A new approach to MFI interest rate statistics in Croatia

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1.   Introduction

The Croatian National Bank (CNB) is responsible for the compilation of monetary financial institution (MFI) interest rate statistics as part of monetary statistics. The current MFI interest rate statistics are based on data collected from reporting institutions by the CNB via a structurally fixed report. The results are published in the CNB bulletin and are also used by CNB researchers for different monetary and financial stability analyses.

As Croatia is in the process of joining the European Union (EU), the CNB is obliged to harmonize its legislation and reporting standards with EU requirements. This was one of the reasons why the CNB started developing a new approach to MFI interest rate statistics.

This paper concentrates on new methodology and especially on the new reporting system for MFI interest rate statistics. After the introduction, the current situation and main reasons for abandoning the old system are explained, followed by an overview of the new methodology and concept of the new reporting system. In the main part, the structure of the new report "KS" (input side of the system) and data warehouse (output side of the system) are introduced. Finally, the text concludes with some remarks on the usability of new data for the CNB analyses.

2.   Current situation

Currently, the MFI interest rate statistics in Croatia comprise interest rates applied by reporting institutions on new loans and new deposits vis-à-vis resident households and nonfinancial corporations in the reporting month. The reporting institutions are banks, savings banks and housing savings banks.

Current MFI interest rate statistics are not able to provide all the data needed to fulfill the European Central Bank (ECB) requirements laid down in Regulation ECB/2001/18[3] and its amendments[4]. Below we briefly summarize four major disadvantages of current MFI interest rates statistics that should be resolved in order to harmonize the data with the ECB requirements.

The first one is lack of data on interest rates on outstanding amounts because the current report only provides data on the following: amounts of new loans and new deposits, outstanding amounts of loans and deposits, weighted average nominal interest rates on new

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loans and new deposits and weighted average effective interest rates on new loans. Interest rates on outstanding amounts are reported only for instruments where outstanding amounts represent new business.

The second deviation from the standard is the calculation of nominal interest rates. Nominal interest rates are defined as agreed rates individually negotiated between the customer and the reporting institution and do not include any charges. They are quoted in percentages per annum and do not take into account the number of interest payments within the year, as the annualized agreed rate (AAR) does, nor are they calculated in the same way as the narrowly defined interest rate (NDER).

The third problem is related to the definition of new business, especially regarding the amount and the time of reporting. Namely, for new loans, according to the ECB regulation, at the time of agreement the whole amount agreed on should be reported. Instead, in the current system in Croatia, only the amount actually withdrawn is reported as a new loan, and it relates only to the reporting month in which it is recorded in the balance sheet. Also, following the same principle, for loans in tranches, every tranche is reported as a new loan (in the appropriate month). On the deposit side, for time deposits, automatic prolongations with accrued interest are also treated as new business instead of being captured only in outstanding amounts.

The last shortcoming of the current system is related to data breakdowns (by sectors, currency, original maturity and types of loans/deposits); these should be adjusted and some additional criteria added to bring them into line with the ECB requirement. Regarding the sectoral breakdown, the scope of the reporting is in line with ECB/2001/13 as long as Croatia uses the kuna as a national currency. However, once it adopts the euro, the report will need to be expanded on households and nonfinancial corporations resident in the European monetary union. In addition, nonprofit institutions serving households have to be added in the household sector, which should provide separate data on sole proprietors and households as generally understood. Regarding the currency breakdown, data on instruments denominated in euros are only available for time deposits instead of all instruments. Breakdowns by original maturity and types of instruments are not completely usable for the ECB. Some instruments should be separately shown in a report (for example, revolving loans) and some new instruments should be added. Finally, new criteria should be added to enable classification of data by period of notice, period of initial interest rate fixation, amount of a loan and collateral/guarantees.

3.   The new methodology

The new methodology of MFI interest rate statistics expands its definition: it will cover interest rates applied by MFIs in Croatia to deposits and loans in all currencies vis-à-vis all resident and nonresident sectors. MFIs are resident credit institutions which consist of banks, savings banks and housing savings banks (the same as today). The CNB will continue to collect the data from the whole reporting population (census).

With regard to business coverage, reporting institutions will continue providing data on the amounts and interest rates (nominal and effective) on new business and start delivering new data on weighted average nominal interest rates on outstanding amounts of loans and deposits.

In order to be in line with the ECB requirements, nominal interest rates are collected as annualized agreed rates (AAR)[5].

The subsidies provided to customers by third parties are treated in terms of reporting institutions. In other words, only those interest rates paid or received by the reporting institution are shown. Favorable rates that reporting agents apply to their employees are included.

Interest rates on loans for restructuring below market conditions (for new loans and outstanding amounts) are not collected for the purposes of MFI interest rate statistics. These loans should be excluded if they are granted with at least a 30% lower interest rate compared to the lowest interest rate published by the reporting institution for this type of loan and its maturity. Interest rates on bad loans for outstanding amounts are also excluded. The CNB defines bad loans as partially recoverable or fully irrecoverable loans for which there is evidence of impairment identified (risk categories B-1, B-2, B-3, C) and fully recoverable loans that have a delay in collection of more than 90 days (risk category A9).

The AAR on outstanding amounts has to cover interest rates on both undue and due stocks (due stocks include only fully recoverable stocks that have a delay in collection of less than 90 days – risk category AA). If they are different, which is usually the case, they need to be treated separately in the calculation of the AAR. To clarify, for each of these types of outstanding amounts, reporting institutions are required to prepare the appropriate AAR and then calculate their weighted average AAR for that instrument. The intercalary interest rate[6] is not included in the calculation of the AAR for new business, but it has to be shown in the AAR on outstanding amounts.

Effective interest rates (regulated separately from MFI interest rate statistics) cover both interest rates and fees that are directly related to the loan. Effective interest rates are defined in the same way as the annual percentage rate of charge (APRC), so there is no need for harmonization[7]. Effective interest rates are shown for all new types of loans granted to customers. This enables the CNB to ensure the data for the ECB (only 2 indicators – consumer credit and loans for house purchases) and to maintain the existing time series (data on all types of loans).

The definition of new business in the new MFI interest rate statistics is harmonized with the ECB regulation and covers any new or redefined agreement between the client and the

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[5] The AAR is defined as the interest rate individually agreed on between a reporting institution and its customer, converted to an annual basis, taking into account the frequency of interest payments, and quoted in percentages per annum. The formula for calculating the AAR is:

$$AAR = \left(1 + \frac{r}{n}\right)^n - 1$$

where for new businesses "r" is the nominal interest rate on an annual basis agreed on between the reporting units and the client; for outstanding amounts, "r" is the nominal interest rate on an annual basis applied to that reporting month; "n" is the number of interest capitalization periods for the deposit and (re)payment periods for the loan in a particular year (the frequency of principal payments is not taken into account when calculating the AAR).

Exceptionally, for new business where a number of different, predetermined interest rates is agreed on, the interest rate on new business is computed as a geometric average of the factors 1+AAR per year for each interest rate.

[6] The intercalary interest rate is an interest rate which a client pays before repayments of a loan starts. Usually, it equals the nominal interest rate, but may also differ from it.

[7] The effective interest rate is an end-of-period interest rate, reported at the annual level by applying the compound interest calculation method, by means of which discounted cash inflows are balanced against discounted cash outflows, i.e. a discounted series of net cash flows equals zero.

reporting institutions. It comprises all financial contracts that specify the interest rates for deposits or loans for the first time and any new negotiations of existing deposits and loans. In negotiations of new terms for existing contracts, it is important that a client is actively involved, because automatic prolongations of existing contracts by the reporting institutions are not considered new business. For loans, the total amount of the agreed loan must be reported as new business at the time it is agreed on. New business in terms of time deposits usually relates to the first amount of the deposit placed in the reporting period. If there is a possibility of additional payments for this deposit, they are not considered new business. An exception is related to agreements for which a reporting institution is ex ante certain that it will receive all the amounts agreed on. In that case, the same rules as for new loans are used.

Outstanding amounts are defined as the stock of all deposits placed by all sectors with reporting institutions and the stock of all loans granted by reporting institutions to different sectors at the end of the reporting period.

In MFI interest rate statistics there is a specific group of instruments for which outstanding amounts and new business coincide by convention. According to the new methodology these are the following instruments: overnight loans, credit card loans, overdrafts on transaction accounts, revolving loans, transaction accounts, savings deposits, deposits redeemable at notice, hardware-based and software-based e-money. All of them can be shown individually or grouped with other instruments.

Data on new business and outstanding amounts are broken down by many criteria: clients on an individual and group basis, economic sector and residency, product category, currency and indexation, maturity, period of notice, period of initial rate of fixation, risk category, amount of a loan and collateral/guarantee. Some of them are introduced for harmonization with ECB reporting standards and some for CNB purposes. Before we go any further with explanations of these breakdowns, the new reporting system should be introduced.

4.   New reporting system

The new MFI interest rate statistics are based on a broader reporting system for statistical and supervisory purposes. The CNB started to develop that system in 2007 to ensure that data met the ECB, Eurostat and Committee of European Banking Supervisors (CEBS) requirements in part of the FINREP reports, since neither of the current systems was appropriate for the complexity of those requirements. The idea was to cover all the data needed for both purposes through the single reporting system and thus to reduce the reporting burden for reporting institutions. The new flexible reporting system enables compilation of aggregates by different rules and can be easily adjusted to any new methodological updates. As a result, a new set of data will be used for a wide range of purposes: balance sheet statistics, interest rate statistics, balance of payments statistics, financial accounts, securities statistics, supervisory statistics (which include data on supervisory balance sheets, profit and loss accounts, exposures of credit institutions, bank shareholders, significant debtors, investments in capital of nonfinancial corporations) and so on.

In order to provide all the necessary information for these purposes, the new reporting system is designed to collect the data on an elementary basis, to the extent possible. The major principle here is to collect the data on a client-instrument principle, enabling reporting institutions to provide the data directly from their bookkeeping records instead of preparing any structured scheme for the data provided. This gives the possibility for the compiler (instead of reporting institutions) to aggregate data in a very flexible manner, in order to cover any structural dimension of aggregates that might be needed for any of the above-mentioned purposes. For example, it enables the compilation of balance sheet data for monetary statistics, in which breakdowns by sectors and types of instruments are essential, or for supervision, where aggregates are broken down by portfolios. Also, in such a flexible

system, any possible changes of rules for aggregation that might appear as a result of changes in the requirements (and that relate to some of the attributes that describe each individual record in the database) can be easily implemented without any additional requirement for reporting institutions.

One of the major advantages of the client-instrument principle of the system is that reporting institutions do not group resident counterparties by sector, but rather submit the data at the level of an individual counterparty (legal persons) or group of counterparties (physical persons, which comprises sole proprietors and other physical persons). Instead of reporting institutions, the CNB classifies resident clients in appropriate sectors, following the classification rules given by the European System of Accounts (ESA95)[8]. This leads to a better accuracy of data, avoiding the possibility of the sectoral misclassification of clients, which happened sometimes in the old system that was based on the methodological description of sectors provided to reporting institutions (those mistakes became apparent via the comparison of aggregated data from the two systems). Also, if there are any future changes in sector definitions or if certain clients change sectors, this can be easily carried out by the compiler (the sector classification database itself has a time dimension). Finally, in this system the CNB has the possibility of excluding or including certain groups of clients for its specific analyses or even tracking the data on individual clients.

As already mentioned, the data are supplied in the form of records, instead of tables, which gives more flexibility in collecting and compiling the data. The system as a whole comprises 18 different records for now, which are used for different purposes, but the same logic of structure is applied to most of them – each reported amount (corresponding to one record) has to be uniquely described in order to allow the formation of different aggregates. There are three main groups of attributes that describe reported amounts. The first group of attributes (group A) enables the identification of a report, reporting period, type of report, reporting institution and counterparty (residency, country, etc.). The second group of attributes (group B) enables the identification of instruments and their characteristics (currency and indexation, original maturity, portfolio, risk category, etc). The third group of attributes (group C) enables the identification of the type of amount (outstanding amount, accrued interest, principal and interest arrears, value adjustments, nominal and effective interest rates, etc.). In addition, the fourth group of attributes (group D) provides information on the record number and the status concerning its correctness.

Figure 1

The concept of reporting records

Description			Amount
Reporting institution and client	Instrument	Type of amount	Amount

Source: CNB, Instructions for statistical and supervisory reporting.

The types of records included in the new reporting system can be classified into four groups: those related to the balance sheet, those related to the individual data on specific clients, those related to the data on interest rates and those related to the profit and loss account.

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[8] In order to harmonize the existing sectors in all official statistics in Croatia, a working group was established with representatives of three institutions: the Croatian National Bank, the Central Bureau of Statistics and the Ministry of Finance.

The basic reporting record is "AA", through which the individual data on balance sheet and off-balance sheet items is reported. In additional reporting records the following data are reported: remaining maturity, possibility of interest rate reset, overdue receivables, changes in the balance sheet used for flows statistics, cumulative changes in value adjustments and provisions, currency-induced credit risk, financial positions of specific clients, exposure to clients, investments in capital, tangible and repossessed assets, providers of collaterals and guarantees and fiduciary shareholders, specific indicators and accompanying lists of certain clients. Also, one additional reporting record is related to MFI interest rate statistics, and in the future the record for the profit and loss account will be introduced.

The current reporting framework was put into force via the CNB's decision and is accompanied by comprehensive instructions that provide all methodological explanations, lists of possible modalities for all attributes, rules for combining attributes, and their fulfillment with accurate modalities for each report.

All reports consist of the obligatory number of attributes that have to be completed depending on the type of reporting record. Additional reporting records are created on the principles of the basic report, resulting in mutual comparability to some extent (where the attributes are the same). The attributes in each report are completed with different modalities (from a predefined list) according to the permitted combinations of instruments and counterparties (for example, each report has defined instruments, types of amounts, etc.). If there are two records in which all attribute modalities are the same, they should be aggregated for reporting purposes, but if the modality of any single attribute differs, a new reporting record should be created.

5.   Input side of the system – the new report "KS"

One of the additional reporting records is related to the MFI interest rate statistics (reporting record "KS"). During 2010 this record is in a testing period, in which reporting institutions are supposed to provide the CNB with data on interest rates through both systems (old and new).

The reporting record "KS" is designed based on the same logic as the basic reporting record "AA" and its attributes. Most of the attributes are the same, although some of the attributes of "AA" are not relevant for the MFI interest rate statistics and therefore are excluded from "KS". On the other hand, some new attributes are added.

Due to the client-instrument principle and the mutual consistency of the attributes between "AA" and "KS", the compiler is able to link clients' outstanding amounts from the balance sheet with their interest rates.

The scheme of the reporting record "KS" is given below:

Figure 2

Reporting record "KS"

A group of attributes									
Report				Reporting institution		Counterparty (client)			
Report	Reporting period	(Un)consoli-dated report	Temporary or revised report	Identification number	Tax number	Identification number of a client	Tax number of a client	Country or international institution	Non-resident sector
B group of attributes									
Instrument	Currency	Original maturity	Period of notice	Indexation	Portfolio	Risk category	Amount of a loan	Initial period of interest rate fixation	Collateral/ Guarantees

C group of attributes	
Type of amount	
D group of attributes	
Record number	Status

Source: CNB, Instructions for statistical and prudential reporting.

The attributes "Type of report" (report "AA", report "KS", etc.), "(Un)consolidated report" and "Temporary or revised report" describe the type of report and enable the subsequent grouping of records. The last two are more important for reports which can have all combinations (for example, the balance sheet), but for report "KS" predefined codes should be entered. "Reporting period" enables the identification of the period to which a particular record relates and the creation of time series. In the case of "KS" it refers to the end of the reporting month.

"Identification number" and "Tax number" should be reported for the reporting institution and its counterparties. The identification number is a unique number for each resident legal entity assigned by the Croatian Central Bureau of Statistics. The tax number is given by the Ministry of Finance for residents, both legal and physical persons. It will eventually replace the identification number but for now it is still in the process of implementation in Croatia. For clients, in addition, "Type of counterparty" is requested to separate residents from nonresidents. For residents, legal persons, sole proprietors and physical persons are identified, which enables CNB to perform appropriate sector classification. Nonresidents are divided into MFIs from the EU and other nonresidents. The identification of MFIs from the EU is based on the list issued by the ECB on the last day of the reporting period. Nonresidents are additionally broken down by "Country or international institution" according to international standards (ISO standard 3166) and the BoP Vademecum (Annex I and Annex II) and by "Nonresident sector" defined by ESA95. Code lists for these two attributes are provided and maintained by the CNB.

"Instruments" covers all types of loans and deposits on the asset and liability sides of the balance sheet (45 instruments with a unique code and definition for each of them). Their definitions are the same as for the balance sheet report (record "AA") to ensure their mutual consistency. In selecting the proper instrument for a type of loan, a specific algorithm should be followed: the first step is to determine whether it is a specific loan or a loan whose purpose is known, after which nonpurpose loans are classified by type of collateral.

"Currency" enables the breakdown of instruments by all world currencies in which they are denominated (defined by ISO standard 4217). The code list is provided and maintained by the CNB. "Original maturity"[9] is determined at the moment the deposit or loan is agreed on

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[9] Original maturity refers to the fixed period of life of a financial instrument before which it cannot be redeemed or before which it can be redeemed only with some kind of penalty.

and it remains unchanged during the life of the financial instrument. In addition, this attribute includes information on the grace period (if any) and it is counted in months. "Period of notice" is the period between the moment a holder gives notice of an intention to redeem the deposit and the time when the holder is allowed to convert it into cash without incurring a penalty. It is counted in months, and it is to be reported only before the period of notice has been initiated. "Indexation" relates to instruments denominated in one currency but payable in another. It covers instruments that are not indexed, or are indexed to a currency with a two-way currency clause and with a one-way currency clause. It shows the data on domestic currency not indexed and indexed to a foreign currency (for example, the kuna indexed to the euro) and foreign currency not indexed and indexed to another foreign currency.

The "Portfolio" attribute relates not only to portfolios of financial assets or financial liabilities in accordance with the International Accounting Standards, but generally to the linking of specific instruments according to certain common criteria. The CNB defined 17 portfolios to fit supervision needs. For example, there is a portfolio of financial instruments held by trading, a portfolio of financial instruments available for sale, a portfolio of loans and receivables, etc. This attribute is not important for MFI interest rate statistics, and the predefined value "Not applicable" is used in order to be in line with the concept of logical checks for the whole system[10]. "Risk category" shows the type of loan according to the degree of credit risk for reporting institutions. It helps in determining bad loans that should be excluded from MFI interest rate statistics. The risk categories are: fully recoverable loans without delay and with delay in collection of more than 90 days, partly recoverable loans and fully irrecoverable loans.

"Amount of a loan" enables a breakdown according to the amount of new loans. It comprises three groups – up to 2 million kuna, from 2 to 7.5 million kuna and over 7.5 million kuna, in order to be in line with ECB requirements. "Amount of a loan" relates to one credit transaction and not to the entire business between companies and reporting units. This attribute enables an insight into the financing of small, medium and big enterprises. "Initial interest rate fixation period" enables a distinction between variable interest rates, interest rates fixed for a certain period and interest rates fixed through the whole original maturity of new loans. "Initial interest rate fixation period" is defined as a predetermined period at the start of a contract during which the value of the interest rate cannot change[11]. The attribute "Collateral/Guarantee" determines whether new loans are collateralized or not.

The attribute "Type of amount" enables the identification of all elements in the reporting record and the proper interpretation of received amounts (is it principal, accrued interest, value adjustments, write-down/write-off, etc.). For report "KS" there are four types of amounts – amount of new business, nominal interest rates on new business, nominal interest rates on outstanding amounts and effective interest rates on new loans.

"Record number" and "Status" are technical attributes, describing the position and the character of the record (whether it is a regular or a corrected record). Records are corrected according to the cancellation-correction principle, i.e. every row has to be cancelled with a new row before the corrected row can be received.

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[10] The concept of logical checks for the new reporting system is based on three key attributes: instrument – portfolio – type of amount. Therefore, key attributes have to be filled in for each record.

[11] The value of the interest rate is considered to be unchangeable if it is defined as the exact level, such as 10% or a differential with reference to a reference rate at a certain point in time, for example, six-month EURIBOR plus two percentage points at a certain date and time.

6.   Data aggregation

There are two levels of aggregating data in the new MFI interest rate statistics: at the level of the reporting agents and at the level of the CNB. Once Croatia enters the EU and adopts the euro as its national currency, the third step of aggregation will be performed at the ECB.

Reporting agents should aggregate data only when there are records with the same characteristics for all attributes (the same counterparty, instrument, currency, type of interest rate, etc.) or when clients are reported on a group basis. Weighted average interest rates should be calculated according to their volume. The formula for weighted average interest rates is:

$$WAIR = \frac{\sum_{i=1}^{n} AAR_i \times w_i}{\sum_{i=1}^{n} w_i}$$

where:

WAIR	The weighted average interest rate (nominal or effective).
AAR_i	The adjusted nominal interest rates.
w_i	The weights for calculation of the weighted average interest rate (nominal or effective) on new business are amounts on new business operations conducted during the entire reporting month.
	The weights for calculation of the weighted average interest rate (nominal) on outstanding amounts are stocks on the last day of the reporting month (including due stocks, fully recoverable, with a delay in collection of less than 90 days).

The second level of aggregation is done in the CNB, whose task is to calculate weighted average interest rates on new business and outstanding amounts for Croatia.

Data on new business – amounts and interest rates – are collected through report "KS". The CNB is able to calculate weighted average interest rates on every type of aggregate, and it is only necessary to connect records on amounts and interest rates with the same characteristics, i.e. the modalities used in each attribute.

Outstanding amounts are taken from the basic report for data on balance sheet and off-balance sheet items (report "AA"). Report "AA" has a few more attributes than report "KS", but it can be easily adjusted by aggregating unnecessary attributes or their modalities in order to be comparable with the scheme of report "KS". For every interest rate from report "KS", an appropriate outstanding amount from report "AA" should be found. Outstanding amounts have to be calculated on a gross basis, without netting by impairments or adding accrued interest, before being taken from report "AA". After that, weighted average interest rates for MFI interest rate statistics can be calculated.

Report "AA" consists of 25 attributes (see picture below). Compared to report "KS", the additional attributes are: "County"[12], "Relationship between reporting institutions and clients"[13], "ISIN"[14], "Marketability of loans"[15], "Equity characteristics"[16], "Embedded derivative"[17] and "Underlying variable"[18]. Aggregation of these attributes results in the same scheme for interest rates on outstanding amounts, considering that the last three attributes from the B group in reporting record "KS" are only used for new business. Pairs can be formed where the same combinations of attribute modalities exist in both records. Exceptionally, the attribute "Portfolio" in report "KS" represents all portfolios in report "AA", so for data pairing, all codes in "AA" have to be summarized. Also, securitized loans are excluded from "AA".

The scheme of basic reporting record "AA" is given below:

Figure 3

Basic reporting record "AA"

A group of attributes											
Report				Reporting institution		Counterparty (client)					
Report	Reporting period	(Un)consoli-dated report	Temporary or revised report	Identification number	Tax number	Identification number of a client	Tax number of a client	County	Country or international institution	Non-resident sector	Relationship between reporting institutions and clients
B group of attributes											
Instrument	ISIN	Currency	Original maturity	Period of notice	Indexation	Portfolio	Marketability of loans	Equity character-istics	Risk category	Embedded derivative	Underlying variable
C group of attributes											
Type of amount											

Source: CNB, Instructions for statistical and supervisory reporting.

In addition, in the following figure the schemes of both records are given, showing attributes that should be aggregated (marked in gray) in order to be able to interlink them.

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[12] "County" is not obligatory and it is completed only for domestic physical persons or sole proprietors.

[13] "Relationship between reporting institutions and clients" enables identification of the ownership relationship between reporting institutions and clients. There can be no relationship, a primary relationship (mother-daughter) and a secondary relationship (sisters). In addition, the percentage of ownership is shown, denoting the holdings of the client in the reporting institution and/or the holdings of the reporting institution in a client (both ways).

[14] "ISIN" enables identification of the ISIN code assigned to securities in accordance with the ISO standards used in international securities trading or the CNB code for specific securities without ISIN codes, shares in investment funds and specific short-term papers.

[15] "Marketability of loans" describes degrees of marketability: non-marketable, occasionally traded and securitized loans.

[16] "Equity characteristics" enables identification of subordinated debt instruments, giving them some of the characteristics of shares and other equity. The code list is provided in accordance with the supervisory regulation on capital adequacy of banks.

[17] "Embedded derivative" defines whether a financial instrument has an embedded derivative. An embedded derivative is an inseparable component of a financial instrument, unlike a derivative that is attached to a financial instrument but is contractually transferable independently of that instrument, or which has a different counterparty (this is a separate financial instrument).

[18] "Underlying variable" denotes a variable whose value changes affect the value of a derivative or a financial instrument with an embedded derivative. Underlying variables relate to interest rates, exchange rates, share prices, goods, etc.

Figure 4

Linkage between reporting records "AA" and "KS"

Report "AA"

A group of attributes											
Report				Reporting institution		Counterparty (client)					
Report	Reporting period	(Un)consoli-dated report	Temporary or revised report	Identification number	Tax number	Identification number of a client	Tax number of a client	County	Country or international institution	Non-resident sector	Relationship between reporting institutions and clients
B group of attributes											
Instrument	ISIN	Currency	Original maturity	Period of notice	Indexation	Portfolio	Marketability of loans	Equity character-istics	Risk category	Embedded derivative	Underlying variable
C group of attributes											
Type of amount											

Report "KS"

A group of attributes									
Report				Reporting institution		Counterparty (client)			
Report	Reporting period	(Un)consoli-dated report	Temporary or revised report	Identification number	Tax number	Identification number of a client	Tax number of a client	Country or international institution	Non-resident sector
B group of attributes									
Instrument	Currency	Original maturity	Period of notice	Indexation	Portfolio	Risk category	Amount of a loan	Initial period of interest rate fixation	Collateral/ Guarantees
C group of attributes									
Type of amount									

Source: CNB, Instructions for statistical and supervisory reporting.

7.   Output side of the system – data warehouse

The CNB designed a data warehouse (DWH), which contains all data delivered through the new reporting system. The DWH enables searching by parameterized reports with the possibility of filtering, navigation and data decomposition. It includes interactive dashboards with predefined queries, such as aggregated balance sheet for a specific period and in time series, parts of assets and liabilities presented by different breakdowns and levels of aggregation, etc. Also, it provides creation of users' own reports for analysis, monitoring and business planning in the CNB. Ad hoc analysis for business decision-making can be easily created too. Also, the DWH offers personalization of the working environment by selecting the required reports according to users' needs.

For the purposes of MFI interest rate statistics, the DWH will offer:

a)   a summary report with the possibility of drilling down to the data at the lowest level of detail stored in the DWH;

b)   continuation of current time series through the compilation of existing reports from new data, allowing only limited decomposition of the data;

c)   indicators on outstanding amounts and new business for ECB purposes, allowing only limited decomposition of data;

d)   creation of ad hoc reports for different analysis by combining different attributes depending on users' needs.

8. Usability of the new MFI interest rate statistics

In general, information on credit and deposit interest rates is necessary to make decisions in conducting monetary policy, and monetary authorities should be promptly and continually informed about their changes. Detailed data on the level of interest rates and their changes over time help in monitoring monetary developments in the country.

The new MFI interest rate statistics collected and compiled through the new reporting system will bring new dimensions to this information. They will improve the quality of reports for the CNB management and the quality of the CNB analyses in different fields (financial stability, external debt, etc.). Many new data analyses will be enabled (data on individual clients and nonresidents, interest rates on outstanding amounts, etc.) Also, once Croatia enters the EU, the CNB will be ready to deliver all the indicators on interest rates and their amounts (for outstanding amounts and new business) required by the EU statistical standards. These indicators will enable comparisons of Croatia's interest rates with those of other EU countries.

Interest rates on outstanding amounts for residents and nonresidents can be helpful for the internal and external debt statistics. If the data on all currencies and indexation are added, they can be connected with the currency structure on loans and deposits. Also, one of the CNB analyses deals with data on deposits and loans that domestic banks accepted and borrowed from their majority foreign owners (usually foreign banks). The aim is to recognize how much domestic banks depend on them due to the fact that over 90% of total bank assets in Croatia are foreign-owned. By expanding data on all deposits and loans from the balance sheet, nonresidents and all other criteria, the new MFI interest rate statistics will provide useful information for this area.

If we move to the financial stability field, which observes movements of banks' interest margins, changes in bank profitability and the potential negative trends that may distort financial stability, it is obvious that new detailed data can improve these analyses.

One of CNB's regular tasks, concerning financial stability analyses, is to determine the degree of indebtedness of particular sectors. Indebtedness depends on the amount of debt and the dynamics of its repayment in relation to the debtor's assets and income. It is important that repayments do not burden the debtor to the extent that the debtor is no longer able to repay the debt. To estimate this reporting burden, different statistical data are used. The amounts of debt and revenues of "a representative debtor" are often estimated on the basis of stock aggregates. The amount of periodic repayments is often calculated from the average aggregate stocks and interest rates on new loans. By introducing the data on interest rates on outstanding amounts, this calculation is significantly improved, because currently a different approach is used: data on new business is combined with data on outstanding amounts.

Bank interest rate policies, set against a background of insured deposits, are prone to moral hazard. At the same time, high deposit rates feed into loan rates, increasing them and driving away most creditworthy customers. Such a phenomenon, known as "adverse selection", may significantly increase the overall riskiness of a bank's balance sheets. Kraft and Galac [9] demonstrate, using the Croatian example, that expansion of moral hazard and adverse selection may be of practical importance for the stability of the banking system. They showed that high deposit interest rates in risk-loving banks helped fund their expansion in the late 1990s as depositors didn't care about the underlying risks. Moreover, the level of bank interest rates was a reliable signal of increased bank asset risk and subsequent distress.

This makes data on deposit and loan interest rates for individual banks an important component of the early warning systems on potential distress risk[19].

One of the analyses in the financial stability area refers to the possibility of income smoothing by banks' management. Income smoothing is defined as manipulation, using provisions for bad loans to smooth incomes: in bad years incomes are evaluated with smaller growth of provisions, which is compensated in good years. The objective is to moderate income variability over the years by shifting income from good years to bad years. The analyses use data on bank loans classified by risk category to determine whether and how the evaluation of the risk category for loans given to the same legal entity differs across reporting agents. New data on interest rates on outstanding amounts for loans broken down by clients and risk categories will help the CNB to determine how much interest rates on these loans differ and correspond to their degree of risk.

Furthermore, use of banks' internal risk assessments, which have a prominent role in the Basel II system, is increasing. Having a correct risk assessment is a source of comparative advantage for a bank, since inconsistencies and errors in a bank's rating may cut into its income or exacerbate the problem of adverse selection. The availability of firm-level interest rate data will enable comparisons of credit ratings and interest rate patterns across companies and banks. This analysis could point to practices of excessive risk accumulation, which may be especially dangerous if coupled with underpricing of risk. Banks may even engage in evergreening on purpose, i.e. lending to insolvent borrowers whose repayment is very doubtful. Usually, this so-called "zombie" lending is provided in the form of restructured loans[20]. Without this restructuring, banks would be forced to classify these loans as "at risk" and then increase their provisions for bad loans, which has an impact on maintaining an adequate level of capital. Also, by keeping unprofitable borrowers alive, banks allow them to distort competition between other firms.

In future CNB analyses, zombie firms could be identified as firms which are receiving an interest rate subsidy[21]. In order to single them out, the firm-level interest rate data can be used to detect the companies whose loans are prolonged with interest rates below the market rate. It can be investigated, whether and to what extent borrowers are able to compensate for the contraction of credit supplied by certain types of banks, by increasing loans from other banks. Then, whether and how the impact of the credit crunch is differentiated according to the firm size (small, medium or big) can be analyzed. Differences according to the size and capitalization of banks can be examined too[22]. Using data on interest rates, the CNB will be able to test the existence of this phenomenon by the following hypothesis: loans not associated with evergreening to riskier borrowers should be linked to higher interest rates. Due to the link between the data on interest rates on outstanding amounts and the balance sheet data, additional information can be provided on the ownership relationship between the client and the reporting institution, which is one of the attributes in report "AA".

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[19]   Kraft and Galac, 2007.

[20]   I.e. granting a new loan to close the existing one or changing the terms of the existing loan.

[21]   As defined by Caballero, Hoshi and Kashyap, 2008 [1].

[22]   Caballero, Hoshi and Kashyap showed that in smaller, low-capitalized banks where discretion in lending decisions is higher, the weight of credit scoring is lower than in larger banks where lending decisions are based on more automatic procedures and there is a bigger possibility of providing these kinds of loans.

9. Conclusion

In this paper, the new system for the compilation of MFI interest rate statistics in Croatia is described. The new system was introduced in order to obtain more atomized data (to the level of instrument-client specification) that would allow a more flexible approach to the compilation procedures and thus ensure both a higher quality for the existing series and consistency with the ECB requirement (via the methodological improvement of the new system), as well as a fast response to possible future changes in the requirements with zero cost for the reporting population. The system is actually part of the wider collection system developed within the CNB that covers the whole monetary statistics, as well as the FINREP part of the supervision.

Deriving from the new system, the atomized data, enriched with a comprehensive description by many different attributes, allow not only a perfect fit of the output to the requirements deriving from the EU standards, but also much more intensive (and methodologically more correct) use of these statistics in different analyses, such as the structural analyses of external debt, financial stability analyses and econometric modeling.

Regarding the use of MFI interest rate statistics in the stability analyses, a possible further step in enriching the information could be the introduction of a new attribute – the indexed variable, which would describe for each relationship with the client not only whether the interest rate is fixed, variable or linked to some parameter, but also, in the latter case, to which parameter the rate is indexed. That might give insight into the vulnerability of the system (especially regarding the external debt) to different movements in different economic areas.

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