguous for all Member States and able to cope with financial innovations, which tend to cause difficulties at the borderline. However, large national differences exist in the retail banking business in the EU to the extent that there is no common view on the period of fixation that classifies a lending interest rate as fixed or variable. An interest rate which is fixed for one year and then variable might be considered as fixed in one Member State and as variable in another depending on the national lending practice.

To overcome this problem the *initial period of rate fixation* was introduced as the basis for a breakdown for new lending business in MFI interest rate statistics. It gives an indication of the variability of interest rates at euro area level, without prejudging whether a loan with a specific fixation period is considered as fixed or variable in the national context. The initial period of fixation is a predetermined period of time at the start of a contract during which the *value* of the interest rate cannot change. The value of the

<sup>108</sup> Defined in Chapter 5.3.8.

<sup>109</sup> See description in Chapter 2.

interest rate is only considered to be unchangeable if it is defined as:

- an exact level, for example as 10%, or
- a spread over an external index at a certain time, for example as six-month EURIBOR plus two percentage points at a certain day and time, which is equivalent to an exact interest rate level.

If at the start of the contract the customer and the reporting agent agree on a procedure for calculating the lending rate, this is not considered to be an initial rate fixation. For example, it might be agreed that six-month EURIBOR plus two percentage points is the interest rate for the first three years of the loan. As the value of this interest rate changes in line with EURIBOR during the three years, there is no initial rate fixation.

Three periods of initial rate fixation are defined for new loans to households for consumption and for other purposes, and for new other loans to non-financial corporations, i.e. indicators 13 to 15, 20 to 22, and 24 to 29 in Figure 20; loans without any interest rate fixation are included as variable or floating rates with loans that have up to one year initial rate fixation:

- variable rate and up to (and including) one year initial rate fixation,
- over one and up to (and including) five years initial rate fixation, and
- over five years initial rate fixation.

Considering that 95% of loans to households for house purchases are granted with an original maturity of over five years, and in some countries with interest rate fixation of 10 years and more, for this type of loan four periods of initial fixation are distinguished; again, loans without any interest rate fixation are included as variable or floating rates with loans that have up to one year initial rate fixation:

- variable rate and up to (and including) one year initial rate fixation,
- over one and up to (and including) five years initial rate fixation,
- over five and up to (and including) 10 years initial rate fixation, and
- over 10 years initial rate fixation.

Normally, the initial period of fixation is shorter or equal to the original maturity of the loan.<sup>110</sup> The initial period of fixation might be short and the interest rate agreed between the customer and the reporting agent for this initial period of fixation might not be representative of the entire maturity of the loan. New business statistics only reflect the interest rate that is agreed for the initial period of fixation at the start of a contract or after renegotiation of the loan. If, after this initial period of fixation, the interest rate automatically changes to a variable rate, which might be at a very different level, this is not reflected in the MFI interest rates on new business but in those on outstanding amounts. Hence, both sets of statistics are needed to capture the interest rate level and development in the euro area and at national level. The two following examples further illustrate the interdependence of MFI interest rate statistics on new business and on outstanding amounts.

A 10-year consumer credit is granted. At time  $t_0$ , the customer and the reporting agent agree that the interest rate is fixed at 10% p.a. for the first four years and that a new interest rate level is negotiated at time  $t_4$ .<sup>111</sup> The result of the renegotiations at time  $t_4$  is a loan fixed at 8% p.a. for the remaining maturity. At time  $t_0$ , the maturity of this loan is 10 years with an initial period of fixation of four years. At time  $t_4$ , the original maturity of the loan is still

<sup>110</sup> In exceptional cases, the initial period of fixation may be longer than the maturity of the loan. For example, if a loan is agreed to which a fixed interest rate applies for the first year and this loan may be repaid with one-month notice, then the shortest possible maturity is one month and the period of initial rate fixation is one year.

<sup>111</sup> See also Figure 14.

10 years and the classification of the loan in the statistics on outstanding amounts is therefore independent of the new negotiations.<sup>112</sup> Hence, the MFI interest rate statistics on *outstanding amounts* would reflect at time  $t_4$  the decrease from 10% to 8% p.a. in the category 'maturity over five years'. The results of the renegotiation are also captured as new agreements in MFI interest rate statistics on *new business*; the 8% p.a. are recorded for loans with an initial rate fixation of six years in the category 'over five years initial rate fixation'.

Another 10-year consumer credit is granted. This time the customer and the reporting agent agree at time  $t_0$  that the interest is fixed at 9% p.a. for the first 12 months and that it then automatically adjusts to EURIBOR plus  $x$  basis points.<sup>113</sup> This rate is then applied for the next 12 months, after which it will again automatically adjust to EURIBOR plus  $x$  basis points. At time  $t_0$ , the maturity of the loan is 10 years with an initial period of fixation of one year. Only the interest rate of 9% for the first year is considered as *new business* at time  $t_0$ . The movements in the interest rate over time are captured in the MFI interest rate on *outstanding amounts*, but no further new business occurs.

The situation is different if the initial period of fixation is very short as compared to the whole maturity of the loan and the interest rate offered during this period is significantly below market conditions. For example, a 10-year loan is granted where the interest rate is fixed at 2% for the first six months and then automatically adjusts to either a fixed to a variable interest rate at a level reflecting market conditions. To qualify for the treatment described here, the 2% must be an introductory offer and 'eye-catcher' to attract new customers, in the sense that the interest

rate is significantly lower than current market conditions, i.e. at least 200 basis points, and applies for a very short period of the loan. The interest rate that applies after this initial period of fixation has to be already laid down in the contract agreed at time  $t_0$ . It can be fixed or variable but in any case at a level reflecting market conditions. The treatment of loans comprising such introductory offers to attract customers is the same as for step-up loans explained in Chapter 9.1. This means that the *new business* statistics cover the loan at time  $t_0$ . The interest rate on new business can either be computed as a geometric average of the factors '1 + interest rate' or as an NDER comprising the introductory offer and the interest rate agreed for after the initial period of fixation. If a variable interest rate is agreed to apply after the initial period of fixation, for example EURIBOR plus  $x$  basis points, as a convention the value of that variable rate is for the purposes of MFI interest rates on new business be determined as at time  $t_0$ . The statistics on *outstanding amounts* always reflect the interest rate actually applied by the reporting agent at the time of calculation of the MFI interest rate, i.e. the 2% during the first months and then the agreed interest rate at a level reflecting market conditions.

For all *step-up* and *step-down loans*, the initial period of fixation is equal to the maturity of the loan, because a *fixed* interest rate is agreed for the *whole* maturity of the loan at time  $t_0$  when the contract is signed.

<sup>112</sup> This treatment is in line with MFI balance sheet statistics. This situation of a loan that is renegotiated before it reaches maturity is different from the deposit with agreed maturity that is renegotiated at maturity described in Chapter 5.3.3. In the latter case, the maturing deposit with agreed maturity is renegotiated, therefore classified as new business, and the maturity of the (new) deposit counted as commencing at the point of the 'new business' classification.

<sup>113</sup> See also Figure 15.



## 8 Treatment of credit card credit

### 8.1 Credit card linked to an overnight deposit account<sup>114</sup>

#### Question:

Holders of credit cards can draw cash or make payments with a direct charge to an *overnight deposit* account. The credit institution sets the credit card limit, i.e. the maximum amount that can be drawn or paid with the credit card. When the overnight deposit account to which the credit card withdrawals are debited is not provisioned, the credit institution, if it authorises the withdrawal, will consider an overdraft to have been incurred and will charge interest on the balance. This transaction and interest rate should be included in the MFI interest rate statistics, but is the amount only the money drawn or the total limit available?

Furthermore, in general the cardholder makes purchases during the month paying with the credit card. The receipts of the purchases arrive successively at the credit institution which issued the card. The credit card contract with the cardholder specifies that everything that arrives during a month will be debited to the cardholder's overnight deposit account on the 5<sup>th</sup> day of the following month. No interest is charged by the cardholder for this deferral in payment which at most amounts to one month. Should these transactions be included in the interest rate on overnight deposits (or bank overdrafts) given the enormous stock of outstanding transactions at the end of a month that are to be settled only five days later?

#### Answer:

The agreement on a maximum amount that may be drawn with the credit card, which is often referred to as a 'credit limit' or 'credit facility', does *not* in itself constitute new business. As long as no payments have been made with the credit card, no figure is recorded in MFI interest rate statistics on new business and on outstanding amounts.

If payments are made with the credit card during the month and the overnight deposit account to which the card is linked is sufficiently provisioned, again no new business occurs. The only (indirect) influence on MFI interest rate statistics is the reduced outstanding amount on the overnight deposit.

If payments are made with the credit card and the overnight deposit account to which the card is linked is *not* provisioned, but the credit institution authorises the withdrawal, then the account turns into a bank overdraft. The reporting agent will consider the amount on the account as a bank overdraft and charge interest. The MFI interest rate statistics for bank overdrafts reflect this interest rate applied by the credit institution and the actual amount drawn, but not the total amount agreed as the credit limit.

The credit card credit in the form of a bank overdraft may be reimbursed over several months with the customer paying back a fixed amount each month. The loan repayments are reflected only as a decrease in the outstanding amounts.

In this example, the credit card contract specifies that all receipts that arrive at the credit institution during a month will be debited to the cardholder's overnight deposit account only on the 5<sup>th</sup> day of the following month and no interest will be charged until the 5<sup>th</sup> day. Hence, during the reference month, in this example from the 6<sup>th</sup> day of the current month to the 5<sup>th</sup> day of the following month, the credit institution is acting as a 'letter box' for the credit card receipts. The customer has not been granted a loan but rather a deferral in payment. It would hence seem more appropriate to record the amounts covered by the interest-free period as *receivables* and not as *loans* in the MFI balance sheet and hence to exclude them from MFI interest rate statistics. However, the exact treatment will depend

<sup>114</sup> See also paragraph 75 of Annex II to the Regulation.

on the accounting rules applied. This needs to be taken up in the context of the MFI balance sheet statistics. If the amounts covered by the interest-free period were considered as receivables in MFI balance sheet statistics, then only on the 5<sup>th</sup> day of the following month the total amount of the credit card receipts would become relevant for MFI interest rate statistics and would have to be reported as specified above. Chapter 8.3 deals with the case where the interest-free period is considered to be a loan.

## 8.2 Credit card linked to a loan account<sup>115</sup>

### Question:

Holders of credit cards can draw cash or make payments with a direct charge to a *loan account*. As in Chapter 8.1, the credit institution defines the credit card limit, the receipts arrive successively at the credit institution, and the contract specifies that everything that arrives during a particular month will be debited to the cardholder's loan account on the 5<sup>th</sup> day of the following month. As above, no interest is charged for this deferral in payment. Should only the portion drawn or the total limit be recorded? What is new business and what should be included in the statistics on outstanding amounts?

### Answer:

Analogous to Chapter 8.1, so long as no payments have been made with the credit card no figure is recorded in MFI interest rate statistics. The agreement on a maximum amount that may be drawn with the credit card does *not* constitute new business.

When a withdrawal is charged to the loan account, the interest rate statistics for new business reflect the interest rate that the credit institution applies to the loan. The amount of new business is the money that has actually been drawn, rather than the total amount agreed as the credit limit.

The credit card credit in the form of a loan may be reimbursed over several months with the customer paying back a fixed amount each month. The repayments of the loan are reflected only as decreases in the outstanding amounts.

As in Chapter 8.1, the credit card receipts will be debited to the cardholder's loan account only on the 5<sup>th</sup> day of the following month without and no interest will be charged until the 5<sup>th</sup> day. Again it would seem more appropriate to record the amounts covered by the interest-free period as *receivables* rather than *loans* in the MFI balance sheet and therefore to exclude them from MFI interest rate statistics. However, this should be taken up in the context of the MFI balance sheet statistics. If the amounts covered by the interest-free period were considered as receivables then, in this case where the credit card is linked to a loan account, on the 5<sup>th</sup> day new business (amount and interest rate) should be recorded. On the same day the amount and interest rate should also enter the statistics on outstanding amounts. Chapter 8.3 deals with the case where the interest-free period is considered to be a loan.

## 8.3 Credit card not linked to any account

### Question:

In contrast to Chapters 8.1 and 8.2, a customer's credit card is *not* linked to a deposit or loan account. In fact, the cardholder does not have to have any account with the credit institution that issued the credit card. The credit institution sets the credit card limit, i.e. the maximum amount that can be drawn or paid with the credit card. During the month, the cardholder makes purchases, paying with the credit card. The credit card receipts arrive at the credit institution that issued the card. Each month-

<sup>115</sup> This excludes loan accounts in the form of bank overdrafts, which are dealt with in Chapter 8.1.



end, the credit institution sends an invoice to the value of the credit card receipts to the cardholder who is granted an interest-free period of 56 days to pay the bill. A minimum amount of 3% of the balance must be paid after this period has elapsed or additional charges will be imposed, in addition to an interest payment. Interest is only charged after this interest-free period has passed for the outstanding balance. A large number of cardholders pay off their balance in full at the counter or by bank transfer before the due date and thereby incur no interest charges. Should the balances at the month-end that are still covered by the interest free period and so may incur no interest charges be included in the MFI interest rate statistics? Furthermore, should the credit card balances which are attracting interest charges be classified as overdraft, consumer credit or other loan?

*Answer:*

As in Chapters 8.1 and 8.2, the credit institution is in principle acting as a 'letter box' for the credit card receipts. The customer is not considered to have been granted a loan but a deferral in payment and it would seem more appropriate to record the amounts covered by the interest-free period as receivables rather than loans in the MFI balance sheet and to exclude them from MFI interest rate statistics. However, in the case where the credit card is not linked to an account, the interest-free balances incurred on credit cards are often included as loans in the MFI balance sheet statistics. Again, this should be taken up in the context of the MFI balance sheet statistics. If the amounts covered by the interest-free period were considered as loans, then both the interest-free balances and the balance for which interest is charged should be treated as *bank overdrafts* in MFI interest rate statistics. The mechanics of the credit card balances that are not linked to an account are similar to bank overdrafts, i.e. without defined maturity, authorised but taken without giving prior notice, with a defined upper limit for the amount that can be drawn, and unsecured.

Furthermore, the interest rate that applies after the interest-free period is of a level similar to overnight deposits becoming negative.

As described in Chapter 8.1, the MFI interest rate statistics for bank overdrafts reflect the interest rate applied by the credit institution to the bank overdraft and the actual amount drawn, but not the total amount agreed as the credit limit. In this example, the cardholder is granted an interest-free period of 56 days and hence 0% interest recorded for 56 days for the newly incurred balances. For balances that are older than 56 days, the interest rate that is charged by the card issuing institution is reflected. If a minimum amount of 3% of the balance is not repaid within 56 days and a penalty is charged in the form of higher interest rates, this penalty is also reflected in MFI interest rate statistics. If the penalty is applied in form of fees or other non-interest components, it is not covered.<sup>116</sup>

The repayments of the outstanding balances during the month are captured by decreases in the outstanding amounts. If the cardholder pays off the balance in full at the counter or by bank transfer before the due date and thereby incurs no interest charges, only the interest-free period is reflected for bank overdrafts in the form of a 0% interest on the outstanding amount.

The difference across countries in the treatment of interest-free periods on credit cards in MFI balance sheet statistics has implications for MFI interest rate statistics. In some countries the interest-free period is considered as a loan and included in the statistics and in others it is off-balance sheet and hence excluded from the statistics. The MFI interest rate statistics are therefore not fully harmonised in this respect, which needs to be accepted at this stage.

<sup>116</sup> See also the treatment of penalties on bank overdrafts discussed in Chapter 7.5.2.

## 9 Specific national products

Not all specific national products can be covered by this manual. Hence, in the same way as paragraphs 74 to 82 of Annex II to the Regulation, the treatment of the selected products defined in this chapter should be used as a reference for other national products with similar characteristics.

### 9.1 Step-up (step-down) deposits and loans

Paragraph 74 of Annex II to the Regulation defines a step-up (step-down) deposit or loan as 'a deposit or loan with a fixed maturity to which an interest rate is applied that increases (decreases) from year to year by a pre-fixed number of percentage points'. As mentioned in Chapter 7.7.4, the initial period of fixation for a step-up or step-down loan is equal to the maturity of the loan, because a *fixed* interest rate is agreed for the *whole* maturity at time  $t_0$  when the contract is signed.

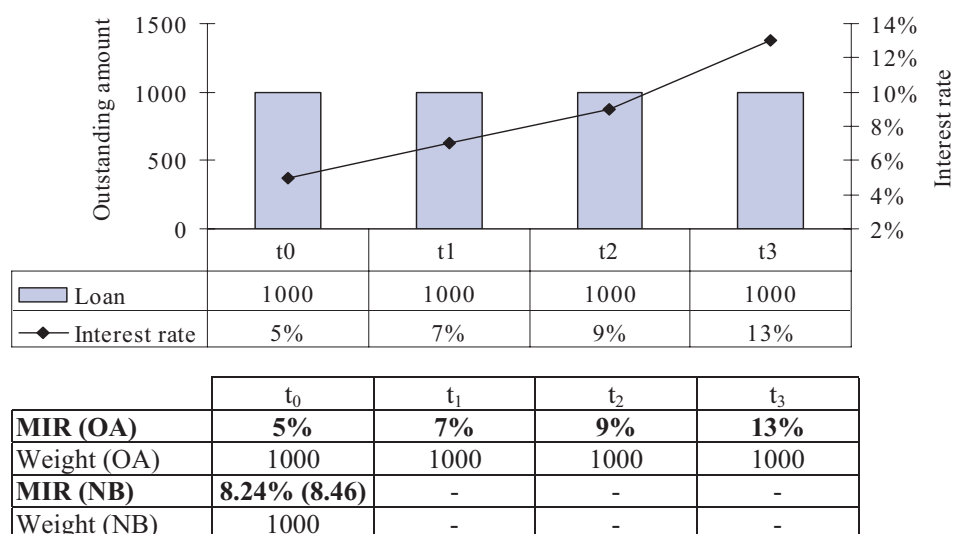
An example of a step-up loan is given in Figure 22, where a four-year consumer credit is granted, for which the credit institution charges 5% interest in the first year, 7% in the second, 9% in the third and 13% in the fourth. The *new business* statistics cover the step-up loan at time  $t_0$  in the category 'over one and up to five years initial rate fixation'. The interest rate on new business can either be computed as a geometric average of the factors '1 + interest rate' or as an NDER. The NDER for this example is 8.2445% and gives the mathematically correct result. The geometric average of the factors '1 + interest rate' provides an approximation. It is 8.46% for the example and calculated as follows:

$$\text{MIR (NB)} = \sqrt[4]{(1+0.05)(1+0.07)(1+0.09)(1+0.13)} - 1 = 0.0845998$$

[Equation 8]

Unlike the NDER, the geometric average does not take into account the timing of the interest

**Figure 22**  
Step-up loan



rate payments. This means that the interest rates computed as a geometric average are the same for a step-up loan with 5% in  $t_0$  and up to 13% in  $t_3$  and for a step-down loan with 13% in  $t_0$  and down to 5% in  $t_3$ . The difference in result between the NDER and the geometric average is small and accepted for MFI interest rate statistics on new business.

The statistics on *outstanding amounts* cover from time  $t_0$  to  $t_3$  the interest rates actually applied by the reporting agent at the time of calculation of the MFI interest rate, i.e. 5% at time  $t_0$ , and  $t_1$ , 7% at time  $t_1$ , 9% at time  $t_2$  and 13% at time  $t_3$ . These interest rates appear in the instrument category 'over 1 and up to 5 years maturity'.

## 9.2 Savings plan for housing loans

*Question:*

According to paragraph 81 of Annex II to the Regulation, savings plans for housing loans are long-term low return savings schemes that, after a certain period of saving, give the saver the right to a housing loan at a discounted rate. In MFI balance sheet statistics, these savings plans are classified under deposits with agreed maturity over two years. When the savings plan is transformed into a loan, this loan is classified as loan to households for house purchases. For the purposes of MFI interest rate statistics, reporting agents report as new deposit business the interest rate that is agreed at the time the initial deposit is placed. The corresponding amount of new business is the amount of money that has been placed. The increase of the amount on the deposit over time is only covered by the outstanding amounts. At the time when the deposit is transformed into a loan, this new loan is recorded as new lending business. The interest rate is the discounted rate that is being offered by the reporting agent. The weight is the total amount of the loan that is being granted to the household.

a) Which amount should be covered as new *deposit* business? Only the first tranche paid into the account, or the total amount of

the deposit which has been agreed and which will be paid into the account in tranches over time?

b) Which amount on the *deposit* should be covered by outstanding amounts? The single tranche, which has been paid into the account in the reference month, or the cumulated amount of all tranches which have been paid into the account so far?

*Answer:*

Analogous to Chapter 5.3.4, the treatment in *new business* statistics depends on whether or not it is known for certain *ex ante* which amount will be held on the deposit account at maturity. In general, savings plans for house purchases are highly flexible products and it is only known *ex post* what amount has been accumulated on the account and can be transformed into a loan or paid out to the customer. Hence, in general the amount of new business is the initial amount of money that has been placed, i.e. the first tranche paid into the account. The corresponding interest rate for new business is the deposit interest rate that has been agreed for when the initial deposit is placed.

If it is known *ex ante* for certain what exact amount will be held on the account at maturity, then the total amount on the deposit should be recorded as new business.

In both cases, the *outstanding amount* is the stock of all deposits placed by the customer on the account. At the time of reporting, the MFI interest rate statistics on outstanding amounts therefore reflect the accumulated amount of all tranches that have been paid into the account so far and the corresponding interest rate.

## 9.3 Interest rate on zero-coupon-bond-like savings bond

*Question:*

In some countries certain non-marketable savings bonds are classified as deposits in MFI

balance sheet statistics. These savings bonds are discounted 'zero-coupon-bond-like' products involving only two cash flows: the initial placement of the 'deposit' at a discounted value and the final redemption payment at 'nominal value' which includes the interest. Which amounts are to be considered as new business and outstanding amounts for the purpose of calculating interest rates on savings bonds? Should the initial value of the deposit placed in  $t_0$  be reflected both as new business and outstanding amounts with any accrued interest over the lifetime to be excluded for the savings bonds? This treatment would be in line with the MFI balance sheet statistics, which requires accrued interest payable on deposits to be classified separately as 'remaining liabilities'.

Answer:

If, for example, the discounted value of the savings bond is EUR 80 and the nominal value at which the it is redeemed after two years is EUR 100, then at time  $t_0$  the amount of EUR 80 is recorded as *new business*. The interest rate on new business is then 11.8034%. It may be calculated as an annualised agreed rate like in Equation 9 or as NDER shown in Figure 23.

$$X = \left( 1 + \frac{\frac{100-80}{80} \cdot \frac{2}{0.5}}{0.5} \right)^{0.5} - 1 = \left( 1 + \frac{0.25 \cdot 2}{0.5} \right)^{0.5} - 1 = 0,118034$$

[Equation 9]

The amount of EUR 80 is also the *outstanding amount* from time  $t_0$  until maturity, including the day of maturity where the bond is redeemed at EUR 100. The reason is that for MFI interest rate statistics, the EUR 20 difference between the issuance and redemption value is interpreted as the interest payment for the two years and not as principal. The interest of EUR 20 is known *ex ante* and interpreted as accrued over the maturity of the bond, in this example over two years. Hence, 11.8034% is reflected as the interest rate on outstanding amounts for the whole period. In this way, the savings bond is treated just like a deposit with an agreed maturity of two years where the interest is fixed at 12.5% p.a. and paid at maturity.

#### 9.4 Split of loan into two parts

Question:

A customer takes out a mortgage loan of EUR 50,000 for 20 years at a variable interest rate. It is agreed with the credit institution and laid down in the contract that at any point in time the customer may split the mortgage. For example, after three years the customer may choose to split it into two parts: EUR 20,000 at a fixed rate and EUR 30,000 at a variable rate. How would this split be treated in MFI interest rate statistics?

**Figure 23**

| Savings bond with agreed maturity of two years, interest rate payment at end of second year: |            |                          |                  |                        |                      |                             |              |  |                                  |           |
|--|------------|--------------------------|------------------|------------------------|----------------------|-----------------------------|--------------|--|----------------------------------|-----------|
|  | t          | Outstand-<br>ing deposit | Interest<br>rate | Reinvested<br>interest | Interest<br>payments | Payments<br>of<br>principal | Cash<br>flow | Discount<br>factor =<br>(1+NDER) <sup>-t/365</sup> | Present<br>value of<br>cash flow | NDER      |
|  | 15/11/2003 | 1                        | 80               |                        |                      |                             | -80          |  |                                  |           |
|  | 14/11/2004 | 365                      | 80               | 0                      | 0                    | 0                           | 0            | 0.89   | 0.00                             | 11.80340% |
|  | 14/11/2005 | 730                      | 80               | 25%                    | 0                    | 20                          | 80           | 0.80   | 80.00                            | 11.80340% |
|  |            |                          |                  |                        |                      |                             | 20           |  | 80.00                            |           |

Answer:

The possibility of the split is already agreed in the contract for the mortgage loan of EUR 50,000. The split does *not* constitute new business if the same contract already determines the terms and conditions of the two loans after a possible split, i.e. the amount of money that would be lent at variable and at fixed interest rate as well as the interest rates applied to these amounts. In this case, the customer is free to choose the timing of the split without engaging in renegotiation of the contract. The change in the interest rates from fully variable to partly fixed after the split is then only reflected in the statistics on outstanding amounts.

If the split of the mortgage loan into two parts implies new negotiation of the terms and conditions of the contract, for example the amount lent at variable and at fixed rate or the level of these interest rates, then *each* of the loans after the split, i.e. the mortgage loan of EUR 20,000 and of EUR 30,000, constitutes new business.

### 9.5 Option of converting the deposit into equity shares

Question:

A deposit with agreed maturity of one year is placed at a higher than market interest rate, currently for example at 14%, where at maturity the credit institution (not the customer) has the option of converting the deposit into the shares of a specific company. If at maturity the share price is high, the credit institution will not exercise the option, but pay the 14% interest and return the deposit. If at maturity the share price is low, then the credit institution will also pay the 14% interest and exercise the option. In this case, at the time of the conversion into shares, the customer will lose part of the deposit because the value of the shares has fallen. The interest rate is high because it includes a risk premium for the possibility of losing part of the capital. This instrument is

also referred to as *reverse convertible*. How should this instrument be treated in MFI interest rate statistics?

Answer:

As there is no capital certainty for the deposit, it is doubtful whether this instrument should be recorded on the MFI balance sheet as *deposit liabilities*. Its classification is currently under review. Assuming that the instrument is recorded on the MFI balance sheet as deposit liabilities, then the treatment in MFI interest rate statistics should be in line with paragraph 78 of Annex II to the Regulation. It reads as follows: 'Loans may be offered to households or non-financial corporations with associated derivative contracts, i.e. an interest rate swap/cap/floor etc. As a convention, such associated derivative contracts shall not be included in the annualised agreed rate on new business. The annualised agreed rate on outstanding amounts shall always cover the rates applied by the reporting agent at the time of the calculation of MFI interest rates. Hence, in the case that such a derivative contract is exercised and the reporting agent adjusts the interest rate charged to the household or non-financial corporation, this shall be reflected in the statistics on outstanding amounts.'

In this case of a deposit with one year maturity at an (higher than market) interest rate of 14%, where at maturity the credit institution has the option of converting the deposit into shares, the annualised agreed rate or NDER on *new business* captures the 14% for the deposit with agreed maturity. This reflects the agreement between the depositor and the reporting agent and it is known when the money is being placed.<sup>117</sup> The gain or loss in capital at the time of the conversion into shares is only known *ex post*

<sup>117</sup> Contrary to Chapter 9.6, in this case an interest rate is agreed *ex ante* for the whole amount of money that is being placed. Although the inclusion of this agreed (higher than market) interest rate might overestimate the level of the deposit rate, the treatment is in line with paragraph 78 of Annex II to the Regulation. Any adjustment of the interest rate of the kind proposed in Chapter 9.7 would be arbitrary.

when the product matures and therefore cannot be covered by the new business rate.

The annualised agreed rate or NDER on *outstanding amounts* always covers the interest rate applied by the reporting agent at the time of calculating the MFI interest rates. Therefore, until the day of maturity, the 14% on the deposit with agreed maturity is captured. At the time of the conversion into shares, the amount converted is *no longer a deposit* and hence not included in MFI interest rate statistics, neither as new business nor as outstanding amounts.

## 9.6 Interest rate linked to share price

*Question:*

A deposit is agreed where the credit institution does not guarantee any interest rate but the return on the deposit is entirely linked to the stock market price of shares in a specific company. If, for example, the share price rises by 10%, the credit institution will pay 20% interest on the deposit to the customer. However, if the share price falls by 30%, then the customer loses 30% of the money placed as a deposit. How should this instrument be treated in MFI interest rate statistics?

*Answer:*

Even more than in Chapter 9.5 it is doubtful whether this instrument should be recorded on the MFI balance sheet as *deposit liabilities*, because there is no capital certainty for the deposit. Again, this needs to be taken up in the context of the MFI balance sheet statistics. The alternative classification in the MFI balance sheet would be as *remaining liabilities*, in which case this instrument would not be covered at all by MFI interest rate statistics.

If the instrument was recorded on the MFI balance sheet as deposit liabilities, then a convention is needed for the level of the interest rate on new business. The return of the deposit is linked to the performance of

the stock market price of shares, which is only known *ex post* and cannot be reflected by the new business rate, and no minimum return at all is guaranteed.<sup>118</sup> The convention for the purposes of MFI interest rate statistics is that the annualised agreed rate or NDER on *new business* captures an interest rate of 0% for the deposit.<sup>119</sup>

The annualised agreed rate or NDER on *outstanding amounts* covers the interest rate applied by the reporting agent at the time of the calculation of MFI interest rates, i.e. it should be based on the stock market price of the shares of the specific company at the time of calculation.

## 9.7 Treatment of deposit comprising two components<sup>120</sup>

*Question:*

A customer and a credit institution agree on a deposit of EUR 10,000 comprising two parts. These two parts are inextricably linked and cannot be placed separately. The first part of EUR 6,000 is placed with an agreed maturity of six months at a (higher than market) fixed interest rate of 15% paid at monthly frequency. The second part of EUR 4,000 is placed with an agreed maturity of three years and the return is linked to a stock exchange index with a guaranteed minimum return of 0%. How should this product be treated in MFI interest rate

<sup>118</sup> This is different to Chapter 5.3.12 where a floor of 2% is agreed as a minimum return, and to Chapter 9.7 where a minimum return of 0% is agreed for the second part of the deposit. It is also different to Chapter 9.5 where a (higher than market) interest rate is agreed *ex ante* for the whole amount of money that is being placed.

<sup>119</sup> This convention might underestimate the level of the deposit rate. However, any adjustment of the interest rate of the kind proposed in Chapter 9.7 would be arbitrary.

<sup>120</sup> This chapter does not cover financial products where the first component is a deposit and the second component an investment in mutual fund shares/units or capitalisation products offered by insurance companies. For these financial products only the amount and the interest rate relating to the first component, i.e. the deposit, is covered by MFI interest rate statistics. The amount and the interest rate placed in the second component are outside the scope of MFI balance sheet statistics and not covered by MFI interest rate statistics. In general, for these financial products the interest rate offered for the first component, i.e. the deposit, is (close to) market interest rates.

statistics? Would the treatment change if the 0% interest, i.e. the minimum return, on the second part of the deposit were not guaranteed, implying the possibility of a capital loss for the investor?

Answer:

Paragraph 79 of Annex II to the Regulation reads as follows: ‘Deposits may be offered comprising two components: a deposit with agreed maturity to which a fixed interest rate is being applied and an embedded derivative with a return that is linked to the performance of a defined stock exchange index or a bilateral exchange rate, subject to a minimum guaranteed return of 0%. The maturity of both components may be the same or may differ. *The annualised agreed rate on new business shall capture the interest rate for the deposit with agreed maturity*, as it reflects the agreement between the depositor and the reporting agent and it is known when the money is being placed. The return on the other component of the deposit linked to the performance of a stock exchange index or a bilateral exchange rate is only known *ex post* when the product matures and therefore cannot be covered by the new business rate. Hence, only *the guaranteed minimum return of 0% should be captured*. The annualised agreed rate on outstanding amounts shall always cover the interest rate applied by the reporting agent at the time of the calculation of MFI interest rates. Until the day of maturity, the rate on the deposit with agreed maturity shall be captured as well as the guaranteed minimum return on the deposit containing the embedded derivative. Only at maturity shall the MFI interest rates on outstanding amounts reflect the annualised

interest rate that is paid by the reporting agent’ (emphasis added).

Hence, according to the Regulation, *both parts* of the deposit are covered by MFI interest rate statistics, i.e. the first part of EUR 6,000 at 15% for a term of six months, and the second part of EUR 4,000 at the guaranteed 0% for three years. However, the Regulation is silent about the precise *treatment* of the two parts, i.e. if they should be treated as two separate deposits or as a single deposit for the purpose of calculating MFI interest rates. If both parts were at the same maturity and would hence fit into the *same instrument category* for MFI interest rate statistics, no question would arise, as it would lead to the same result whether both parts were treated separately or together.

If the two parts have different maturities, as in the example, the two parts of the deposit are classified into two *different instrument categories*. The two parts should, however, be looked at together, because together they form one contract, could not be placed independently of each other, and hence the interest rates on the two parts need to be seen as a ‘package’. For such products either the NDER is calculated comprising the two components or as an approximation a weighted average of the annualised agreed rates on both parts with the maturity and the amount placed as weighting information. The difference in the interest rate level resulting from the different compilation method needs to be accepted.

For the example, the calculation of the annualised agreed rate is given in Equation 10 and of the NDER in Figure 24.

$$\left[ \left( 1 + \frac{0.15}{12} \right)^{12} - 1 \right] * \frac{6000 * 6}{6000 * 6 + 4000 * 36} + 0 * \frac{4000 * 6}{6000 * 6 + 4000 * 36} = 3.2151\%$$

[Equation 10]



**Figure 24**

**Deposit with two components: 6,000 at 15% for three months, 4,000 at 0% for 36 months, standard year of 365 days:**

| t          | Outstand-<br>ing loan | Interest<br>rate p.a. | Outstand-<br>ing loan | Interest<br>rate p.a. | Interest<br>payments | Repay-<br>ments of<br>principal | Cash flow | Discount<br>factor =<br>$(1+NDER)^{-t/365}$ | Present<br>value of<br>cash flow | NDER    |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|---------------------------------|-----------|---|----------------------------------|---------|
| 01/01/2002 | 1.00                  | 6,000                 | 4000                  |                       |                      |                                 | -10,000.0 |   |                                  |         |
| 31/01/2002 | 30.42                 | 6,000                 | 4000                  | 15%                   | 75.00                |                                 | 75.0      | 1.00  | 74.81                            | 3.1371% |
| 28/02/2002 | 60.83                 | 6,000                 | 4000                  | 15%                   | 75.00                |                                 | 75.0      | 0.99  | 74.61                            | 0.03    |
| 31/03/2002 | 91.25                 | 6,000                 | 4000                  | 15%                   | 75.00                |                                 | 75.0      | 0.99  | 74.42                            | 0.03    |
| 30/04/2002 | 121.67                | 6,000                 | 4000                  | 15%                   | 75.00                |                                 | 75.0      | 0.99  | 74.23                            | 0.03    |
| 31/05/2002 | 152.08                | 6,000                 | 4000                  | 15%                   | 75.00                |                                 | 75.0      | 0.99  | 74.04                            | 0.03    |
| 30/06/2002 | 182.50                | 0                     | 4000                  | 15%                   | 75.00                | 6000                            | 6,075.0   | 0.98  | 5,981.90                         | 0.03    |
| 31/07/2002 | 212.92                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.98  | 0.00                             | 0.03    |
| 31/08/2002 | 243.33                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.98  | 0.00                             | 0.03    |
| 30/09/2002 | 273.75                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.98  | 0.00                             | 0.03    |
| 31/10/2002 | 304.17                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.97  | 0.00                             | 0.03    |
| 30/11/2002 | 334.58                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.97  | 0.00                             | 0.03    |
| 31/12/2002 | 365.00                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.97  | 0.00                             | 0.03    |
| 31/01/2003 | 395.42                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.97  | 0.00                             | 0.03    |
| 28/02/2003 | 425.83                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.96  | 0.00                             | 0.03    |
| 31/03/2003 | 456.25                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.96  | 0.00                             | 0.03    |
| 30/04/2003 | 486.67                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.96  | 0.00                             | 0.03    |
| 31/05/2003 | 517.08                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.96  | 0.00                             | 0.03    |
| 30/06/2003 | 547.50                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.95  | 0.00                             | 0.03    |
| 31/07/2003 | 577.92                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.95  | 0.00                             | 0.03    |
| 31/08/2003 | 608.33                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.95  | 0.00                             | 0.03    |
| 30/09/2003 | 638.75                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.95  | 0.00                             | 0.03    |
| 31/10/2003 | 669.17                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.94  | 0.00                             | 0.03    |
| 30/11/2003 | 699.58                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.94  | 0.00                             | 0.03    |
| 31/12/2003 | 730.00                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.94  | 0.00                             | 0.03    |
| 31/01/2004 | 760.42                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.94  | 0.00                             | 0.03    |
| 29/02/2004 | 790.83                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.94  | 0.00                             | 0.03    |
| 31/03/2004 | 821.25                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.93  | 0.00                             | 0.03    |
| 30/04/2004 | 851.67                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.93  | 0.00                             | 0.03    |
| 31/05/2004 | 882.08                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.93  | 0.00                             | 0.03    |
| 30/06/2004 | 912.50                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.93  | 0.00                             | 0.03    |
| 31/07/2004 | 942.92                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.92  | 0.00                             | 0.03    |
| 31/08/2004 | 973.33                |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.92  | 0.00                             | 0.03    |
| 30/09/2004 | 1003.75               |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.92  | 0.00                             | 0.03    |
| 31/10/2004 | 1034.17               |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.92  | 0.00                             | 0.03    |
| 30/11/2004 | 1064.58               |                       | 4000                  | 0%                    | 0.00                 |                                 | 0.0       | 0.91  | 0.00                             | 0.03    |
| 31/12/2004 | 1095.00               |                       | 4000                  | 0%                    | 0.00                 | 4000                            | 4,000.0   | 0.91  | 3,645.99                         | 0.03    |
|            |                       |                       |                       |                       | 450                  | 10,000                          | 450       |   | 10,000                           |         |

At the time of agreement on the contract, the compiled average interest rate is reflected both as *new business* at six months maturity for an amount of EUR 6,000 and as *new business* at three years maturity for an amount of EUR 4,000. The MFI interest rate statistics on *outstanding amounts* also reflect the average interest rate based on the minimum guaranteed return on the two components of the deposit at the time reference point. Hence, in this example the interest rate on outstanding amounts both at six months maturity for an amount of EUR

6,000 and at three years maturity for an amount of EUR 4,000 reflect the average interest rate as compiled above until the respective part of the deposit reaches maturity.<sup>121</sup> A higher than 0% interest rate that is paid by the reporting agent at maturity

<sup>121</sup> Products exist where the interest rate for the second part of the deposit may have a return above 0% for a certain period of time before the deposit reaches maturity, even if at the date the contract is agreed the minimum guaranteed return is 0%. In this case, the average interest rate on outstanding amounts is recalculated at the time reference point in order to take into account the change in the return for the second part of the deposit.



of the second part of the deposit is only reflected in the interest rate on outstanding amounts for this instrument category at maturity. As always, the interest rate needs to be annualised, i.e. it has to be taken into account that the interest paid at maturity on the EUR 4,000 is an one-off payment after 36 months.

If there is *no capital certainty* for the second component of the deposit, the following treatment is applied in MFI interest rate statistics. The *amount* placed in the first part of the deposit, in this example the EUR 6,000, is reflected in MFI interest rate statistics, but *not* the EUR 4,000 placed in the second part, i.e. the remaining liability. Independent of whether or not there is capital certainty for the second part of the deposit, the *interest rate* of 15% on the first part of the deposit is adjusted for the return on the second part, as both parts cannot be placed independently.<sup>122</sup> As the actual return on the remaining liability is only known *ex post* and no minimum return at all is guaranteed, analogous to Chapter 9.6, a convention is needed. The convention for the purposes of MFI interest rate statistics is that the return on the remaining liability is assumed to be 0%. Hence, the interest rate on the first part of the deposit is calculated as described above as NDER or weighted average of the annualised agreed rate taking into account the 15% as well as the assumed 0%. At the time of agreement of the contract, 3.1371% or 3.2151% are reflected as *new business* with agreed maturity of six months and an amount of EUR 6,000. The MFI interest rate statistics on *outstanding amounts* reflect the same rate for a deposit with agreed maturity of six months and an amount of EUR 6,000 until this deposit matures after the six months.

## 9.8 Purchase of mortgage loans by a credit institution

### Question:

A credit institution acquires the economic but not legal ownership of mortgages that

are granted to households by a (related) life insurance corporation. The mortgages in question have different starting dates and are transferred normally in small, sometimes in large, portions from the life insurance corporation to the credit institution. Originally, the life insurance corporation grants the mortgage loans. It is in fact selling mortgages through its network to households and these mortgages are funded or refinanced by the credit institution. The amount paid by the credit institution to the life insurance corporation is the going market rate at the time of the purchase of the mortgage loans and includes among others a fee for handling the mortgage administration and collection of payments by the life insurance corporation. The customer pays the interest for the mortgage loan directly to the insurance company not to the credit institution. In MFI balance sheet statistics, the credit institution records these (purchased) mortgage loans as mortgage loans extended to households. Is the transfer of mortgage loans new business? If it is which interest rate should be reported for new business and outstanding amounts?

<sup>122</sup> This treatment is different to paragraph 80 of Annex II to the Regulation, which reads as follows: 'Deposits with a maturity of over two years as defined in Part 3 of Annex I to Regulation (EC) No 2423/2001 (ECB/2001/13) may contain pension savings accounts. The main part of pension savings accounts is placed in securities and the interest rate on the accounts therefore depends on the yield of the underlying securities. The remaining part of pension savings accounts is held in cash and the interest rate determined by the credit or other institution in the same way as for other deposits. At the time when the deposit is placed, the total return to the household from the pension savings account is not known and may also be negative. Also at the time the deposit is placed, there is no interest rate agreed between the household and the credit institution or other institution for the part invested in securities, only for the remaining deposit part. Hence, only the deposit part that is not invested in securities shall be covered by MFI interest rate statistics. The annualised agreed rate on new business that shall be reported is the rate agreed between the household and the reporting agent for the deposit part at the time the deposit is placed. The annualised agreed rate on outstanding amounts shall be the rate applied by the reporting agent to the deposit part of the pension savings accounts at the time of calculation of the MFI interest rate.' The difference in treatment is justified because the deposit with two components, where one part is a remaining liability without capital certainty and one part a short-term deposit, gains an unusually high interest rate on the short-term deposit which could distort the MFI interest rate statistics.

Answer:

The key for the treatment of such loans in MFI interest rate statistics is their recording in MFI balance sheet statistics. The mortgage loans are originally granted by the insurance company and therefore initially appear on the books of the insurance company and not of the credit institution. There is in fact *no* contractual relationship between the household and the credit institution, only between the household and the insurance company. The latter is beyond the scope of MFI interest rate statistics on *new business*, as the insurance company is obviously not a credit institution and therefore not included in the potential reporting population<sup>123</sup> of the Regulation.

Once the credit institution purchases the mortgage loans, however, a loan to households for house purchases is recorded in the books of the credit institution. At this point in time, the interest rate actually paid by the household for the mortgage loan is recorded in the MFI interest rate statistics on *outstanding amounts*. The purchase of the loans by the credit institution does not constitute new business. As these mortgage loans are covered in MFI balance sheet statistics under loans to households for house purchases, they are also included in the weighting information which is used to calculate the euro area interest rate for outstanding housing loans to households.

### **9.9 Securitisation of mortgage loans by a credit institution**

Question:

A credit institution transfers the economic but not legal ownership of mortgage loans that it has granted to households to a financial vehicle corporation. Analogous to Chapter

9.8, the mortgages in question have different starting dates and are transferred normally in small, sometimes in large portions from the credit institution to the financial vehicle corporation. Originally, the credit institution grants the mortgage loans and records them as loans to households for house purchases in MFI balance sheet statistics. Once the mortgage loans are sold to the financial vehicle corporation, the loans no longer appear in the MFI balance sheet of the credit institution. How should the securitisation be treated in MFI interest rate statistics?

Answer:

As in Chapter 9.8, the key for the treatment of securitisation in MFI interest rate statistics is the recording in MFI balance sheet statistics. The mortgage loans are originally granted by the credit institution to the household and constitute new business at the time of agreement on the contracts. They are hence reflected as loans to households for house purchases in the MFI interest rate statistics on *new business* and also appear at that time in MFI interest rate statistics on *outstanding amounts*.

However, once the credit institution sells the mortgage loans to the financial vehicle corporation, the loans disappear from the books of the credit institution. At that point in time, they are removed from the MFI balance sheet of this institution and also no longer covered in MFI interest rate statistics on *outstanding amounts*. The transfer of the loans to the financial vehicle corporation does not constitute new business for MFI interest rate statistics.

<sup>123</sup> Defined in Chapter 3 and further discussed in Chapter 11.1.

## 10 Aggregation of the data and reporting obligations<sup>124</sup>

### 10.1 Overview

To derive euro area aggregates for each of the instrument categories in Figure 18 and Figure 20, three levels of aggregation are necessary: the first at the level of the reporting agents, the second at that of the NCBs and at the third at the ECB level. The three levels are illustrated in Figure 25.

The starting point for the compilation of MFI interest rate statistics is the individual deposit and loan products within the reporting agents. As a first step, each reporting agent collects data on all relevant products, aggregates them as appropriate and sends them to the NCB of the Member State in which it is resident. In general and as indicated in Figure 25,<sup>125</sup> each reporting agent provides for each instrument category one average interest rate referring to the credit institution or other institution as a whole. In the case of new business it also provides the volume of the new deposits and loans.

As a second step in aggregation, each NCB compiles for each instrument category a weighted average interest rate for each instrument category referring to the Member State as a whole and reports it to the ECB. In the case of new business, the NCB also reports the volume of the new contracts at national level.

The ECB carries out the third and last step of aggregation by compiling for each instrument

category a weighted average interest rate referring to the euro area as a whole. The reporting obligations are discussed in more detail in the following chapters.

### 10.2 Statistical information at the level of the reporting agents<sup>126</sup>

Each reporting agent needs to submit the data collected for MFI interest rate statistics to the NCB of the Member State in which it is resident.

As explained in Chapter 6.1, MFI interest rates on *outstanding amounts*, i.e. indicators 1 to 14 in Figure 18, may be compiled as a snapshot of end-month observations or as implicit rates referring to the average over the month. The same applies to *overnight deposits, deposits redeemable at notice and bank overdrafts*, i.e. indicators 1, 5, 6, 7, 12 and 23 in Figure 19 or Figure 20. It is up to the NCBs to decide which of the two methods is better suited to the national context. The data that reporting agents need to provide to the NCB depend on the chosen method:

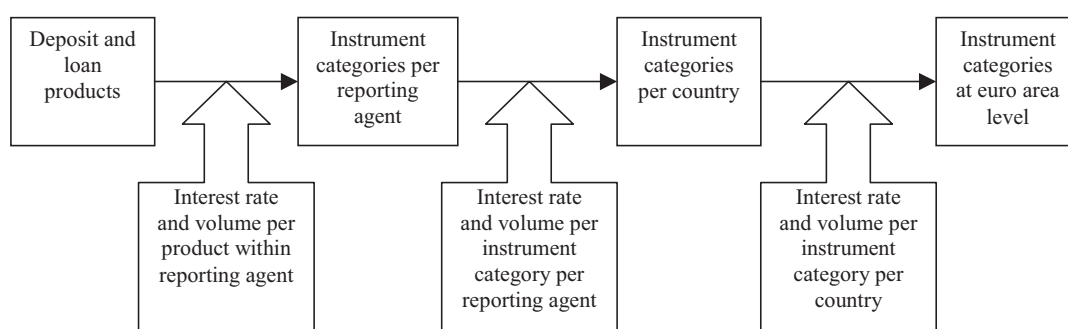
- In the case of a *snapshot* of end-month observations, the reporting agents need to

<sup>124</sup> This chapter refers mainly to Part 5 of Annex II to the Regulation.

<sup>125</sup> NCBs may also choose the compilation of implicit rates (see Chapter 6.1) or require reporting agents to provide data on the level of individual deposit and loans. In both cases the reporting obligations differ from those illustrated in Figure 25.

<sup>126</sup> See also paragraphs 59 to 65 of Annex II to the Regulation.

**Figure 25**



provide for each instrument category a weighted average interest rate referring to the last day of the month. The weighted average interest rate covers all outstanding deposits that have been placed and not yet withdrawn by customers or all outstanding loans that have been withdrawn and not yet repaid by customers in all the periods up to and including the reporting date.<sup>127</sup>

- In the case of *implicit rates* referring to the average of the month, reporting agents provide for each instrument category the accrued interest payable or receivable during the month and the stock of deposits and loans on average during the same month.

In both cases and hence independent of the chosen method, reporting agents need to provide for bank overdrafts (i.e. indicators 12 and 23 in Figure 20) the outstanding amount at the end of the month.

For each instrument category on *new business*, i.e. indicators 2 to 4, 8 to 11, 13 to 22, and 24 to 31 in Figure 20 and Figure 21, all reporting agents need to provide a weighted average interest rate. This weighted average interest rate refers to all interest rates on new business operations in the instrument category during the entire reference month.<sup>128</sup> In addition, they need to report for indicators 2 to 4, 8 to 11, 13 to 22, and 24 to 29 in Figure 20 the amount of new business conducted during the month. Reporting agents do not need to provide the amount of new business for loans to households for consumption and for house purchase compiled as APRC, i.e. indicators 30 and 31 in Figure 21. These amounts can be derived as aggregates from the more detailed data that is provided for the other new business rates.

Instead of asking reporting agents to provide weighted average interest rates on new business and the corresponding volume referring to the institution as a whole, NCBs may also request data at the level of individual deposits and loans.

NCBs may allow credit institutions and other institutions which are resident in a single national territory and individually included in the list of MFIs to report MFI interest rate statistics *together as a group*.<sup>129</sup> The group then becomes a *notional* reporting agent and has the same reporting requirements as the other (individual) credit institutions and other institutions that are reporting agents. So they have to provide the data on outstanding amounts and new business as defined in this chapter referring to the group as a whole. In addition they need to report every year for each instrument category the number of reporting institutions in the group and the variance of interest rates across these institutions. The number of reporting institutions and the variance should refer to the month of October and be transmitted with the October data.

### 10.3 National weighted average interest rates<sup>130</sup>

NCBs receive the data from the reporting agents and aggregate them to MFI interest rate statistics at the national level. These data are then submitted to the ECB:

- For each instrument category on *outstanding amounts*, i.e. indicators 1 to 14 in Figure 18, and for each instrument category on *new business*, i.e. indicators 1 to 31 in Figure 20 and Figure 21, each NCB provides a weighted average interest rate referring to the Member State as a whole.
- In addition, each NCB provides for each of the *new business* indicators 2 to 4 and 8 to 29 in Figure 20 the amount of new business conducted at national level in each instrument category during the reference month. These amounts of new business refer to the *population total*, i.e. to the

<sup>127</sup> *Bad loans and loans for debt restructuring at rates below market conditions are excluded. See also Chapters 5.1 and 5.2.1.*

<sup>128</sup> *See also Chapter 6.2.*

<sup>129</sup> *Further discussed in Chapter 11.5.*

<sup>130</sup> *See also paragraphs 66 to 71 of Annex II to the Regulation.*

entire potential reporting population, not only to the sample, i.e. the actual reporting population.<sup>131</sup> Therefore, where a sampling approach is chosen at national level for selecting the reporting agents, the NCB must apply *expansion factors* at national level to derive the population total for the amount of new business.<sup>132</sup> The computation of selection probabilities and their use as expansion factors for deriving population totals is explained in generic terms in Chapter 11.7.

The NCBs provide the interest rates on outstanding amounts and on new business to the ECB with a detail of four decimal places, i.e. 12.3456%. The level of detail at which the NCBs wish to collect the data from the reporting agents is up to them to define. The published ECB results do not contain more than two decimal places.

Together with the national data, NCBs need to provide methodological notes<sup>133</sup> that document any important special national practices, comprising regulatory arrangements, national conventions, institutional arrangements and specific products affecting MFI interest rate statistics. This information is essential in order to interpret the level and the development of the deposit and lending rates set by MFIs.

NCBs carrying out a sampling approach for the selection of the reporting agents also provide an estimate of the sampling error for the initial sample. A new estimate is required after each maintenance<sup>134</sup> of the sample. The sampling error depends on the national sampling method used, i.e. the stratification, the sample size and its allocation, and the way the reporting agents are selected in each stratum.

#### 10.4 Aggregated results for the euro area<sup>135</sup>

The ECB carries out the final level of aggregation of the instrument categories for each participating Member State to euro area

MFI interest rates statistics. It compiles weighted average interest rates for each instrument category referring to the euro area as a whole:

- In the case of *outstanding amounts*, i.e. indicators 1 to 14 in Figure 18, and *overnight deposits* and *deposits redeemable at notice*, i.e. indicators 1, 5, 6 and 7 in Figure 20, the weighting information is derived from the MFI balance sheet statistics. The interest rates on outstanding amounts compiled as a snapshot of end-month observations have the same time reference point as MFI balance sheet statistics, whereas implicit rates refer to the average over the month. Independent of the compilation procedure at national level, the ECB uses the data on the size of each balance sheet item at the end of the month in each Member State to calculate from the national interest rates weighted averages for the euro area.
- In the case of *new business* and *bank overdrafts*, i.e. indicators 2 to 4 and 8 to 31 in Figure 20 and Figure 21, the weighting information is provided by the NCBs, which collect the data from the reporting agents.

The system of interest rates and weighting information is fully additive to allow combinations of rates such as synthetic deposit and lending rates.

<sup>131</sup> Potential and actual reporting population is defined in Chapter 3 and further discussed in Chapter 11.1.

<sup>132</sup> No expansion factors are required for the weighted average interest rates where it is assumed that the estimate from the sample is the estimate for the entire potential reporting population.

<sup>133</sup> Their content is further discussed in Chapter 4.5.2.

<sup>134</sup> Further discussed in Chapter 11.8.

<sup>135</sup> See also paragraph 72 of Annex II to the Regulation. Further discussed in Chapter 11.2.

## II Selection of the reporting agents<sup>136</sup>

### II.1 Selection of the actual reporting population<sup>137</sup>

MFI interest rate statistics provide for the euro area as a whole and individually for each Member State detailed information about the interest rates that resident credit institutions and other institutions apply to euro-denominated deposits and loans vis-à-vis households and non-financial corporations resident in the euro area. In each Member State, the reporting agents for MFI interest rate statistics are selected by the respective NCB. Each NCB has the choice of declaring all or only a subset of resident credit institutions and other institutions as reporting agents.

The starting point for the selection of the reporting agents is the *potential reporting population*, which provides the *reference population* and *sampling frame*. For each NCB, the potential reporting population comprises *all* resident credit institutions and other institutions which take euro-denominated

deposits from and/or grant euro-denominated loans to households and/or non-financial corporations resident in the participating Member States.<sup>138</sup> In order to select from the potential reporting population the *actual reporting population*, i.e. the reporting agents for MFI interest rate statistics, NCBs follow the procedure defined in Annex I to the Regulation, which is outlined as a ‘decision tree’ in Figure 26.

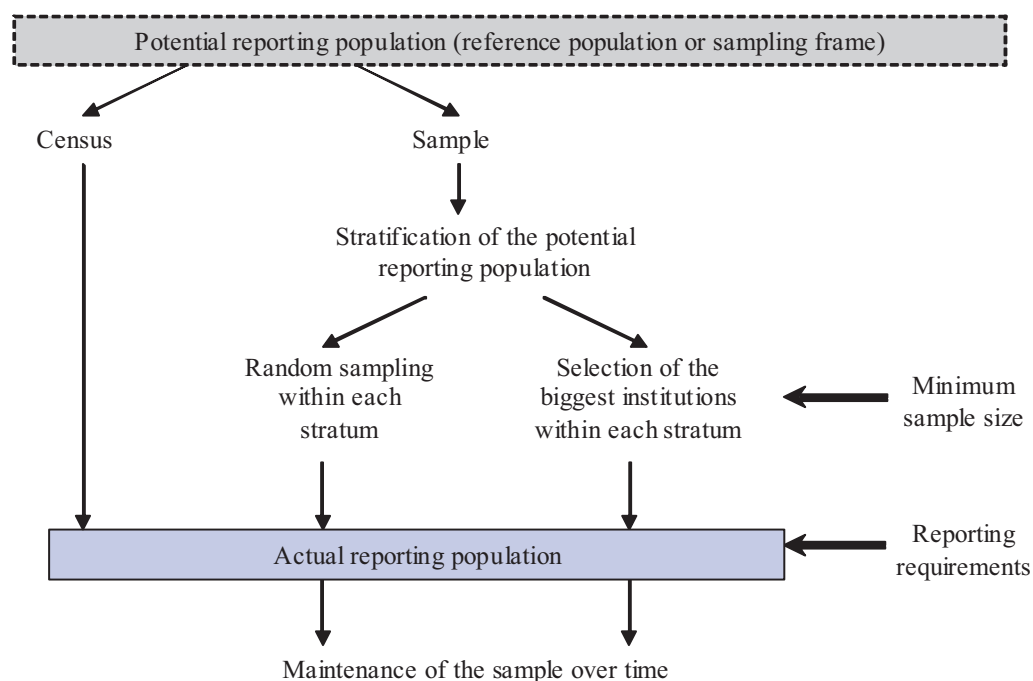
An NCB first has the choice between a census and a sample. In the case of a census, the NCB requires each resident credit institution or other institution in the potential reporting population to report MFI interest rate statistics. In the case of a sample, the NCB stratifies the potential reporting population, which means that the entire reference population is subdivided into sub-populations

<sup>136</sup> This chapter refers mainly to Annex I to the Regulation.

<sup>137</sup> See also Article 2 of the Regulation.

<sup>138</sup> Defined in Article 1(5) of the Regulation. See also Chapter 3.

**Figure 26**  
Decision tree





including institutions that as a result of their limited banking activity are of minor significance for MFI balance sheet statistics, i.e. so-called ‘tail institutions’. After the stratification, the NCB ideally selects the reporting agents at random from each stratum. The alternative to drawing at random is to select the largest institutions within each stratum. In order to keep the sample representative over time, the NCB needs to refresh the sample with joiners and adjust it for leavers and other changes in the characteristics of the reporting agents. To ensure the quality of the output, the Regulation defines a minimum size for the national sample.

The sampling approach aims to reduce the reporting burden on the whole banking sector, as only some credit institutions and other institutions have to report, but might require some small institutions to report MFI interest rate statistics to ensure a representative range of results. Small specialised institutions might offer different interest rates than big universal banks. Following national procedures, the NCB needs to inform the selected reporting agents about their reporting obligations.

## 11.2 Census versus sampling approach<sup>139</sup>

As stated in Chapter 11.1, NCBs first have the choice between a census and a sample. In the case of a *census*, the NCB asks all credit institutions or other institutions in that Member State to report MFI interest rate statistics. In other words, the actual reporting population is identical to the potential reporting population. In the case of a *sample*, only a selection of the reference population is asked to report, which implies that the actual reporting population is smaller than the potential reporting population. In general, the advantages of a sample survey as compared to a census are as follows:

- **Costs:** A sample is less costly than a census, since data are collected only from a subset of the potential reporting population.<sup>140</sup>

The total costs depend on the size of the sample, which is determined by the desired degree of precision<sup>141</sup> of the results.

- **Timeliness:** A sample gives more timely results than a census. Sampling limits the number of reporting agents and therefore the number of reports that the NCBs need to collect, check and process.
- **Accuracy:**<sup>142</sup> Sampling procedures may lead to higher quality data. The smaller volume of work (fewer reports), make possible more careful guidance and monitoring of the reporting institutions, and more careful checking of the responses and data processing. In general, sampling procedures tend to reduce *measurement errors*<sup>143</sup> in surveys resulting from coding, editing, processing, non-response, incorrect answers, etc.

The disadvantages of sampling procedures as compared to a census are partly the costs for setting up and maintaining the sample, but above all the uncertainty resulting from the fact that only a part of the potential reporting population is being observed. The results derived from a sample, i.e. from the actual reporting population, might therefore differ from the true (unknown) values in the potential reporting population. The errors that may occur because sampling procedures are used are referred to as *sampling errors*.<sup>141</sup>

<sup>139</sup> See also paragraphs 2 to 5 of Annex I to the Regulation.

<sup>140</sup> Council Regulation (EC) No 2533/98 of 23 November 1998 concerning the collection of statistical information by the European Central Bank, OJ L 318, 27.11.1998, p. 8, specifies in Article 3 that ‘without prejudice to the fulfilment of its statistical reporting requirements, the ECB shall minimise the reporting burden involved’ and ‘may fully or partly exempt specific classes of reporting agents from its statistical reporting requirements’. The ESCB-internal ‘merits and costs exercise’ formalises the procedures to be followed for justifying new statistical requirements. One step of this procedure is the assessment of the collection and compilation costs borne by reporting agents, NCBs and the ECB.

<sup>141</sup> Variance and standard error, also referred to as sampling error, are measures for the precision of the sampling procedure:

$$\text{Var}(\hat{\theta}_n) = E[\hat{\theta}_n - E(\hat{\theta}_n)]^2$$

<sup>142</sup> The mean square error aims to quantify the accuracy of the estimator:

$$\text{MSE}(\hat{\theta}_n) = E(\hat{\theta}_n - \theta)^2 = \text{Var}(\hat{\theta}_n) + [E(\hat{\theta}_n) - \theta]^2 = \text{Variance} + \text{Bias}$$

<sup>143</sup> Measurement errors are sometimes referred to as ‘non-sampling errors’.



In contrast to measurement errors, which may occur both in a sample and in a census, sampling errors only occur in samples.

As explained in Chapter 10.4, the ECB performs the final stage in aggregating the instrument categories for each Member State to euro area results. To do so, the ECB requires both interest rates and weights, i.e. the deposit and loan amounts per instrument category and Member State. Whereas for outstanding amounts the weights can be derived from the MFI balance sheet statistics, for new business the weights are based on data collected from the actual reporting population. Hence, in the case of a census and a sample the interest rates on outstanding amounts and on new business, as well as the amount of new business, need to be collected from the reporting agents. This implies that, in the case of a sample, not only the interest rates on outstanding amounts and new business but also the amounts of new business are *sampling variables*, i.e. variables measured with certainty after a random selection of the reporting agents. Sampling variables are estimates and therefore subject to sampling errors.

To minimise the risk that the results of a sample survey deviate from the true (unknown) value in the potential reporting population, the aim is to compile a representative sample of credit institutions and other institutions. A sample is considered *representative* of the potential reporting population if it comprises all the characteristics of the institutions that are relevant for MFI interest rate statistics and found in the potential reporting population. In other words, the sample, i.e. the actual reporting population, should reflect the relevant characteristics of all credit institutions and other institutions in the potential reporting population.

There are two main ways of creating a sample:

- In the case of non-random or *purposive sampling*, a number of *typical* units are selected from the potential reporting

population. A unit is typical if it conforms closely, in the sampler's view, to the characteristics of the potential reporting population. The probability of selecting any particular unit cannot be quantified and therefore the computation of the precision of the sample is impossible.

- In the case of *random sampling*, each unit in the population has a chance of being selected in the sample and this selection probability can be quantified.

The advantages of random sampling over purposive sampling are as follows:

- The reporting agents are selected by chance, i.e. objectively, and not subject to the sampler's view.
- The standard error and hence the precision of the sampling procedure can be quantified.
- The degree of accuracy of the estimates from the sample can be estimated.
- The optimal sample size can be defined, which is further discussed in 11.4.
- Selection probabilities and hence expansions factors can be defined, which is further discussed in Chapter 11.7.

### 11.3 Stratification of the potential reporting population<sup>144</sup>

To ensure that the sample of credit institutions and other institutions is representative of the potential reporting population, the Regulation requires that if a Member State decides on a sample, then the potential reporting population needs to be stratified before any reporting agents are selected. *Stratification* implies that the potential reporting population  $N$  is subdivided into sub-populations or strata  $N_1, N_2, N_3, \dots$ ,

<sup>144</sup> See also paragraphs 6 to 9 of Annex I to the Regulation.

$N_L$ . These are not overlapping and together comprise the entire reference population:

$$N_1 + N_2 + N_3 + \dots + N_L = N$$

[Equation 11]

The advantage of stratification and hence of stratified random sampling is that 'extreme' samples, i.e. samples which are not representative of the potential reporting population, can be avoided, resulting in a lower sampling error. For example, in the case of MFI interest rate statistics, a sample containing only institutions specialising in housing loans would be an extreme sample that did not represent all institutions in the potential reporting population. A further advantage of stratified random sampling is that, in addition to the estimated values referring to the entire sample, information can also be gathered about each stratum.

To avoid extreme samples, first the heterogeneous potential reporting population is divided into homogeneous strata. Next, from each stratum a certain number of reporting agents are drawn, which together constitute the sample. By selecting reporting agents from each of the homogeneous strata, the sample becomes heterogeneous and is therefore representative of the heterogeneous potential reporting population. The heterogeneity refers to the variance of the sampling variables.

A stratum is homogeneous if the measurements for the sampling variables, i.e. the interest rates on outstanding amounts and the interest rates and amounts of new business, vary little from one institution to the other. For example, in the case of MFI interest rate statistics, a stratum containing only institutions specialising in housing loans could be a homogeneous stratum, as interest rates might be similar. The result of such homogeneous strata is that the variance of the sampling variables within each stratum, i.e. the *intra-stratum variance*, is lower than the variance between strata, i.e. the *extra-stratum variance*. The decomposition of the total variance into intra-stratum and an extra-

stratum variance is also known as *variance analysis* or *Huygens theorem*. The univariate equation<sup>145</sup> is as follows:

$$\begin{aligned} \text{Var}(y) &= \text{Var}_{\text{within}}(y) + \text{Var}_{\text{between}}(y) \\ \text{Var}(y) &= \frac{1}{N} \sum_{h=1}^L N_h \text{Var}_h(y) + \frac{1}{N} \sum_{h=1}^L N_h (\bar{y}_h - \bar{y})^2 \\ \text{Var}(y) &= \frac{1}{N} \sum_{h=1}^L N_h * \frac{1}{N_h} \sum_{i=1}^{N_h} (y_i - \bar{y}_h)^2 + \frac{1}{N} \sum_{h=1}^L N_h (\bar{y}_h - \bar{y})^2 \\ \text{Var}(y) &= \frac{1}{N} \sum_{h=1}^L \sum_{i=1}^{N_h} (y_i - \bar{y}_h)^2 + \frac{1}{N} \sum_{h=1}^L N_h (\bar{y}_h - \bar{y})^2 \end{aligned}$$

[Equation 12]

More generally:

$$\text{Var}(y) = \sum_{h=1}^L \sum_{i=1}^{N_h} w_i (y_i - \bar{y}_h)^2 + \sum_{h=1}^L w_h (\bar{y}_h - \bar{y})^2$$

Meaning of letters and symbols:

|                                  |  |
|----------------------------------|--|
| $\text{Var}(y)$                  | Total variance of $y$ in the potential reporting population, with $y$ as the sampling variable |
| $\text{Var}_{\text{within}}(y)$  | Variance of $y$ within the strata (intra-stratum variance)                                     |
| $\text{Var}_{\text{between}}(y)$ | Variance of $y$ between the strata (extra-stratum variance)                                    |
| $N$                              | Number of institutions in the potential reporting population                                   |
| $N_h$                            | Number of institutions in stratum $h$ , with $h = 1, \dots, L$                                 |
| $\bar{y}_h$                      | Average $y$ in stratum $h$   |
| $\bar{y}$                        | Average $y$ in the potential reporting population  |
| $w_i$                            | Weight of the individual institution $i$   |
| $w_h$                            | Weight of the stratum $h$  |

<sup>145</sup> The same kind of relationship exists for multiple variables. In vectorial notation it reads as follows:

$$\text{Inertia} = \sum_h \sum_{i \in h} w_i \|y_i - g_h\|^2 + \sum_h w_h \|g_h - g\|^2$$

Meaning of letters and symbols:

|       |   |
|-------|---|
| $w_i$ | Weight of institution $i$   |
| $w_h$ | Weight of the stratum $h$   |
| $y_i$ | Vector of observations for institution $i$                              |
| $g_h$ | Vector which is the barycentre ('centre of gravity') of the stratum $h$ |
| $g$   | Vector which is the barycentre of the whole set of data                 |

$\|\bullet\|$  A kind of distance: Generally, for numerical data, the family of distances of Minkowski is applied, where the distance between two items, e.g. institutions or barycentres is computed with the following formula, where  $i$  denotes an institution and  $j$  a variable:

$$\|y_i - y_j\| = d(y_i; y_j) = \left\{ \sum_{j=1}^n \alpha_j |y_{ij} - y_{ij}|^\lambda \right\}^{\frac{1}{\lambda}}$$

The Euclidean distance is given with  $\lambda = 2$  and  $\alpha_j = 1$ .

Stratification requires that suitable *stratification criteria* are defined, which allow the subdivision of all credit institutions and other institutions into homogeneous strata. Information on the stratification criteria must be available for each institution in the potential reporting population. The stratification criteria must relate to the purpose of the survey, i.e. to the sampling variables that are to be estimated from the sample. Sampling variables for MFI interest rate statistics are the interest rates on outstanding amounts and on new business as well as the amount of new business.<sup>146</sup> Suitable stratification criteria can be derived, for example, from the MFI balance sheet statistics, national surveys conducted for supervisory purposes, national retail interest rate statistics, or the list of MFIs.

If the institutions within each stratum show little variance in terms of the stratification criteria, and if there is a strong relationship between the stratification criteria and the sampling variables, then the institutions within each stratum are also likely to show little variance in interest rates and amounts of new business. If a small number of credit institutions and other institutions is selected from one stratum, the interest rates and the amounts of new business collected from these institutions can be assumed to be representative of that stratum. Combining the data from the different strata should give results that are representative of the potential reporting population.

Within each Member State *at least one stratification criterion* is required as a minimum standard by the Regulation. The aim is to ensure that the sample of credit institutions and other institutions is representative of this Member State's potential reporting population and the standard error small. Ideally each Member State defines a hierarchy of stratification criteria. These should take into account the national circumstances and hence be specific to each Member State.

In many countries the banking business with households and non-financial corporations is

highly concentrated. The organisational structure of the national banking business may amplify this effect. Some credit institutions might have a legal organisation where only the 'head office' is included in the list of MFIs whereas all the regional offices are treated as 'branches'. In this case the head office submits one statistical report covering the whole organisation. In other banking groups, each regional office might be organised as an independent credit institution and as such included in the list of MFIs. In this case, one statistical report covers only the business of the reporting entity. *Concentration in the banking business and organisational differences* need to be taken into account when designing the sample. It might be necessary to work with unequal probabilities for the selection of the reporting agents.<sup>147</sup>

Bigger countries might consider the region in which the credit institution or other institution is located as a stratification criterion. Without aiming at the compilation of regional statistics, which goes beyond the user requirements, *regional (ex ante) stratification*<sup>148</sup> reduces the sampling error where regional differences in interest rates or in the type of customer exist. However, depending on the organisational structure, regional differences might be apparent at branch level rather than at the level of credit institutions. Regional differences are captured in interest rates and the new business amounts, if the head office provides data covering all branches. The alternative is to draw a sample at branch level.<sup>149</sup> In the latter case, the same minimum standards as for the sampling of credit institutions and other institutions apply.

For the construction of the strata, the use of *quantitative data analysis techniques*, such as

<sup>146</sup> See also Chapter 11.2.

<sup>147</sup> Further discussed in Chapter 11.6.

<sup>148</sup> Stratification according to region which is decided by the sample before any application of quantitative data analysis and regrouping techniques.

<sup>149</sup> Sampling at branch level is allowed under certain conditions and discussed in Chapter 11.6. It is carried out without any intermediate drawing, i.e. without sampling (in a first step) credit institutions and (in a second step) branches of the selected institutions; this is further discussed at the end of this chapter.

principal component or factor analysis, and of *regrouping techniques*, such as cluster analysis, is recommended. These statistical methods help to allocate the institutions according to their statistical proximity, with similar ones allocated to the same stratum and dissimilar ones to different strata.

Since MFI interest rate statistics are aimed at providing data on the level and development of interest rates both at euro area and at national level, the country of residence of the credit institutions and other institutions is chosen as the first 'natural' stratification criterion. *Geographical ex ante stratification* gives NCBs flexibility to choose within the framework set by the Regulation the most suitable procedure for selection the reporting agents. Furthermore, it enables the national samples or census procedures to be combined into a euro area sample ensuring reliable statistics at euro area level and national level. In practice, the data are collected by NCBs from reporting agents at national level and then aggregated to euro area results. The stratification at euro area level can be illustrated in a schematic way<sup>150</sup> as follows:

The random selection of the reporting agents takes place after all strata are defined. Only at this stage, indicated as shaded cells in Figure 27, are credit institutions drawn from the sampling frame. Since there is no intermediate drawing, for example at the level of regions or by the size of the institutions, the approach is referred to as *single-stage sampling*. If there were an intermediate drawing, the sampling would occur in several stages (*multi-stage sampling*) which would require more complex formulae and increase the variance of the estimator.

#### 11.4 Minimum national sample size<sup>151</sup>

##### 11.4.1 Definition

The sample of reporting agents for MFI interest rate statistics has to be of a size that ensures reliable euro area *and* national statistics simultaneously. Trying to achieve

<sup>150</sup> A brief description of the actual euro area sample for MFI interest rate statistics is given in Chapter 11.10.

<sup>151</sup> See also paragraphs 10 to 14 of Annex I to the Regulation.

**Figure 27**

| Member States  | Potential stratification criteria |                     |                  | Resulting strata |
|----------------|-----------------------------------|---------------------|------------------|------------------|
|                | Region                            | Size of institution | Type of business |                  |
| Member State A |                                   |                     |                  | A1               |
|                |                                   |                     |                  | A2               |
|                |                                   |                     |                  | A3               |
|                |                                   |                     |                  | A4               |
| Member State B |                                   |                     |                  | B1               |
|                |                                   |                     |                  | B2               |
|                |                                   |                     |                  | B3               |
|                |                                   |                     |                  | B4               |
|                |                                   |                     |                  | B5               |
|                |                                   |                     |                  | B6               |
| Member State C |                                   |                     |                  | C1               |
|                |                                   |                     |                  | C2               |
| Member State D |                                   |                     |                  | D1               |
|                |                                   |                     |                  | D2               |
|                |                                   |                     |                  | D3               |
|                |                                   |                     |                  | D4               |
| etc.           |                                   |                     |                  |                  |

reliable results for only the euro area could lead to the situation that small countries in particular have too few reporting agents to compile a national set of statistics, which would conflict with the aim of providing information about the level and development of interest rates both at euro area *and* at national level. So for the purposes of MFI interest rate statistics the minimum *national* sample size is defined. The aggregate of the national samples is then big enough to derive reliable data on the level and development of interest rates in the euro area.

The Regulation gives flexibility to NCBs while ensuring that the national results are comparable and both the national and euro area results are of high quality. It defines that the *minimum national sample size* shall be such that the maximum random error

$$D = z_{\alpha/2} * \sqrt{\text{var}(\hat{\theta})} \approx z_{\alpha/2} * \sqrt{\hat{\text{var}}(\hat{\theta})}$$

for interest rates on new business on average over all instrument categories does not exceed 10 basis points<sup>152</sup> at a confidence level of 90%, where:

$z_{\alpha/2}$  Factor computed from the normal distribution or any suitable distribution according to the structure of the data (e.g. t-distribution) assuming a confidence level of  $1-\alpha$ ,

$\text{var}(\hat{\theta})$  Variance of the estimator of parameter  $\theta$ , and

$\hat{\text{var}}(\hat{\theta})$  Estimated variance of the estimator of parameter  $\theta$ .

NCBs must prove compliance directly with appropriate data. Alternatively, in the absence of such data, if they fulfil one or the other of the following criteria, the sample size may be presumed large enough to meet the minimum requirement.

- (a) The minimum national sample size shall be such that it covers at least 30% of the resident potential reporting population; where 30% of the resident potential reporting population is greater than 100,

the minimum national sample size may nevertheless be limited to 100 reporting agents.

- (b) The minimum national sample size shall be such that the reporting agents in the national sample cover at least 75% of the stock of euro-denominated deposits received from and at least 75% of the stock of euro-denominated loans granted to households and non-financial corporations resident in the participating Member States.

As part of the preparation for defining the minimum national sample size, the ECB carried out a series of simulations to derive a *theoretical* minimum sample size at national level. In the simulations the sample size is based on the acceptable *maximum random error*, the desired *confidence level* for the results and the *variance* of the interest rates. The statistical details are given in Chapters 11.4.2 to 11.4.4.

The data that was available to the ECB for these simulations are of course not the harmonised MFI interest rate statistics that are in fact the aim of the survey for which the sample size is being defined. Instead the ECB used data provided by NCBs from their current national statistics on retail interest rates or from surveys conducted for supervisory purposes. These national data are not harmonised at euro area level. As a result of the limited availability and comparability of these data, the definition of the minimum sample size could not be stringently based on the simulation results. Deviations from the pure sampling theory were necessary. Hence, the definition takes into account, in a judgmental way, any weaknesses in the assumptions and drawbacks of the mathematical approach, tries to achieve a balance across countries and instrument categories and considers the reporting burden on the banking sector imposed by the survey.

<sup>152</sup> The absolute measure of 10 basis points at a confidence level of 90% may be directly translated into a relative measure in terms of the acceptable maximum variation coefficient of the estimator. Further discussed in Chapter 11.4.2.

Paragraph 10 of Annex I to the Regulation gives *priority* to the definition of the minimum national sample size that is closest to the theoretical ideal, i.e. a size defined in terms of acceptable absolute or relative measure of precision. Compliance with this definition requires that *appropriate data* are available, i.e. data that are sufficiently detailed and derived from surveys that apply definitions that are sufficiently close to the concepts of MFI interest rate statistics. These data are unlikely to be available to NCBs before the survey on MFI interest rate statistics is implemented and reporting agents provide the first sets of data. Hence, the Regulation gives two alternative and more pragmatic definitions of the minimum national sample size, i.e. a coverage of 30% of the potential reporting population or a coverage of 75% of the relevant business. The simulations by the ECB have shown that in general these pragmatic definitions lead to a sample size that ensures a maximum error for interest rates on new business on average over all instrument categories that does not exceed 10 basis points.

Once *appropriate data* are available, NCBs may reassess their sample. They may reduce the sample size, if less than 30% of the potential reporting population or less than 75% of total euro-denominated deposits and loans lead to a maximum random error of not more than 10 basis points at a confidence level of 90%. Analogously, after a transitional period<sup>153</sup> they *must* increase the sample size, if 30% of the potential reporting population or 75% of total euro-denominated deposits and loans would lead to a maximum random error of more than 10 basis points at a confidence level of 90%. When appropriate data are available at national level, the extent to which the national sample meets the requirement of a maximum random error of 10 basis points at a confidence level of 90% may be shown by applying a formula which is *more targeted* to the national sampling procedure than Equation 18 in Chapter 11.4.2. Therefore, at national level NCBs should take into account in particular the gain in precision due to stratification, and

should also consider, where applicable, the selection of reporting agents with probability proportional to size.

In any case many NCBs select more reporting agents than defined as the minimum national sample size, i.e. a *larger sample*, which lowers the national sampling error for that Member State. In particular, an NCB might have to select more reporting agents than the number defined as the minimum national sample size, because it may need to make the national sample more representative in the light of the structure of the national banking system. NCBs may also choose to apply a *census*. The exhaustiveness of the census makes the estimator 'perfect' for the Member State in question. The variance of the estimator in each stratum for that Member State, and hence the sampling error, is by definition zero. This reduction in variance is attributable only to the uncertainties connected with the selection and the sampling plan. Owing to the exhaustiveness of the statistics, the measurement errors<sup>154</sup> might increase since less time can be devoted to each report and reporting agent. Yet these measurement errors are difficult to quantify.

If national samples comply with the defined minimum sample size or if NCBs select more reporting agents than the strict minimum, then the aggregate of these national samples is large enough to derive reliable euro area results. Defining a minimum national sample size thus ensures high quality for euro area data and, in general, for the analysis by individual Member State.

The minimum national sample size defined in the Regulation refers to the *initial sample* and the *sample after maintenance*. Therefore the

<sup>153</sup> Annex IV to the Regulation defines for the sample a transitional period up to the reference month of December 2006. Until then NCBs that cover 30% of the potential reporting population or 75% of total euro-denominated deposits and loans do not need to increase their sample even if that sample size leads to a maximum random error of more than 10 basis points at a confidence level of 90%. The reason is that experience needs to be gained with this completely new and complex survey and stability of the reporting population should be ensured for the first introductory years.

<sup>154</sup> Further discussed in Chapter 11.2.



sample drawn at the beginning of the survey needs to be of the defined size. Due to the effect of mergers and leavers the sample might reduce in size over time, but needs to be refreshed at least at the next maintenance period.<sup>155</sup> When selecting new reporting agents, NCBs need to consider that they will require some time to implement the reporting system for MFI interest rate statistics. Hence it needs to be accepted that between maintenance periods the sample might drop below the threshold given by the minimum national sample size.

#### 11.4.2 Theoretical background

The theoretical model for deriving the minimum sample size is based on simple random sampling without replacement,<sup>156</sup> i.e. a sample where each unit can only be drawn once. For reasons of simplification it is assumed that the average interest rate  $\bar{y}$  is calculated as a simple arithmetic mean instead of a weighted average:<sup>157</sup>

$$\bar{y} = \frac{1}{n} \sum_{i=1}^n y_i, \text{ with } E(\bar{y}) = \bar{Y} \quad \text{[Equation 13]}$$

The variance of this average interest rate  $\bar{y}$  across the institutions  $i$  in the simple random sample without replacement is:

$$\text{var}(\bar{y}) = E\left[\left(\bar{y} - E(\bar{y})\right)^2\right] = \frac{S_y^2}{n} \left(\frac{N-n}{N}\right) \quad \text{[Equation 14]}$$

with  $S_y^2 = \frac{1}{N-1} \sum_{i=1}^N (Y_i - \bar{Y})^2$

Since for MFI interest rate statistics the interest rates  $Y_i$  and  $\bar{Y}$  in the potential reporting population and hence the true variance  $S_y^2$  are unknown, the variance of the average interest rate  $\bar{y}$  across the institutions  $i$  is estimated as follows:

$$\hat{\text{var}}(\bar{y}) = \frac{s_y^2}{n} \left(\frac{N-n}{N}\right) = \frac{s_y^2}{n} (1-f)$$

with  $s_y^2 = \frac{1}{n-1} \sum_{i=1}^n (y_i - \bar{y})^2$  and  $f = \frac{n}{N}$

[Equation 15]

Meaning of letters and symbols:

|                             |   |
|-----------------------------|---|
| $y_i$                       | Interest rate offered by institution $i$ in the sample                            |
| $\bar{y}$                   | Average interest rate across all institutions $i$ in the sample                   |
| $Y_i$                       | Interest rate offered by institution $i$ in the potential reporting population    |
| $\bar{Y}$                   | True (unknown) average interest rate in the potential reporting population        |
| $n$                         | Number of institutions in the sample  |
| $N$                         | Number of institutions in the potential reporting population                      |
| $E$                         | Expected value  |
| $S_y^2$                     | True (unknown) variance of interest rates in the potential reporting population   |
| $s_y^2$                     | Observed variance of the interest rates across all institutions $i$ in the sample |
| $\text{var}(\bar{y})$       | True (unknown) variance of the average interest rate in the sample                |
| $\hat{\text{var}}(\bar{y})$ | Estimated variance of the average interest rate in the sample                     |

To derive the minimum national sample size  $n$ , a *confidence interval* is defined. The sample size  $n$  should be such that with a confidence level of  $1-\alpha$ , the average interest rate  $\bar{y}$  estimated by means of the sample lays within a certain range around the true (unknown) average interest rate in the potential reporting population  $\bar{Y}$ . This range should not be wider than plus or minus the maximum random error  $D$ :

$$\begin{aligned} P(|\bar{Y} - \bar{y}| \leq D) &= 1 - \alpha \\ P(\bar{y} - D \leq \bar{Y} \leq \bar{y} + D) &= 1 - \alpha \quad \text{[Equation 16]} \\ \text{with } D &= z_{\alpha/2} * \sqrt{\text{var}(\bar{y})} \end{aligned}$$

As explained above, the true variance of the average interest rate in the sample  $\text{var}(\bar{y})$  is

<sup>155</sup> Further discussed in Chapter 11.8.

<sup>156</sup> In a simple random sample with replacement, the estimated variance would be calculated without the finite population correction  $(N-n)/n$ .

<sup>157</sup> It is important to note that in the case of a weighted average, the variance of a ratio would have to be calculated.



unknown for MFI interest rate statistics. It is instead estimated from national surveys for retail interest rate statistics, from data collected for supervisory purposes, and other sources. Hence the maximum random error D is:

$$D = z_{\alpha/2} * \sqrt{\text{var}(\bar{y})} = z_{\alpha/2} * \sqrt{\frac{1-f}{n} * s_y^2} \quad [\text{Equation 17}]$$

Solving for n provides the formula for the simulations to derive the minimum national sample size per instrument category used by the ECB:

$$\begin{aligned} D^2 &= z_{\alpha/2}^2 * \frac{1-f}{n} * s_y^2 \\ D^2 &= z_{\alpha/2}^2 * \frac{1-\frac{n}{N}}{n} * s_y^2 \\ D^2 &= z_{\alpha/2}^2 * \left(\frac{1}{n} - \frac{1}{N}\right) * s_y^2 \\ \Rightarrow n &= \frac{z_{\alpha/2}^2 * s_y^2}{D^2 + \frac{z_{\alpha/2}^2 * s_y^2}{N}} \end{aligned} \quad [\text{Equation 18}]$$

If the potential reporting population is very large and in the case of sampling with replacement, which is equal to drawing from an infinite population, then  $\frac{z_{\alpha/2}^2 * s_y^2}{N}$  goes to zero and the formula can be simplified to:

$$n = \frac{z_{\alpha/2}^2 * s_y^2}{D^2} \quad [\text{Equation 19}]$$

The Regulation requires that the maximum random error D does not exceed 10 basis points at a confidence level of 90%. In other words, if all samples of size n were drawn from the potential reporting population, then in 90% of the cases the estimated average interest rate in the sample should not deviate more than 10 basis points from the true average interest rate in the potential reporting population.

The maximum random error D defined as an *absolute measure of error* of 10 basis points is used in Equations 16 to 19. For example, a reference population comprises N = 120 institutions. The observed average interest

rate is 5% with a variance of  $s_y^2 = 0.4$ . At a given confidence level,  $z_{\alpha/2}$  can be derived from statistical tables: given a confidence level 1- $\alpha$  of 95% then  $z_{\alpha/2} = 1.96$  and given a confidence level 1- $\alpha$  of 90% then  $z_{\alpha/2} = 1.645$ . It follows from Equation 18 that the minimum national sample size needs to comprise n = 57 reporting agents. The problem is that higher interest rates usually have a higher variance and would therefore require *ceteris paribus* a bigger sample size. If for the same population the average interest rate was 10% with a variance of  $s_y^2 = 1.6$ , then the minimum national sample size would have to cover n = 94 reporting agents.

Differences in the level and variance of interest rates across instrument categories exist in each Member State. Hence, in order to define the minimum national sample size for MFI interest rate statistics, an 'average' size over all instrument categories needs to be taken. Furthermore, in order to overcome the (potential) problem of increasing sample size with increasing interest rates, the Regulation allows the translation of the absolute measure of error D into a *relative measure of error* in terms of an acceptable maximum variation coefficient CV of the estimator:<sup>158</sup>

$$CV = \frac{\text{Standard deviation of } \bar{y}}{\bar{y}} = \frac{\sqrt{\frac{1-f}{n} * s_y^2}}{\bar{y}} \quad [\text{Equation 20}]$$

The minimum national sample size is then calculated as:

$$n = \frac{s_y^2}{(CV * \bar{y})^2 + \frac{s_y^2}{N}} \quad [\text{Equation 21}]$$

The task of the NCB is to translate the absolute measure of error D = 10 basis points at a confidence level of 90% into a *comparable* relative measure of error in term of an acceptable maximum variation coefficient CV for all instrument categories. The ECB does not define this relative level of error.

<sup>158</sup> See footnote 152.

### 11.4.3 Assumptions and data availability

The theoretical model explained in Chapter 11.4.2 refers to a situation where a *simple random sample* is drawn *without replacement*. MFI interest rate statistics are indeed based on a sampling procedure without replacement and hence refer to a finite reference population. However, they are not based on a simple random sampling procedure but rather on stratified random sampling or a census. To achieve the same level of precision,<sup>159</sup> owing to the stratification of the potential reporting population, fewer institutions need to be drawn with stratified random sampling than with simple random sampling. The model hence *overestimates* the minimum sample size needed for MFI interest rate statistics.

Furthermore, the model assumes a *normal distribution* of the sampling variables, i.e. the interest rates and the amount of new business in the potential reporting population. A normal distribution of the sampling variables may be assumed if the potential reporting population is very large and/or the sample large enough, which is the case for MFI interest rate statistics. It may, however, be argued that the distribution of interest rates in the potential reporting population is usually skewed, which means that the results of the simulations need to be interpreted with caution.

The higher the *variance*, the larger the sample needed to achieve the same level of precision in the results. The true variance of the interest rates in the potential reporting population is unknown. For the purpose of the simulations, the variance is mainly estimated from national surveys for retail interest rate statistics and from data collected for supervisory purposes. As mentioned in Chapter 11.4.1, these data are not harmonised and do not comply with the level of detail and the definitions agreed for MFI interest rate statistics. The (unharmonised) data provided by NCBs refer to weighted or simple average interest rates, but also to the most commonly applied rates. Some of the

data are already derived from samples and others based on a (near) census. Some NCBs report data collected from 'branches', whereas others refer to 'head offices' or 'banking groups'. Some interest rates refer to typical products within an instrument category and others to a range of very different products in the same category. Finally, some NCBs have only limited information on MFI/retail interest rates. As a consequence, the estimates for the variance of interest rates differ widely across Member States. These differences are a result of the diverse national banking systems and also of the dissimilar collection systems. For example, the variance of interest rates for typical products is expected to be lower than if the full range of interest rates in an instrument category were taken into account. Furthermore, the variance over a small number of institutions is expected to be lower than if the estimate was based on a larger number. So the variances used in the simulations are only rough *approximations* of the real variances that occur in MFI interest rate statistics.

Since a finite potential reporting population and sampling without replacement are assumed for MFI interest rate statistics, the national sample size also depends on the *total number of institutions in the potential reporting population*. This reference population may differ for each instrument category as not all institutions offer the full range of deposit and lending business vis-à-vis households and non-financial corporations. The ECB used in its simulations in most cases the number of credit and other institutions as defined in the list of MFIs. In most Member States, this number overestimates the potential national reporting population as it includes institutions that are not active in deposit and lending business vis-à-vis households and non-financial corporation. Therefore, the theoretical model *overestimates* the minimum sample size per instrument category.

<sup>159</sup> Defined in footnote 141.

#### 11.4.4 Sample size and maximum random error

Figure 28 to Figure 31 illustrate the link between the theoretical minimum sample size derived by means of Equation 18 (vertical axis) and the maximum random error D (horizontal axis) for a confidence level of 90%. Since the minimum sample size is also dependent on the variance of the interest rates across MFIs and the size of the potential reporting population in total or per instrument category, this information is given for each of the series in the legend above the chart. To illustrate the influence of the variance on the sample size, an instrument category with a low variance, i.e. deposits with agreed maturity up to two years, and one with a high variance, i.e. consumer loans or loans to non-financial corporations up to one year, have been chosen for each of the four countries A to D.

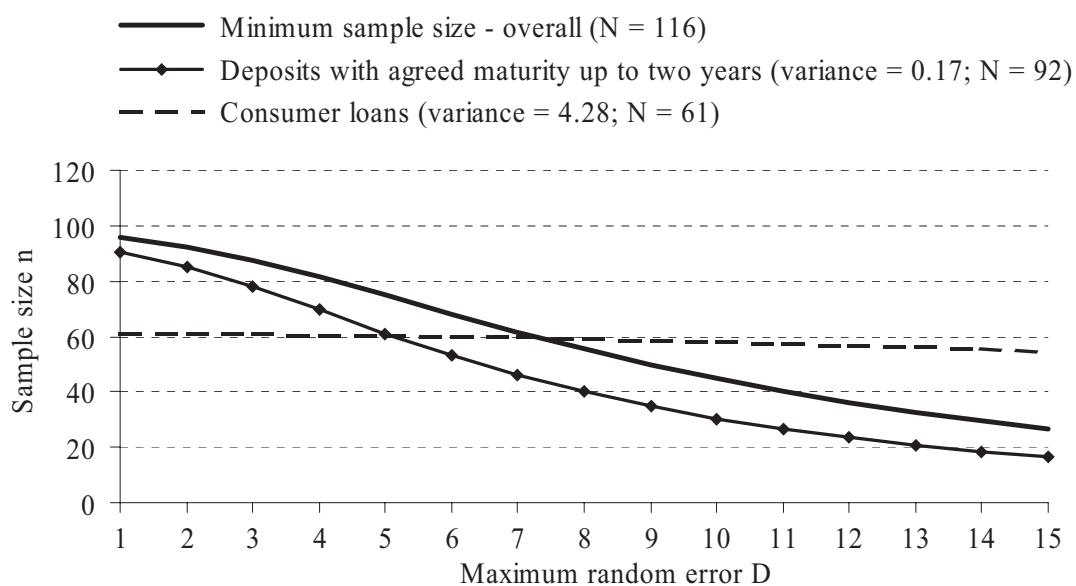
Figure 28 shows that when accepting a maximum random error D of 10 basis points, Country A would have to collect data from 30 reporting agents on deposits with agreed maturity up to two years out of a potential reporting population of 92 institutions for this instrument category. Furthermore, it

would have to cover data from 58 reporting agents on consumer loans out of a potential reporting population of 61 institutions for the instrument category. The difference in sample size is due to the difference in variance, which is with 0.17 low for the deposit and with 4.28 high for the loan category. A weighted average<sup>160</sup> of the results of all instrument categories would lead to a theoretical overall minimum sample size of 45 reporting agents for Country A out of an overall potential reporting population of 116 credit institutions and other institutions.

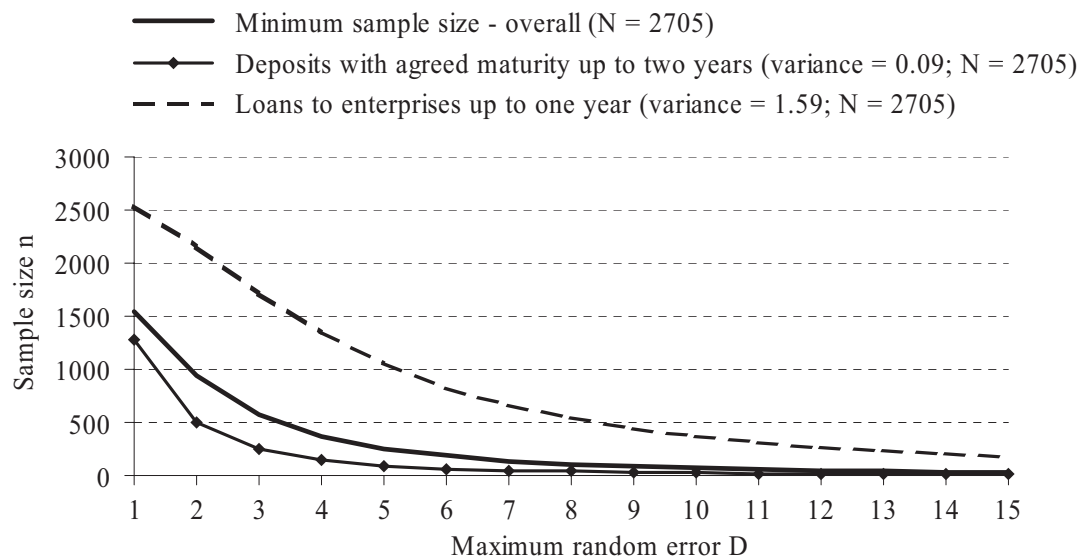
The same maximum error of 10 basis points would for Country B in Figure 29 lead to a sample comprising 24 reporting agents for deposits with agreed maturity up to two years and 371 reporting agents for loans to non-financial corporations up to one year. A weighted average of the results of all instrument categories would lead to a theoretical minimum sample size of 71 reporting agents for Country B out of a potential reporting population of 2,705 credit institutions and other institutions.

<sup>160</sup> Computed from the minimum national sample size per instrument category and the outstanding amounts per instrument category, the latter being used as weighting information.

**Figure 28**  
Country A with a potential reporting population of N = 116 institutions



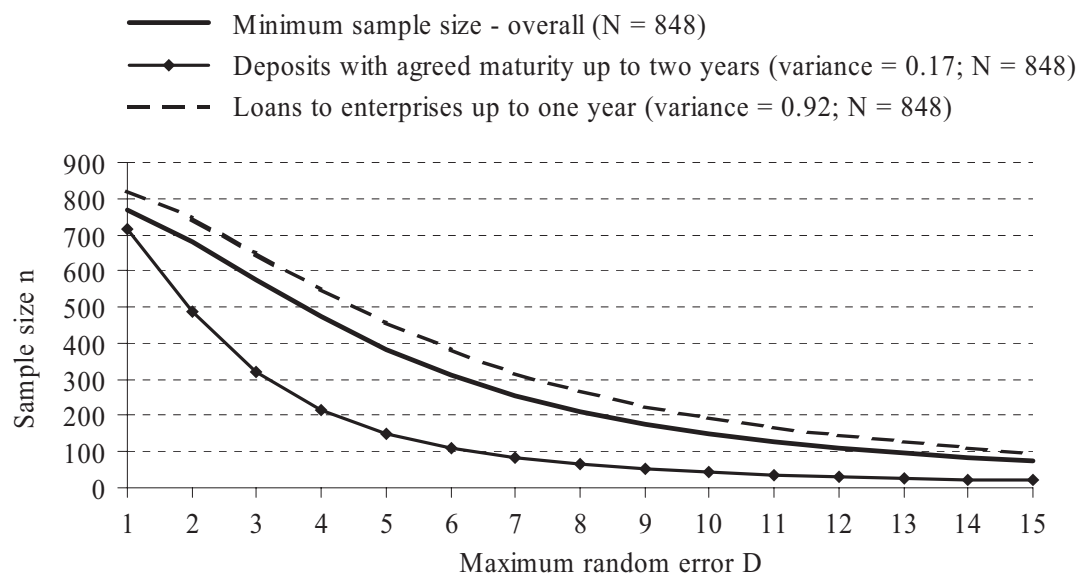
**Figure 29**  
**Country B with a potential reporting population of N = 2,705 institutions**



Applying the same model for Country C leads in Figure 30 to a sample size of 44 reporting agents for deposits with agreed maturity up to two years and 192 reporting agents for loans to non-financial corporations up to one year.

The overall sample in Country C would need to comprise 150 reporting agents out of a potential reporting population of 848 credit institutions and other institutions.

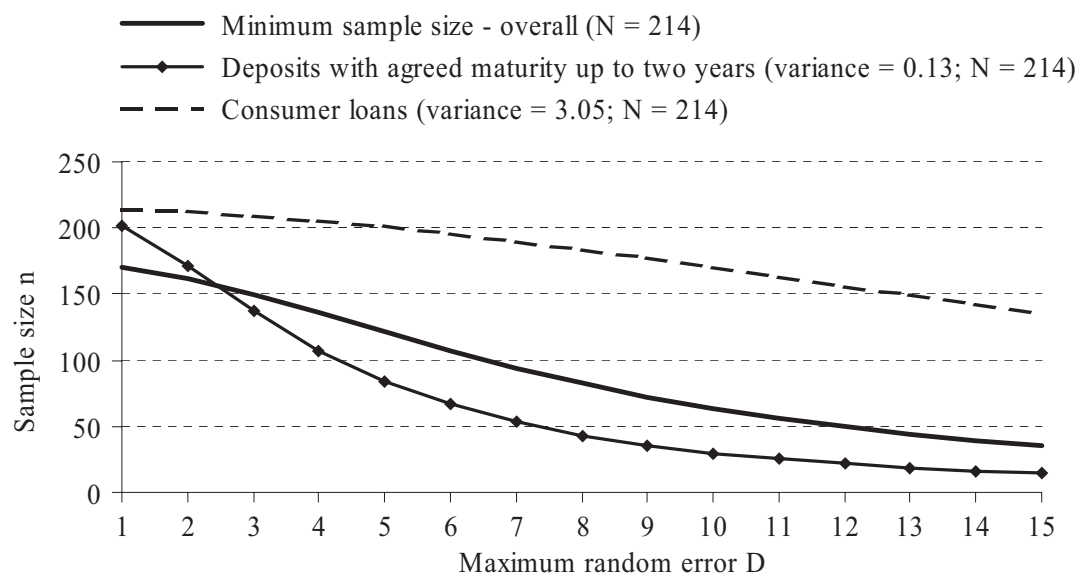
**Figure 30**  
**Country C with a potential reporting population of N = 848 institutions**



Finally, Figure 31 gives for Country D an overall sample size of 63 reporting agents out of a potential reporting population of 214 credit institutions and other institutions. Data

would need to be collected from 30 reporting agents on deposits with agreed maturity up to two years and from 170 reporting agents on consumer loans.

**Figure 3 I**  
**Country D with a potential reporting population of N = 214 institutions**



### 11.5 Special provisions in the case of group reporting

The potential reporting population for MFI interest rate statistics are all credit and other institutions that take deposits from and grant loans to households and non-financial corporations identified in the list of MFIs. However, as mentioned in Chapter 10.2, NCBs may allow credit institutions and other institutions which are resident in a single national territory and individually included in the list of MFIs to report MFI interest rate statistics *together as a group*. Such groups could, for example, be the *Rabobanks* in the Netherlands or the *Caixas de Crédito Agrícola Mútuo* in Portugal. The group becomes a *notional* reporting agent and has the same reporting requirements as the other (individual) credit institutions and other institutions that are reporting agents.

The counting of the number of institutions in the potential reporting population must be consistent with the counting of them in the minimum sample size. For example, if the 400 or so *Rabobanks* in the Netherlands are reporting together as a group they should either be counted as one entity in both the potential reporting population and the sample

or they should each be counted individually in both the potential reporting population and the sample.

Groups that are reporting together need to tell the NCB each year, for each instrument category, the number of reporting institutions and the variance of interest rates across these institutions in the group. The number of reporting agents and the variance must refer to the month of October and be transmitted with the October data.<sup>161</sup> The reporting of variances in the group is intended to compensate for the loss of information that results from reporting as a group, and is required by NCBs so they can estimate the total variance of interest rates in the national potential reporting population. The variance of interest rates across individual reporting agents is likely to be higher than the variance across groups. The reason is that each group only reports an average interest rate for the whole group and these are supposed to be more homogeneous than the rates offered by the individual MFIs in the group. The average of a group could, for example, even out

<sup>161</sup> October was chosen as a 'normal' month, because it is not a month of quarterly production as are March, June, September and December, and not a 'holiday' month.

regional differences if those exist. If group reporting led to underestimating the variance of interest rates in the national potential reporting population, then the required sample size would also be underestimated, as *ceteris paribus* the sample needs to be smaller (larger) if the variance is lower (higher). Likewise, the sampling error would be underestimated. So it is necessary to report variances within the group to achieve comparable results for all Member States based on the same legal definition of a reporting agent.

### 11.6 Allocation of the sample across strata<sup>162</sup>

After defining the national strata and the national sample size  $n$ , the sample is drawn by selecting the reporting agents from each stratum. In this way the actual reporting population is being defined. The total sample size  $n$  is the sum of the sample sizes  $n_1, n_2, n_3, \dots, n_L$  for each of the strata:

$$n_1 + n_2 + n_3 + \dots + n_L = n \quad \text{[Equation 22]}$$

Two issues need to be defined prior to drawing the reporting agents:

- the allocation of the sample size  $n$  among the strata, and
- the method for selecting the reporting agents.

Each NCB may choose the most appropriate *allocation of the national sample size*  $n$  among the strata. In other words, it is up to the NCBs to define how many reporting agents  $n_h$  have to be drawn from the total of credit institutions and other institutions  $N_h$  in each stratum, as long as the sampling rate  $n_h/N_h$  for each stratum  $h$  fulfils the following condition:

$$0 < n_h/N_h \leq 1 \quad \text{[Equation 23]}$$

The minimum standard is to select at least one reporting agent from each stratum, i.e.

the sampling rate needs to be above zero ( $0 < n_h/N_h$ ), which implies that it is not possible to exclude one entire stratum from the actual reporting population. The number of reporting agents  $n_h$  may be the same for each stratum (*constant allocation*), proportional to the size of the stratum (*proportional allocation*), or dependent on the variance of the sampling variables or another closely linked variable in each stratum (*optimal allocation*<sup>163</sup>). The sampling rate may also be one ( $n_h/N_h = 1$ ), which means that all credit institutions and other institutions in a stratum are selected as reporting agents. The allocation of the national sample size across strata has an influence on the variance of the estimator. The best results and hence the lowest total sampling error is in general achieved with optimal allocation.

Regarding the *method of selecting the reporting agents* within each stratum, the Regulation gives NCBs the choice between random sampling and the selection of the largest institutions per stratum,<sup>164</sup> where one method may be used for one part of the strata and the other method for the rest:

- The statistically ideal case is the *random selection* of reporting agents in each stratum. In a random sample each credit institution and other institution in the stratum has a known probability above zero of being selected as a reporting agent. The random drawing of the institutions in each stratum can then be carried out with *equal probability* for all institutions or with *probability proportional to the size* of the institution. In the latter case, big institutions are more likely to be drawn. However, the small institutions also have a probability of selection above zero and could hence in theory also be selected. Random selection with probability proportional to size is highly recommended with extremely skewed populations.

<sup>162</sup> See also paragraphs 15 to 20 of Annex I to the Regulation.

<sup>163</sup> Also known as Neyman optimum.

<sup>164</sup> Advantages and drawbacks are discussed in Chapter 11.2.

- The alternative to random sampling is the *selection of the largest institutions* in each stratum. The aim of this procedure is to protect small credit institutions and other institutions from reporting as they might bear very high costs in relation to bigger institutions. The selection of the largest institutions per stratum is not random sampling, as small institutions have a probability of selection equal to zero, but can be justified with highly skewed populations. However, the procedure of selecting the largest institutions in each stratum can for the purposes of MFI interest rate statistics be treated in the same way as sampling with probability proportional to size.

The *precondition* for sampling with probability proportional to size, i.e. for random sampling and the selection of the largest institutions, is a *strong statistical relation* between the sampling variables and the size of the credit institutions and other institutions in the potential reporting population. Sampling variables are the interest rates and amount of new business. The size of the credit institution or other institution is approximated by the size of the relevant balance sheet items for each institution. In some countries the current surveys on retail interest rate statistics might provide data on new business amounts which could be compared to the size of the corresponding balance sheet items for these institutions. In other countries, data collected for supervisory purposes might be used to test whether such a strong relationship exists. Where such data are not available, NCBs should make assumptions about the relationship between the sampling variables and the size of the institution. The precision of the results of the survey depends on the strength of the statistical relationship.

### 11.7 Estimation of total new business volume<sup>165</sup>

MFI interest rates for the euro area are compiled as weighted averages of the interest rates applied in the Member States. For

interest rates on outstanding amounts the weighting information is derived from the MFI balance sheet statistics. For interest rates on new business, the new business amount per instrument category and Member State is needed for computing weighted average new business rates for the euro area. The amount of new business is collected from the reporting agents together with the interest rates. Assuming that a sample is applied, the total amount of new business per Member State and instrument category needs to be estimated from the results in the sample by applying *expansion, raising or inflation factors*. The estimation of the population total is also referred to as *grossing-up*.<sup>166</sup>

This chapter explains in generic terms the grossing-up procedure for the amount of new business, including the computation of *selection probabilities* and their use as expansion factors. *Generic terms* are used because the precise formulae for a Member State depend on the NCBs' choice of strata, the allocation of the sample across the strata, the method of drawing the reporting agents per stratum and also, in the case of the initial sample, on the data available as auxiliary information. First, the estimation of the population total from amounts derived by simple random sampling is explained. Then the more complex procedure for sampling with probability proportional to size is illustrated, which also applies to the selection of the largest institutions within each stratum. As explained in Chapter 11.6, both the random selection and the selection of the biggest institutions in a stratum are treated as random procedures for the purposes of MFI interest rate statistics. Therefore, the same general method may be used to estimate the total amount of new business in the potential reporting population from the results of the sample.

<sup>165</sup> Already mentioned in Chapter 10.3. See also paragraph 68 of Annex II to the Regulation.

<sup>166</sup> No grossing-up is required for simple averages and ratios, because it is assumed that the estimate from the sample is also the estimate for the population.



In the case of *simple random sampling* within a stratum, each credit institution and other institution has the same chance of being selected. At each draw the procedure gives an equal chance of selection to every institution in the potential reporting population, i.e. to each institution that has not already been drawn. Hence, each institution has a known probability of selection. Before the first draw, the probability of selecting institution  $i$  is:

$$\pi_i = \frac{n}{N} \quad \text{[Equation 24]}$$

with  $n$  as the size of the sample and  $N$  as the size of the potential reporting population. The inverse of this selection probability is then used as the expansion factor to estimate the total amount of new business in the population from the sample:

$$\frac{1}{\pi_i} = \frac{N}{n} \quad \text{[Equation 25]}$$

The Horvitz-Thompson estimator for the population total derived from a sample is:

$$\hat{Y} = \sum_{i \in S} \frac{y_i}{\pi_i} \quad \text{[Equation 26]}$$

with  $\hat{Y}$  as the estimated total amount of new business in the potential reporting population,  $y_i$  as the amount of new business of institution  $i$  and  $\pi_i$  as the probability of selecting institution  $i$ . In the case of simple random sampling, the estimator from Equation 26 for the total amount of new business in the population becomes:

$$\hat{Y} = \sum_{i \in S} \frac{y_i}{\frac{n}{N}} = N * \frac{1}{n} \sum_{i \in S} y_i = N * \bar{y}_s \quad \text{[Equation 27]}$$

The starting point for *sampling with probability proportional to size* is also the calculation of the selection probability  $\pi_i$  for each institution  $i$ . The selection probabilities are computed separately for each stratum from the fixed sample size  $n_h$  per stratum and the variable  $U_i$  indicating the size of the institution  $i$ :

$$\pi_i = n_h * p_i = n_h * \frac{U_i}{\sum_{i=1}^{N_h} U_i} \quad \text{[Equation 28]}$$

Variable  $U$  signifies auxiliary information, which can differ between Member States. It is up to NCBs to define the most suitable national variable  $U$ , which must be strongly correlated with the amount of new business, i.e. variable  $Y$ , in that Member State. For example,  $U_i$  could be the outstanding amount for each instrument category for institution  $i$  from the MFI balance sheet statistics. An *important restriction* for the calculation of the selection probabilities is that the product of the fixed sample size  $n_h$  and the size  $U_i$  of institution  $i$  is smaller than the total of all institutions in the same instrument category:

$$n_h * U_i < \sum_{i=1}^{N_h} U_i \quad \text{[Equation 29]}$$

This restriction guarantees the coherence of the selection probabilities. If the restriction of Equation 29 is not fulfilled for institution  $i$ , this institution is selected automatically. The probability of its selection is hence set as 1. The other selection probabilities are recalculated based on the exclusion of  $i$  with the new restriction:

$$(n_h - 1) * U_{k \neq i} < \sum_{k=1}^{N_h-1} U_{k \neq i} \quad \text{[Equation 30]}$$

If this restriction is again not fulfilled, institution  $k$  is selected automatically and its selection probability set to 1. The other probabilities are then calculated as follows:

$$(n_h - 2) * U_{j \neq k, i} < \sum_{j=1}^{N_h-2} U_{j \neq k, i} \quad \text{[Equation 31]}$$

etc.

Figure 32 gives an example for the calculation of the selection probabilities in the case of sampling with probabilities proportional to size.

**Figure 32**

N=15

n=4

| Institution | Size Xi  | Xi/(sum Xi) | Xi/(sum Xi-A) | 4*Xi     | 3*Xi     | Selection probability |
|-------------|----------|-------------|---------------|----------|----------|-----------------------|
| A           | 16271700 | 0.3414      |               | 65086800 |          | 1                     |
| B           | 9293500  | 0.1950      | 0.2960        |          | 27880500 | 0.8881 =3*0.2960      |
| C           | 6627700  | 0.1391      | 0.2111        |          | 19883100 | 0.6334 =3*0.2111      |
| D           | 4822600  | 0.1012      | 0.1536        |          | 14467800 | 0.4609                |
| E           | 3420100  | 0.0718      | 0.1089        |          | 10260300 | 0.3268                |
| F           | 2975100  | 0.0624      | 0.0948        |          | 8925300  | 0.2843                |
| G           | 2418600  | 0.0507      | 0.0770        |          | 7255800  | 0.2311                |
| H           | 669732   | 0.0141      | 0.0213        |          | 2009196  | 0.0640                |
| I           | 470700   | 0.0099      | 0.0150        |          | 1412100  | 0.0450                |
| J           | 260775   | 0.0055      | 0.0083        |          | 782325   | 0.0249                |
| K           | 203760   | 0.0043      | 0.0065        |          | 611280   | 0.0195                |
| L           | 126591   | 0.0027      | 0.0040        |          | 379773   | 0.0121                |
| M           | 47600    | 0.0010      | 0.0015        |          | 142800   | 0.0045                |
| N           | 34987    | 0.0007      | 0.0011        |          | 104961   | 0.0033                |
| O           | 20000    | 0.0004      | 0.0006        |          | 60000    | 0.0019                |
| Sum Xi      | 47663445 |             |               |          |          |                       |
| Sum Xi-A    | 31391745 |             |               |          |          |                       |

As in the case of simple random sampling, the Horvitz-Thompson estimator in Equation 26 is used to estimate the total amount of new business Y in the potential reporting population from the result of the sample. Hence, inverses of the selection probabilities calculated by means of Equations 28 to 31, i.e.  $\frac{1}{\pi_i}$ , are used as expansion factors.

Assuming that there is a strong statistical relationship between the size of the institutions U and the amount of new business Y, the Horvitz-Thompson formula provides an unbiased estimate of the population total, i.e. the total amount of new business in the potential reporting population. It is important to note that  $p_i$ , i.e. the size of institution i as share of all institutions, in Equation 28, changes over time. In order to derive an unbiased estimate of the total amount of new business from the sample, the  $p_i$  and hence the  $\pi_i$  need to be recalculated each month.

MFI interest rate statistics are based on a selection without replacement, i.e. each credit institution and other institution can only be selected once. In random sampling with probability proportional to size, care has to be taken that the selection probabilities are proportional to the size of the institutions after each draw. Hence, after the first

institution is drawn, the selection probabilities of the remaining institutions need to be adjusted, the same after the second institution is drawn, etc. For stratified random sampling, practical methods have been developed. If the largest institutions within each stratum are chosen, a selection with replacement can be assumed. In this case the selection probabilities only need to be calculated once before the first draw.

Each Member State either carries out a census or has one sample for MFI interest rate statistics covering all instrument categories.<sup>167</sup> It is hence possible that a reporting agent has no business in some instrument categories. For example, a sample comprises 50 reporting agents but for one instrument category only 30 of them carry out business and have outstanding amounts. The outstanding amount, however, is used as auxiliary variable U indicating the size of the institutions. For estimating the total amount of new business for this instrument category, the selection probabilities and hence expansion factors only take into account the 30 reporting agents that carry out business and have outstanding amounts. Whether the reporting agents also have new business or not in that month is

<sup>167</sup> See also Chapter 11.9

irrelevant in calculating the selection probabilities and expansion factors.

### 11.8 Maintenance of the sample<sup>168</sup>

NCBs that choose the sampling approach must ensure that the sample remains representative over time. Maintenance of the sample over time is inherent to *panel surveys* that aim to collect two or more measures from the same sample units over time. The fact that the same units report repeatedly over time ensures the consistency of the answers, also known as the panel effect.<sup>169</sup>

The selection procedure for a panel does not differ from the selection of any other sample. The same methods are applied, but adapted to the panel situation as necessary. What is difficult to capture in a panel, but of no importance in a one-off sample, is the variability of the structure of the potential reporting population compared to the actual reporting population, i.e. the reporting agents. The sample must therefore be adjusted for joiners to the potential reporting population, leavers from the potential and actual reporting population, as well as for changes in the characteristics of the reporting agents. The following table describes the procedures that needs to be followed:

|                                | $t_1$      | Leavers | Joiners     |                   | $t_2$             |
|--------------------------------|------------|---------|-------------|-------------------|-------------------|
| Panel of reporting agents      | $n_1$      | $n_d$   | $(n_b)$     | $n_2$             | $n_c = n_1 - n_d$ |
| Potential reporting population | $N_1$      | $N_d$   | $N_b$       | $N_2 = N_c + N_b$ | $N_c = N_1 - N_d$ |
| Selection probability          | $\pi_{1i}$ |         | $\pi'_{2i}$ |                   | $\pi_{2i}$        |

At time  $t_1$  of the drawing of the initial sample,  $n_1$  institutions of the total  $N_1$  have been selected as reporting agents. At time  $t_2$ , the potential reporting population has changed to  $N_2$  institutions consisting of the common institutions  $N_c$ , which are included in the potential reporting population at  $t_1$  and at  $t_2$ , as well as the joiners of the potential reporting population  $N_b$  during the period from  $t_1$  to  $t_2$ . The common institutions  $N_c$  consist of all institutions  $N_1$  in the potential reporting population in  $t_1$  less the leavers  $N_d$  during the period from  $t_1$  to  $t_2$ .

If the initial sample  $n_1$  was drawn as a simple random sample and the sample  $n_2$  not adjusted for joiners and leavers, then the sample  $n_2$  includes only the common institutions  $n_c$ , i.e. the  $n_1$  institutions of the initial sample less the leavers  $n_d$ . Hence, although the structure of the potential reporting population changes from  $t_1$  to  $t_2$  this is not reflected in the sample. The situation is as follows:

$$n_2 = n_c = n_1 - n_d$$

$$\frac{n_c}{N_2} \neq \frac{n_1}{N_1} \quad \text{[Equation 32]}$$

$$\pi_{1i} \neq \pi_{2i}$$

The sample  $n_2$  needs to be adjusted for the *joiners* to the potential reporting population to remain representative of the potential reporting population over time. In order to do so, it is necessary to draw a sample  $n_b$  from the population of all joiners  $N_b$ . The sample  $n_2$  then includes the common institutions  $n_c$ , i.e. the  $n_1$  institutions of the initial sample less the leavers  $n_d$ , as well as the joiners  $n_b$  in the period from  $t_1$  to  $t_2$ . In this way the changes in the structure of the potential reporting population resulting from joiners from  $t_1$  to  $t_2$  are also reflected in the sample. The complementary selection of joining institutions  $n_b$  among the total number of joiners  $N_b$  is referred to as *incremental sampling* over time. The situation is then as follows:

$$n_2 = n_c + n_b = n_1 - n_d + n_b$$

$$\frac{n_c + n_b}{N_c + N_b} = \frac{n_2}{N_2} \cong \frac{n_1}{N_1} \quad \text{[Equation 33]}$$

$$\pi_{1i} \cong \pi_{2i}$$

$$N_2 \cong \hat{N}_2 = \sum_{i \in n_c} \frac{1}{\pi_{1i}} + \sum_{i \in n_b} \frac{1}{\pi_{2i}}$$

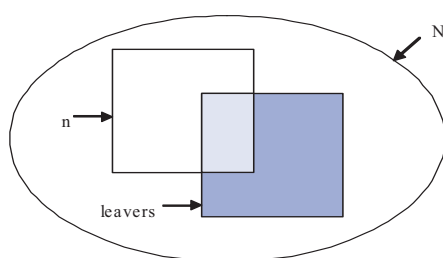
The sample  $n_2$  also needs to be adjusted for the *leavers* from the potential and the actual

<sup>168</sup> See also paragraphs 21 to 26 of Annex I to the Regulation.  
<sup>169</sup> See also Chapter 11.9.

reporting population. No adjustment is necessary if there is proportionality between the leavers in the potential reporting population  $N_d$  and the leavers in the sample  $n_d$  (Case 1). If the institutions are leaving the potential reporting population and these institutions are not in the sample, the sample becomes relatively too large for the size of the potential reporting population (Case 2). If relatively more institutions leave the sample than the potential reporting population, the sample becomes too small over time and might cease to be representative (Case 3). These three situations are illustrated in Figure 33, where the circle signifies the potential reporting population  $N$ , the uncoloured square the sample  $n$  and the dark square the leavers in the period from  $t_1$  to  $t_2$ :

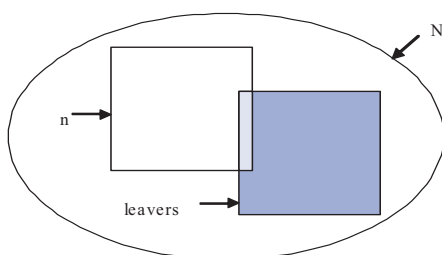
**Figure 33**

**Case 1: Proportionality**



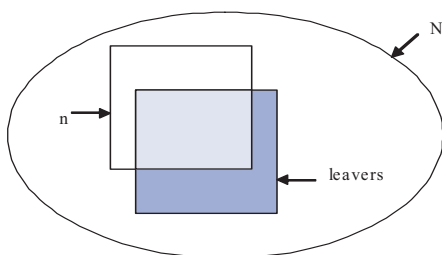
**Case 2:**

**Leavers underrepresented in the sample**



**Case 3:**

**Leavers overrepresented in the sample**



Whereas in Case 1 the number of leavers from the potential reporting population can

be estimated using the formula  $\sum_{i \in \Omega_d} 1/\pi_{1i} \cong N_d$ ,

this is not possible in Cases 2 and 3. In Case 2 the number of leavers in the population is underestimated and in Case 3 overestimated. If, in Cases 2 and 3, the inverses of the selection probabilities were used as expansion factors, this would lead to biased results for the population total. Therefore, in Cases 2 and 3 the weights attached to each reporting agent in the sample must be adjusted, for example by means of *poststratification*, i.e. stratification after the selection of the sample. The weight attached to each reporting agent is the inverse of its selection probability and hence the expansion factor for estimating the population total. With poststratification, the sample becomes restratified. New selection probabilities and hence weights are allocated.

Even in Case 2, where the sample is relatively too big for the potential reporting population, none of the common institutions  $n_c$  is taken out of the sample. This means that an institution that once implemented the MFI interest rate reporting scheme will only be relieved of the reporting burden if it leaves the list of MFIs or if the NCBs in agreement with the ECB decides to reselect all reporting agents.

Finally, the sample needs to be adjusted for *changes in the characteristics of the reporting agents*. These changes can occur because of mergers, divisions, growth of the institution, etc. Some reporting agents might change the stratum. As in Cases 2 and 3 for leavers, the sample needs to be adjusted, for example by means of poststratification. In this case, the sample is restratified and new selection probabilities and hence weights are allocated.

According to the Regulation, NCBs that choose the sampling approach must *check the representativity* of their sample at least every year. If there are *significant changes* in the potential reporting population, these are reflected in the sample after the annual check. In intervals of at least two years, the sample

must be *refreshed* to take account of joiners, leavers and other changes of the characteristics of the reporting agents. NCBs may check and refresh their sample more often. Such adjustments of the sample over time are statistically necessary to ensure the quality of panel surveys; in general they will not lead to breaks in the time series.

The ECB leaves it to the discretion of the NCB when in the year it reviews the national sample. The ECB also leaves it to the discretion of the NCB how much time it grants to new reporting agents for implementing the reporting requirements, but expects that there are not more than 12 months between the identification of a new reporting agent and the first reporting of data.

### 11.9 Further sampling issues<sup>170</sup>

To achieve *consistency* between MFI interest rate statistics on:

- outstanding amounts referring to deposits,
- outstanding amounts referring to loans,
- new business referring to deposits, and
- new business referring to loans,

NCBs should use the same sample of credit institutions and other institutions for collecting these sets of statistics. It is, however, possible to use a sample for a subset of MFI interest rate statistics and a census for the rest, for example a sample for new business and a census for outstanding amounts or a sample for new lending business and a census for new deposit business and outstanding amounts. The Regulation does not allow the use of two or more different samples.

By definition, the interest rates on outstanding amounts comprise all deposits placed and not yet withdrawn and all loans withdrawn and not yet repaid by customers

in all the periods up to and including the reporting date. This includes all new business during the month before and including the reporting date unless these new contracts have already been closed before the reporting date. Moreover, as the MFI interest rates on new business and on outstanding amounts are both weighted averages, not only the interest rates but also the attached quantities are interlinked. The fact that the same credit institutions and other institutions report the statistics both on outstanding amounts and new business and do so repeatedly period after period leads to a *panel effect*.<sup>171</sup> This effect ensures consistency of answers for the two sets of statistics at one particular time (*cross-sectional analysis*) and for each set of statistics over time (*time series analysis*). If the sample differed for the collection of MFI interest rates on new business and outstanding amounts, a 'time series panel effect' would still exist because the same institutions were surveyed in each period. If two samples were drawn, one for the reporting on new business and the other for outstanding amounts, sampling effects might lead to a different composition of the two actual reporting populations, which might then lead to discrepancies between the two sets of statistics.

NCBs need to cover each *instrument category* that exists in the banking business of resident credit institutions and other institutions with euro area households and non-financial corporations, but not each *product* offered at national level.<sup>172</sup> An instrument category is inapplicable at national level only if credit institutions and other institutions do not offer any such products to resident non-financial corporations and households. NCBs must provide data if some business exists, however limited this business is. Hence, if an instrument category is only offered by one institution, then this institution needs to be represented in the sample. If an instrument category did not exist in a Member State at

<sup>170</sup> See also paragraphs 27 and 28 of Annex I to the Regulation.

<sup>171</sup> See also Chapter 11.8.

<sup>172</sup> See also Chapter 7.2.

the time of the initial drawing of the sample, but afterwards one institution introduces a *new product* belonging to this instrument category, then this institution needs to be selected into the sample at the time of the next representativity check. If a *new product* is created that belongs to an existing instrument category, the institutions in the sample need to cover it with the next reporting, as all reporting agents are required to report for each instrument category *all* interest rates applied to *all* the products that fit this category.

Under certain conditions sampling is allowed at the level of *branches* rather than at the level of credit institutions or other institutions. Sampling at the level of branches can be undertaken for one or more of the strata in the sample. The first precondition is that the NCB decides on a census for that stratum, i.e. that all credit institutions and other institutions in the stratum are subject to reporting. The second precondition is that the NCB has a full list of branches that covers the entire business of the credit institutions and other institutions in the stratum. The third precondition is that the NCB has appropriate data to assess the variance of interest rates on new business vis-à-vis households and non-financial corporations across branches, and based on this variance the number of branches that should report. The selected branches become *notional* reporting agents and hence have the same reporting obligations as credit institutions and other institutions that are selected as reporting agents. Reporting at branch level does not affect the liability as reporting agent of the credit institution or other institution to which branches belong, i.e. if a branch reports incorrectly or fails to report, the institution included in the list of MFIs is liable, rather than the branch.

#### **11.10 Description of the euro area sample**

All euro area Member States except Greece currently apply a *sampling approach* for

selecting the reporting agents. Hence only a subset of the potential reporting population had to implement the requirements of the Regulation and provides data for MFI interest rate statistics. Greece carries out a *census*. Apart from legal reasons in favour of a census, the Greek reporting agents and the interest rates they offer are heterogeneous to the extent that a sampling approach would have resulted in a near-census. France combines census and sampling approach: a census is implemented for collecting the interest rates on outstanding amounts, including bank overdrafts, overnight deposits, and deposits redeemable at notice, and sampling is applied for (the rest of) MFI interest rate statistics on new business.

NCBs draw on a variety of *stratification criteria* in order to divide the potential reporting population into homogeneous strata prior to drawing the sample. The variety of stratification criteria reflects the diversity of the banking business in the euro area. Some Member States stratify with respect to bank categories. Others apply regional components to group the MFIs in the potential reporting population. Furthermore, the type of product and customer, the degree of specialisation, the size of the institution and the number of branches are used to build up homogenous strata. Some countries use principal component or factor analysis to determine the relevant stratification criteria and apply cluster analysis to establish the strata. The resulting number of strata per Member State varies between two and 15.

Most NCBs selected as reporting agents the *largest institutions* within each stratum. The procedure is often combined with, or leads to, a census in at least one stratum. Two NCBs selected reporting agents *randomly* with probability proportional to size. One Member State applies sampling at *branch level* for interest rates on new business. Their stratum of large universal banks covers about 25,000 branches, from which the NCBs selected randomly with probability proportional to size about 2,000 branches as reporting agents.

Two Member States allow *group reporting*. Therefore some of their credit institutions and other institutions, which are individually included in the list of MFIs, report MFI interest rate statistics together as a group, i.e. as if they were a single MFI. The group becomes a notional reporting agent.

The selection procedure leads to a euro area sample of more than 1,800 reporting agents

out of a total of more than 7,000 institutions in the potential reporting population. The euro area sample covers about 80% of the stock of euro-denominated deposits received from and at least 80% of the stock of euro-denominated loans granted to households and non-financial corporations resident in the participating Member States.





# Index of terms

- advertised interest rates, 12
- agio, 17
- annual percentage rate of charge (APRC),
  - 12, 24, 50
  - national legislation, 27, 28
- annualised agreed rate, 13, 18, 50
- annualised agreed rate formula, 13
- annualising interest rates, 13, 18, 21
  
- bad loans, 30, 52
- bank overdrafts, 16, 31, 40, 47, 50, 56, 74
- business coverage.
  - See MFI interest rates on new business or on outstanding amounts
  
- capital certainty, lack of, 68, 69, 72
- ceiling, 43, 44
- census, 78, 98
- charges
  - in MFI interest rate statistics, 13
  - in the APRC, 25
  - indicator of, 26
- consumer credit, 40, 45, 56, 60
- Consumer Credit Directive, 12, 24, 25, 27
- converting a deposit into shares, 68
- cooling off period, 45
- credit cards, 62, 63
- credit facility, 62
- credit institutions, 10
- credit limit, 62
  
- deposits comprising two parts, 69
- deposits redeemable at notice,
  - 31, 34, 47, 50, 54, 55, 74
- deposits with agreed maturity,
  - 35, 36, 37, 43, 44, 55, 68
- derivative contract, 68, 70
- disagio, 13, 17
  
- effective interest rate, 12
- euro area, 10
- euro area sample, 98
- expansion factors, 76, 96
- external index, 43, 44
  
- favourable rates, 21
- fees. See charges
- fixed interest rates, 38, 59
- floor, 43, 44
  
- frequency
  - of interest payments, 14
  - of interest rate statistics, 8
  - of repayments of principal, 14
  
- grossing-up.
  - See expansion factors
- group reporting, 75, 90, 99
  
- Horvitz-Thompson estimator, 93
- households, 53
- Huygens theorem, 80
  
- implicit rates, 47, 48, 75
- incremental sampling, 96
- indefinite loan, 16
- initial period of fixation, 27, 38, 59
- institutional arrangements, 23
- instrument categories, 51
- interest rates.
  - See MFI interest rates
  
- loan in tranches, 41, 43, 59
- loan offer, 45
- loans for debt restructuring, 30, 46, 52
- loans to households for house purchases,
  - 44, 46, 57, 66, 67, 72, 73
- loans to non-financial corporations, 56
  
- matured deposit, 36
- maturity, 38, 39, 58, 59, 60
- maximum random error, 83, 86, 88
- measurement error, 78
- methodological notes, 23, 76
- MFI interest rate statistics
  - coverage of, 11
  - scope of, 8
  - uses of, 8
- MFI interest rates
  - linked to share price, 69
  - on new business, 35, 48, 50, 75
  - on outstanding amounts, 30, 47, 49, 74
  - on the amount granted but not yet withdrawn, 42
  - type of rate, 12
- monetary financial institutions (MFIs), list of,
  - 10, 75, 81, 87, 90, 96, 98
- moratorium on a loan, 46
- mortgage loans.
  - See loans to households for house purchases

narrowly defined effective rate (NDER), 18, 49, 50

national conventions, 23

new business.  
See MFI interest rates on new business

new products, 52, 98

nominal interest rate, 12

non-financial corporations, 53, 57

non-negotiable debt security, 17

non-profit institutions serving households (NPISHs), 11, 29, 54

notional reporting agent, 75, 90

one-off deposit, 16

original maturity. See maturity

other institutions, 10

other loans to households, 57

outstanding amounts.  
See MFI interest rates on outstanding amounts

overnight deposits, 31, 32, 47, 50, 55, 62, 74

panel survey, 95, 97

participating Member State, 10

period of notice, 58

population total.  
See expansion factors

preliminary offers, 45

prime rates, 12

prolongation of existing deposit or loan, 35, 36

purposive sampling, 79

random sampling, 79, 91

regular savings, 34, 37

Regulation ECB/2001/18, 7

regulatory arrangements, 23

renegotiation of contract, 27, 35, 46, 60, 68

repayments  
exceptional repayments, 15  
frequency of, 14  
stop of, 46

reporting agents, 11

reporting population  
potential, 95

reporting population  
actual, 11, 78, 91, 95  
extension of, 11  
potential, 11, 73, 76, 78, 90  
representative of, 79  
stratification of potential, 79

repos, 54, 56

resident, 10

retail interest rates, 8

reverse convertible, 68

sample, 78

sample maintenance, 95

sample size, 83, 85, 88, 91

sampling at branch level, 81, 98

sampling error, 76, 78

sampling variables, 79

sampling with probability proportional to size, 91, 93, 98

savings bonds, 67

savings plan, 66.  
See regular savings

securitisation, 73

selection of the largest institutions, 92, 94, 98

selection probabilities.  
See expansion factors

selection without replacement, 94

short-term approach, 8

single-stage sampling, 82

snapshot, 47, 48, 74

sole proprietorships, 54

special national practices, 23

specific national products, 23

split of loan, 67

standard year, 19

steady-state approach, 8

step-up and step-down deposit, 65

step-up and step-down loan, 61, 65

stratification, 79

stratification criteria, 81, 98

subsidies, 21, 28

subsidised loan, 23

tail institutions, 78

taxes, 21

top-up loan, 40

total costs of the credit to the consumer, 25

variable interest rates, 21, 42, 59.  
See also external index

variance, 80, 83, 88, 90

weighted average interest rate, 74