Decision
on the effective interest rate of credit institutions and credit unions and on service contracts with consumers

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I GENERAL PROVISIONS

Subject matter
Article 1

This Decision prescribes:
1) the uniform method of calculating and disclosing effective lending rates on loans granted and effective deposit rates on deposits received, and
2) content and form of information provided by credit institutions to consumers, which are needed to compare different offers and to take an informed decision on concluding a contract.

Legal persons subject to the application of the Decision
Article 2

(1) This Decision shall apply to:
1) credit institutions with registered offices in the Republic of Croatia, with the exception of electronic money institutions,
2) branches of third-country credit institutions authorised by the Croatian National Bank to provide services,
3) credit institutions of the Member State, providing services through branches or directly providing mutually recognised services within the territory of the Republic of Croatia, and
4) credit unions with registered offices in the Republic of Croatia.

(2) Notwithstanding paragraph (1) of this Article, the provisions of this Decision concerning the calculation and disclosure of effective deposit rate on received deposits and the provisions of this Decision on service contracts with consumers shall not apply to credit unions.

Definitions
Article 3

Individual terms used in this Decision shall have the following meaning:

(1) **'Effective interest rate' (hereinafter: EIR)** means an end-of-period rate of interest, 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, which refer to loans granted or deposits received. In the case of loans, this rate is additionally adjusted for a one-off effect of discounted cash inflows and outflows based

on a cash deposit, which is used as an instrument of collateral. In discounting, the actual (calendar) number of days in a month and a 365/366-day year are used. EIR shall be reported by rounding it to 2 decimal places.

(2) '**Loan**' means money lent by a creditor to a borrower (debtor), with or without purpose, which the borrower is obliged to repay, increased by the agreed interest, within a certain period of time and on certain conditions.

(3)'**Deposit**' means money placed by a depositor with a credit institution, with or without purpose, which the credit institution is obliged to return, increased by the agreed interest within a certain period of time and on certain conditions.

(4) '**Interest**' means a price of a loan or deposit (return on deposit), which depends on the nominal amount of loan (principal) or deposit, method and repayment period, as well as on the amount of the agreed or prescribed interest rate, representing, actually, a fee payable by the debtor for the borrowed principal for a certain period of time.

(5) '**Interest rate**' means a relative number p, showing the yield earned on 100 monetary units in the certain period of time (accounting period or time period), i.e. interest rate is the amount of interest on 100 monetary units in a particular unit of time. During the compounding period, the interest rate may be fixed or variable for units of time of the same duration. Interest rate for the basic accounting period is referred to as the nominal interest rate. The unit of time of the nominal interest rate may be any time period (e.g. year, half-year, month, etc.).

(6) '**Accounting period** or **time period** (or **compounding period** or **capitalisation period**)' means a period for which interest is calculated. The basic (main) accounting period and the level of interest rate are defined in a contract between the parties or are prescribed by law. Interest may be calculated annually, daily, etc.

(7) '**Proportional interest rate**' means an interest rate computed according to a length of the basic accounting period and a length of the actual accounting period.

(8) '**Equivalent interest rate**' means the rate of interest which yields the same interest amount on the same principal, irrespective of whether compounding is performed in periods longer or shorter than the period to which the nominal interest rate refers.

(9) '**Simple interest calculation method**' means an interest calculation method where at any capitalisation period, in the course of capitalisation, interest is always calculated on the original principal.

(10) '**Compound interest calculation method**' (interest on interest calculation method) means an interest calculation method where the calculated interest for the first accounting period is added to the original principal. In the following accounting period interest is thus calculated on the original principal increased by the amount of interest

from the first accounting period. In all subsequent compounding periods, interest is calculated on the remaining principal increased by the interest calculated for the previous compounding period. More specifically, interest is calculated on interest as well (the so called anatocism).

(11) '**End-of-period interest calculation**' means an interest calculation method where interest is calculated and added to the principal, or paid out, at the end of the accounting period. In such a calculation, interest is calculated with respect to the original amount, i.e. principal at the beginning of the basic capitalisation period.

(12) '**Beginning-of-period interest calculation**', means an interest calculation method where interest is calculated in advance for the capitalisation period, i.e. at the beginning of the compounding period, with respect to the final amount of principal (amount at the end of the accounting period). After the calculation, interest is deducted from that principal at the beginning of the compounding period.

II ANNOUNCEMENT OF SERVICES AND SERVICE CONTRACTS

Announcement of services
Article 4

(1) Data on deposit and lending rates announced by a credit institution or credit union on their premises and commercial messages and advertisements in the media, which directly or indirectly show interest rate or some other amount considered as a part of the loan price, or deposit price, shall also contain effective interest rate.

(2) Effective interest rate shall not be less conspicuous than other data and a credit institution or a credit union shall, when disclosing it, use the term "effective interest rate". If this term is repeated, a credit institution or a credit union may use the abbreviation: EIR.

(3) A credit union shall in all business premises where it provides services to members, in a visible place and in an understandable manner, disclose that deposits deposited with the credit union are not insured pursuant to the act governing deposit insurance.

Service contracts
Article 5

(1) A credit institution shall disclose the effective interest rate to a consumer before the conclusion of a credit contract, i.e. before the conclusion of a deposit contract.

(2) A credit union shall disclose the effective interest rate to a member of that credit union before the conclusion of a credit contract.

(3) A credit union shall before the conclusion of deposit contracts inform members that deposits deposited with the credit union are not insured pursuant to the act governing deposit insurance.

(4) In addition to the EIR data, the credit institution shall disclose to a consumer all other information needed to compare different offers in order to take an informed decision on concluding a contract.

(5) On request and free of charge, the credit institution shall provide the consumer with a draft of the contract, unless the credit institution is at the time of filing the application unwilling to proceed to the conclusion of that legal arrangement. Before concluding the credit or deposit contract, the credit institution shall inform the consumer about his right to obtain the draft contract free of charge.

(6) A minimum content of information referred to in paragraph (3) of this Article and the obligatory elements of the draft contract shall imply, as appropriate, the information referred to in Article 306, paragraph (4) of the Credit Institutions Act for granting loans, i.e. the information referred to in Article 306, paragraph (5) of the same Act for accepting deposits.

(7) The information and the draft contract, referred to in paragraphs (1) to (5) of this Article, shall be provided in writing, unless otherwise prescribed by a special law regulating consumer protection.

III METHODOLOGY FOR CALCULATING THE EFFECTIVE INTEREST RATE

Repayment plan
Article 6

(1) The credit institution or credit union shall calculate the effective interest rate in accordance with the repayment plan, in a manner prescribed by the Instructions for the application of this Decision, constituting its integral part.

(2) When concluding a credit or deposit contract, a credit institution shall present the repayment plan, together with a clearly stated effective interest rate, to the consumer. In addition, the credit institution shall enclose the repayment plan with its credit or deposit documentation.

(3) When concluding a credit contract, a credit union shall present the repayment plan, together with a clearly stated effective interest rate, to the credit union member. In addition, the credit union shall enclose the repayment plan with its credit documentation.

(4) The draft credit or deposit contract and credit or deposit contract shall contain the appropriate provision from which it is evident that the consumer or a member of the credit union have been informed of the effective interest rate and that the repayment plan has been presented to them.

(5) In the case of loans and deposits where it is not possible to anticipate the amount and date of cash flows (current account and giro account overdrafts (i.e. permitted transaction account overdrafts), revolving lines of credit based on credit cards, etc.), it is not necessary to prepare the repayment plan. In that case, the nominal interest rate shall be considered as the EIR, and in addition to the data on EIR, the credit institution shall also inform the consumer on possible other fees, commissions and similar cash flows related to these types of loans or deposits.

IV TRANSITIONAL AND FINAL PROVISIONS

Application of the Decision
Article 7

(1) On the day of entry into force of this Decision, the Decision on the uniform disclosure of the effective interest rate on loans and deposits (Official Gazette 74/2003) and the Decision on the uniform disclosure of the effective interest rate on loans of credit unions (Official Gazette 71/2007) shall cease to have effect.

(2) This Decision shall enter into force on the eighth day after the day of its publication in the Official Gazette, with the exception of the provisions of Article 2, paragraph (1), item (3) of this Decision, which shall enter into force on the date of accession of the Republic of Croatia to the European Union.

Instruction
for the implementation of the Decision
on the effective interest rate of credit institutions and credit unions
and on service contracts with consumers

This Instruction shall prescribe the methodology for calculating the effective interest rate on loans and deposits.

1 Mathematical background for the calculation of the effective interest rate

End-of-period compound interest rate calculation represents the basis of the uniform method of calculating the effective interest rate on loans and deposits. The uniform method of calculating the effective interest rate is based on the net present value. The effective interest rate is that rate of interest by the application of which discounted cash inflows are balanced against discounted cash outflows, which refer to loans granted or deposits received, i.e. that rate of interest by the application of which a discounted series of net cash flows equals zero. In the case of loans, net cash flow k implies a difference between all payments to the creditor's account (credit institution's or credit union's inflows) and all payments made to the borrower (credit institution's or credit union's outflows) during the day k. Cash flows include any cash transfer between a borrower and a creditor, which is directly related to the granting of loan, i.e. representing a constituent part of the conditions for utilising the loan (e.g. disbursement of principal, loan instalment (annuity), one-off loan origination fee, loan servicing fee, etc.), or which represents a condition for granting the loan (e.g. loan application fee). Similarly, in the case of deposits, net cash flow k implies a difference between all payments to the deposit-taker's account (credit institution's inflows) and all payments made to the depositor, i.e. owner of funds (credit institution's outflows) during the day k.

The starting point for deriving the above stated definitions of the effective interest rate is the following mathematical principle: the effective interest rate represents a difference between the sum of the final amounts paid to a creditor, or deposit-taker, and the sum of the original amounts of payments made to a borrower, or depositor, expressed as a percentage of the sum of the original amounts of payments made to a borrower, or depositor, at the annual level. The effective interest rate **e** is defined as follows:

$$(1) \quad e = 100 \left[\left(1 + \frac{e_n}{100} \right)^{\frac{t}{n}} - 1 \right], \ where$$

$$e_n = 100 \frac{\sum_k [FV_n(CF_k +)] - \sum_k [PV_0(CF_k -)]}{\sum_k [PV_0(CF_k -)]} = 100 \left\{ \frac{\sum_k [FV_n(CF_k +)]}{\sum_k [PV_0(CF_k -)]} - 1 \right\}$$

(2)
$$= 100 \left\{ \frac{\sum_k \left[(CF_k +) \left(1 + \frac{e_1}{100}\right)^{n - d_k} \right]}{\sum_k \left[(CF_k -) \left(1 + \frac{e_1}{100}\right)^{-d_k} \right]} - 1 \right\}$$

and

(3) $e_1 = 100 \left[\left(1 + \frac{e_n}{100}\right)^{\frac{1}{n}} - 1 \right]$

The symbols have the following meanings:

e = effective interest rate
e_n = effective interest rate expressed at the level of n days of the loan term
e_1 = effective interest rate expressed at the level of one day
t = number of days in a year (depends on the method of calculating the number of days)
n = total number of days of the loan term
k = 0, 1, 2, ...
CF_k- = (sum) payments to a borrower during the day k (negative cash flow)
CF_k+ = (sum) payments to a creditor during the day k (positive cash flow)
$FV_n(x)$ = future value of the x amount at the end of the day n
$PV_0(x)$ = present value of the x amount at the end of the day 0
d_k = number of days that passed from the day 0 to the observed cash flow on the day k.

By combining the above three expressions the equation for e is obtained.

Expressions (1) and (3) give $\left(1 + \frac{e_1}{100}\right) = \left(1 + \frac{e_n}{100}\right)^{\frac{1}{n}} = \left(1 + \frac{e}{100}\right)^{\frac{1}{t}}$ while substitution in (2)

$$1 + \frac{e_n}{100} = \frac{\sum_k \left[(CF_k +) \left(1 + \frac{e_1}{100}\right)^{n - d_k} \right]}{\sum_k \left[(CF_k -) \left(1 + \frac{e_1}{100}\right)^{-d_k} \right]}$$ and assumption e>-100 imply that

$$0 = \sum_k \left[(CF_k +) \left(1 + \frac{e}{100}\right)^{-\frac{d_k}{t}} \right] - \sum_k \left[(CF_k -) \left(1 + \frac{e}{100}\right)^{-\frac{d_k}{t}} \right], \text{ or}$$

$$\sum_{k} \left[NCF_k \left(1 + \frac{e}{100} \right)^{-\frac{d_k}{t}} \right] = 0, \text{ where } NCF_k = (CF_k+) - (CF_k-) = \text{net cash flow (net}$$

payment to creditor) during the day k.

2 Interest calculation

The interest calculation may be performed by applying the simple or compound interest calculation method. Irrespective of the interest calculation method, interest may be calculated and paid at the end of period or at the beginning of period.

2.1 Simple Interest Calculation Method

2.1.1 End-of-Period Interest Calculation

When calculating interest by applying the simple interest calculation method at the end of the period, the following mathematical expressions are used:

- for years $\qquad I = \dfrac{C \times p \times g}{100}$

- for months $\qquad I = \dfrac{C \times p \times m}{1200}$

- for days $\qquad I = \dfrac{C \times p \times d}{36500}$, whereby 36500 may be replaced by 36600 or 36000,

  depending on the method used,

where individual symbols have the following meanings:

C = principal amount

g = number of years

m = number of months

d = number of days

p = end-of-period interest rate, and

I = interest amount.

2.1.2 Beginning-of-Period Interest Calculation

In contrast to end-of-period interest calculation, where a loan (debt or principal) is repaid after the expiry of the agreed term, increased by the accrued interest, in the case of interest calculation at the beginning of the period, principal is immediately reduced by the calculated interest, and after the expiry of the loan term, the borrower (debtor) is obliged to repay the entire amount of principal.

When calculating interest by applying the simple interest calculation method at the beginning of the period, the following mathematical expressions are used:

$$S_n = C_0\left(1 - \frac{q}{100}\right) \quad \text{or} \quad S_n = C_0 - D, \text{ where}$$

S_n = present value of the future debt (disbursed amount)

q = beginning-of-period interest rate

C_0 = debt (principal) amount, and

D = discount amount.

The above expressions actually show the present value of principal which matures in one year. The principal that matures in n years is worth less today, so that converting into present value is also referred to as discounting, and interest factor used in discounting is called a discount factor.

By applying the simple interest calculation method, the amount of a discount may be calculated as follows:

▪ for years
$$D = \frac{C_0 \times q \times \text{years}}{100 + q \times \text{years}}$$

▪ for months
$$D = \frac{C_0 \times q \times \text{months}}{1200 + q \times \text{months}}$$

- for days $D = \dfrac{C_0 \times q \times \text{days}}{36500 + q \times \text{days}}$, whereby 36500 may be replaced by 36600 or

36000, depending on the method used.

where

D = discount amount

C_0 = principal amount, and

q = beginning-of-period interest rate.

2.2 Compound Interest Calculation Method

2.2.1 End-of-Period Interest Calculation

When calculating interest by applying the compound interest calculation method at the end of the period, the following mathematical expression is used:

$$C_n = C_0 \left(1 + \frac{p}{100} \right)^n.$$

Accordingly, the final value of C_n is obtained by multiplying the original value C_0 by $\left(1 + \dfrac{p}{100} \right)$ raised to the n power. This expression is also referred to as the end-of-period interest factor and is denoted by r. Accordingly, the formula for calculating the final value by applying the compound end-of-period interest calculation method, may be written as follows:

$$C_n = C_0 r^n$$

Expression r^n is the final value of 1 monetary unit together with the end-of-period interest, for n periods and p interest rate.

2.2.2 Beginning-of-Period Interest Calculation

The application of the compound beginning-of-period interest calculation method, is somewhat more complex. The financial mathematics allows us to establish which beginning-of-period interest rate (q) corresponds to the end-of-period interest rate (p), which, in mathematical terms, may be expressed as follows:

$$C_0\left(1-\frac{q}{100}\right)=\frac{C_0}{1+\dfrac{p}{100}}\ ,\ \text{implying that}\ \ p=\frac{100q}{100-q}\ ,\ \text{or that}\ \ q=\frac{100p}{100+p}\ .$$

In compounding at the beginning of the period, identical original amounts, identical interest rate, identical capitalisation and number of years yield greater final values, compared to compounding at the end of the period, since in the case of the latter, interest is calculated with respect to the value at the beginning of the year, while in beginning-of-period interest calculation, interest is calculated in relation to the value at the end of the year.

2.2.3 Proportional and Equivalent Interest Rate

If the compounding period and the period to which the nominal interest rate refers are identical, the nominal interest rate may be used directly in the mathematical expression for calculating interests. In practice, the nominal interest rate is often not adapted to the accounting periods (e.g. interest rate is expressed at the annual level and interest calculation is performed monthly), so that in such a case, the nominal interest rate should be converted into the interest for a longer or shorter period. This can be done in two ways: by applying the proportional or equivalent method.

Since in the case of the simple interest calculation method, the application of the nominal or appropriate proportional interest rate results in identical final value, i.e. identical interest rate, the issue of proportional and equivalent interest rate is not discussed in that section. However, in the case of the compound interest calculation method, the application of nominal interest rate and the appropriate proportional interest rate does not result in the identical final value of principal. The final or future value of principal is identical when nominal interest rate is used and when the appropriate equivalent interest rate is used, i.e. compound interests are identical. Accordingly, there are differences between proportional and equivalent interest rate in compound interest calculation method. Equivalent interest rate is more favourable for the borrower than the proportional interest rate, if the interest is compounded for periods shorter than the period to which the nominal interest rate refers (which is most common in practice), while it is more favourable for a creditor when interest is compounded for periods longer than the period to which the nominal interest rate refers.

Proportional interest rate is calculated with respect to the length of time period to which nominal interest rate refers and length of time period for which interest in calculated. Interest rate is converted to the basic compounding period by simply dividing the nominal interest rate by a ratio of the period to which it refers to the basic compounding period.

Example:

Annual interest rate is 20%. Proportional interest rate thus amounts to:

a) 10%, in semi-annual compounding,
b) 5%, in quarterly compounding, and
c) 40%, in two-year compounding.

Equivalent interest rate is the rate of interest which for the identical principal yields the identical interest, irrespective of whether interest is calculated in longer or shorter time periods, compared to the period to which the nominal interest rate refers. It is calculated by using the following formula:

$$p' = 100 \left[\left(1 + \frac{p}{100} \right)^{\frac{1}{m}} - 1 \right], \text{ or } p' = 100 \left(\sqrt[m]{r} - 1 \right), \text{ where}$$

p = annual end-of-period interest rate

p' = equivalent interest rate for time periods shorter (longer) than one year, and

m = number of compounding periods.

Interest rate is converted to the basic compounding period in accordance with the principle of capital equivalency maintenance.

Example:

Annual interest rate is 20%. Equivalent interest rates for semi-annual, quarterly and two-year compounding are calculated below.

a) semi-annual compounding (m=2)

$$p' = 100 \left[\left(1 + \frac{20}{100} \right)^{\frac{1}{2}} - 1 \right] = 9.54\% \text{ semi-annually}$$

b) quarterly compounding (m=4)

$$p' = 100 \left[\left(1 + \frac{20}{100} \right)^{\frac{1}{4}} - 1 \right] = 4.66\% \text{ quarterly}$$

c) two-year compounding (m=1/2)

$$p' = 100\left[\left(1 + \frac{20}{100}\right)^2 - 1\right] = 44.00\% \text{ in a two-year period}$$

Equivalent interest rate may be calculated by applying the method of interest calculation at the end and at the beginning of the period. Formula for calculating end-of-period equivalent interest rate is the following:

$$p'd = 100\left[\left(1 + \frac{p}{100}\right)^{\frac{d}{365}} - 1\right], \text{ where}$$

p'd = equivalent interest rate for a particular number of days at the annual basis

p = annual interest rate, and

d = number of days for which equivalent interest rate is calculated.

The mathematical expression for the beginning-of-period equivalent interest rate calculation is the following:

$$q' = 100\left[1 - \left(1 - \frac{q}{100}\right)^{\frac{1}{m}}\right], \text{ where individual symbols have the following meanings:}$$

q' = beginning-of-period equivalent interest rate

q = annual beginning-of-period interest rate, and

m = number of compounding periods.

3 Loan repayment methods

Two methods of calculating instalments (annuities) are presented in the text below.

A loan may be repaid in equal instalments (annuities), with the amount of interest decreasing during repayment and the principal payments increasing, in consequence of the fact that interest is calculated on the outstanding debt that is decreasing. The second method of repayment is when instalments (annuities) are variable, and principal payments are equal during repayment.

The symbols have the following meanings:

C = principal amount

p = annual end-of-period rate of interest

C_k = principal amount (outstanding debt) at the end of period k

R_k = amount of instalment (annuity) at the end of period k

n = number of loan repayment periods

Q_k = the amount of principal payment at the end of period k

I_k = interest amount at the end of period k

3.1 Loan repayment in equal instalments

The loan C needs to be repaid in n equal instalments (annuities) that mature in equal time units at the end of each period, with the annual end-of-period rate of interest p. The compounding period is identical to the time unit between instalments (annuities).

Instalments (annuities) are calculated from the following expression:

$$R_k = R = C \frac{r^n(r-1)}{r^n - 1}, \text{ where r} = 1 + \frac{p}{100},$$

the interest rate at the end of period k amounts to $\qquad I_k = \frac{C_{k-1}p}{100}$,

the principal payment at the end of period k amounts to $\qquad Q_k = R - I_k$,

the principal at the end of period k amounts to $C_k = C_{k-1} - Q_k$, where the previous four expressions are valid for all loan repayment periods k = 1,…,n.

The sum of all principal payments equals the loan amount $C = \sum\limits_{k=1}^{n} Q_k$,

and for each period k $\quad\quad R = I_k + Q_k$,

which equals, adding by each period, $\quad \sum\limits_{k=1}^{n} R_k = \sum\limits_{k=1}^{n} I_k + \sum\limits_{k=1}^{n} Q_k \quad$ and

$n \times R = \sum\limits_{k=1}^{n} I_k + C$, i.e. total interest equals

$\sum\limits_{k=1}^{n} I_k = n\,R - C,$

while the last principal payment is always equal to the debt from the period before last

$Q_n = C_{n-1}.$

3.2 Loan repayment in equal principal payments

The loan C needs to be repaid in variable instalments (annuities) R_k at the end of each period k during which principal payments are equal, with the end-of-period interest rate p and repayment period n.

Firstly, equal principal payments are calculated for each period k

$Q_k = Q = \dfrac{C}{n}$, k = 1,...,n

Outstanding debt at the end of period k

$C_k = C_{k-1} - Q \quad\quad$ or $\quad\quad C_k = C\left(1 - \dfrac{k}{n}\right)$

Interest rate at the end of period k

$I_k = \dfrac{C_{k-1}\,p}{100} \quad$ or $\quad I_k = C\left(1 - \dfrac{k-1}{n}\right)\dfrac{p}{100}.$

Variable instalment (annuity) at the end of period k is

$R_k = I_k + Q \quad\quad$ or $\quad\quad R_k = \dfrac{C}{n}\left[(n-k+1)\dfrac{p}{100} + 1\right].$

16

Total interest equals

$$\sum_{k=1}^{n} \mathrm{I}_{k} \; = \; \frac{C\,p}{200} \; (n+1),$$

with $\mathrm{Q}_{n} = \mathrm{C}_{n-1}$.

4 Calculation of the effective interest rate on loans and deposits

4.1 Methodological explanations

(1) The effective interest rate is calculated from the repayment plan whose elements are laid down in item 4.2 for loans and item 4.3 for deposits. When making loan or deposit arrangements with a client or a member of a credit union, a credit institution, or a credit union, presents to the client or member of a credit institution a repayment plan without auxiliary columns for the effective interest rate calculation, together with a clearly stated effective interest rate. The repayment plan with the auxiliary columns for the effective interest rate calculation, as well as the annual percentage rate (APR) in case of loans, should be enclosed by the credit institution or the credit union to their loan or deposit documentation. The auxiliary columns for the calculation of the effective interest rate are the columns showing the net cash flow and the discounted net cash flow, and as regards loan contracts the columns showing discounted loan repayments and discounted security deposit flows. The empty columns need not be printed. The effective interest rate should be reported in the repayment plan, rounded to 2 decimal places, and should not be less conspicuous than other data (Information). The repayment plan should contain the date of computation and the note stipulating that the disclosed effective interest rate is valid as at the date of drawing up the repayment plan.

(2) The name and address, as well as the contact information, of the credit institution or the credit union should precede the heading of the repayment plan. The repayment plan presented to a client or a member of the credit union when the loan or deposit arrangements are being made must contain the signature of the authorised person of a credit institution or a credit union. The signature of the authorised person may be a handwritten signature or an electronic signature in accordance with a special law.

(3) Drawing up of the repayment plan is based on the assumed regular flow of all transactions (cash flows), implying regularity of all parties in meeting their obligations arising from the contract. The contract is considered to be valid in the period for which it has been concluded. For the purpose of this Instruction, it is assumed that the credit institution or the credit union and the lender, and the credit institution or the credit union and the depositor meet their obligations under the agreed terms and conditions and at maturity. For instance, if the loan contract stipulates a larger interest rate in the case a client or a member of a credit institution fails to repay the loan to the credit institution or the credit union regularly, the fact should be disregarded and the

repayment plan should be prepared on the basis of the rate of interest envisaged for regular (timely) loan repayments.

(4) In the case of loans or deposits containing the clauses on variability of interest rates, fees and commissions included in the effective interest rate calculation, the effective interest rate is calculated under the assumption that the rate of interest and other fees are fixed, i.e. equal to those as at the date of calculation. The credit institution or credit union is obligated to show the nominal interest rate in the repayment plan, specifying whether it is fixed or variable and indicating the periods to which they relate (e.g. the loan contract envisages a fixed interest rate in the first two years of the loan utilisation and a variable interest rate during the remaining period of utilisation).

(5) In model calculation of the effective interest rate on loans, and for the purpose of public communication, the hypothetic loan from the example is assumed to be granted on the first date of the month and that interim interest is calculated for a minimum of one month.

(6) In the case of agreed lines of credit, if dates of funds withdrawal cannot be predetermined, each withdrawal of funds is considered as a special loan, for which a separate repayment plan is prepared with the disclosed effective interest rate. If a particular loan is granted in several tranches, the loan origination fee, account management fee and other fixed charges, or those related to the total loan amount should be divided into individual tranches, proportionate to their amount, and the respective aliquot parts of these fees and commissions should be included in the effective interest rate calculation on the actual maturity date.

(7) In the case of loan contracts in relation to which it is not possible to foresee the amount and the date of cash flows (current account and giro account overdrafts, i.e. permitted transaction account overdrafts), revolving lines of credit based on credit cards, etc.) it is not necessary to prepare repayment plans since such loans are repaid from the flows that arrive first in the client's account. For the purpose of calculating and disclosing the effective interest rate, only the nominal interest rate is included in the calculation. If a credit institution charges or pays different interest rates on different balances in these accounts, the entire scale of the respective effective interest rates should be calculated and disclosed, stating precisely the marginal balances in these accounts up to which an individual effective interest rate applies. A credit institution is obliged to notify its clients of other possible fees, bonuses and similar cash flows related to this type of loan.

(8) In the case of deposit contracts in relation to which it is not possible to foresee the amount and the date of cash flows (current accounts or giro accounts, i.e. transaction accounts, savings deposits, demand deposits, etc.) it is not necessary to prepare repayment plans. For the purpose of calculating and disclosing the effective interest rate only the nominal interest rate is included in the calculation. If a credit institution charges or pays different interest rates on different balances in these accounts, the entire

scale of the respective effective interest rates should be calculated and disclosed, stating precisely the marginal balances in these accounts up to which an individual effective interest rate applies. A credit institution is obliged to notify its clients of other possible fees, bonuses and similar cash flows related to this type of accounts. If a deposit is not debited by costs included in the effective interest rate calculation and if there are no additional bonuses on deposit, when the interest rates are calculated once a year or more frequently, by applying the equivalent interest rate, or when the nominal and effective interest rates are identical, the credit institution is not obliged to draw up the repayment plan. In that case a credit institution should indicate in the deposit contract that the effective interest rate equals the nominal interest rate.

(9) A credit institution is obligated to stipulate in the repayment plan the currency in which the said amounts are reported. Foreign currency loan contracts and foreign currency deposit contracts are reported in that currency, while loan contracts in kuna and deposit contracts in kuna, as well as foreign currency-indexed loan contracts and foreign currency deposit contracts are reported in kuna at the exchange rate effective as at the date of the repayment plan preparation. The exchange rate based on which the previous conversion has been carried out must be indicated in the repayment plan. If a credit institution uses more than one reference rate of exchange (e.g. buying rate when a loan is granted, selling rate when a loan is repaid), each of the individual exchange rates and their application should be indicated in the repayment plan as well as include the difference between the reference rates of exchange in the effective interest rate and loan repayment and deposit payment. Exceptionally, foreign currency-indexed loan contracts and foreign-currency deposit contracts may be reported in foreign currency (instead of in kuna) provided that loans are granted or repaid, or deposits are received or withdrawn, by applying the same reference rate of exchange (e.g. midpoint exchange rate of the Croatian National Bank). As regards foreign currency loan contracts and foreign currency deposit contracts where fees and commissions are determined and charged in kuna, they should be converted into the respective foreign currency, at the midpoint exchange rate of the Croatian National Bank, effective as at the date of repayment plan preparation, for the purpose of the effective interest rate calculation.

4.2 Calculation of the effective interest rate on loans

The effective interest rate on loans is calculated on the basis of the repayment plan (e.g. by means of the interest table calculator). The repayment plan consists of the following columns:

(1) *Time period* – denotes an ordinal number of the period in which a particular cash flow occurs. Time 0 is the period when the first cash flow occurs or the agreed date when the loan is made available, which ever occurs first. The final period is the one in which the final cash flow occurs.

(2) *Maturity date* – denotes a date when a particular cash flow occurs. It is important to indicate the exact date, since the actual (calendar) number of days in a month and a

365/366-day year are used for calculating the effective interest rate. In calculating and reporting the effective interest rate on loans withdrawn in tranches, a client should be required to state the planned date of withdrawals and the amounts of the tranches.

(3) *Loan disbursement* – the amount of loan, i.e. a portion of the loan (the amount of a tranche), to be disbursed should be entered in this column, under the period, or the date, when it is certain that the disbursement will take place, i.e. when the clients expect that they will withdraw an individual tranche or the entire loan amount. In the case of loans that are withdrawn in tranches, the amount of loan should be indicated in the plan.

(4) *Other disbursements* – other disbursements carried out by a credit institution on the basis of the concluded loan contract should be entered in this column, apart from the disbursement of security deposit and interest on the paid in security deposit.

(5) *Instalment (annuity)* – repayment may be made in equal annuities, variable annuities with equal payments, variable annuities with variable principal payments, and in another manner. The elements constituting the instalment (annuity) should be indicated in the repayment plan.

(6) *Principal payment* – a portion of instalment allocated to the principal that is to be repaid should be entered in this column.

(7) *Interest payment* – a portion of instalment allocated to the interest to be paid is recorded in this column, including the interim interest. A reference should be made in the repayment plan to the nominal interest rate, specifying whether the rate of interest is fixed or variable. If the interest rate is variable, that fact should be disregarded in calculating and reporting the effective interest rate, and the calculation is made by applying the nominal interest rate valid as at the date of calculation (see item 4.1, paragraphs (3) and (4)).

(8) *Other payments* – all other payments made by the borrower based on the concluded loan contracts should be entered in this column.

For the purpose of this Instruction, other payments shall imply all possible payments that are directly related to the loan, i.e. to the terms and conditions of utilising or granting the loan. They include:
- loan application fee,,
- loan origination fee,
- loan management fee, servicing fee and statement issuance fee,
- the costs of loan collateralisation via insurance policies, with the exception of endowment life insurance policies, (assurance on survival to a stipulated age or on earlier death) that are ultimately borne by the borrower and constitute one of the terms and conditions for granting the loan;
- fee for the unwithdrawn loan amount in credit lines or other loans,

- fee for keeping pledge as an instrument of collateral for loan repayment, and
- other similar fees and commissions directly related to the loan.

For the purpose of this Instruction, the following shall not be included in the calculation of the effective interest rate:
- appraisal costs for immovables and movables,
- public notary fees,
- fees for obtaining a land register certificate,
- fees for obtaining various certificates, statements, licenses and decisions from the competent bodies and authorities,
- default interests or any other charges or penalties incurred as a result of the borrower's default on loan contract terms and conditions,
- postage, telegram and telefax charges, and

- other similar fees and commissions.

In cases where one of the terms and conditions for granting a loan is to purchase an endowment life insurance policy (assurance on survival to a stipulated age or on earlier death) to which supplementary insurance is attached (for instance, accident insurance) the costs relating to supplementary insurance is included in the calculation of the effective interest rate and are reported in column 8 *Other payments*.

Where in public communication or prior to the conclusion of a loan contract, a credit institution or a credit union is not able to determine the amount of insurance costs in advance and therefore they cannot be included in the calculation of the effective interest rate, the credit institution or the credit union is obligated to notify the public and their clients or members of the credit union that the purchasing of an insurance policy is one of the terms and conditions for obtaining the loan and that insurance costs are not included in the calculation of the effective interest rate.

(9) *Outstanding loan balance* – the outstanding loan balance at a particular period should be entered in this column. It equals the amount of loan disbursed, reduced by the repaid portion of principal until that time (cumulated principal payments).

(10) *Security deposit flows* - all cash flows related to security deposit are entered in this column - payment and disbursement of security deposit, possible costs related to security deposit and possible interest on security deposit, bearing a positive sign when the funds flow from a client to a credit institution (payment) and a negative sign when the funds flow from a credit institution to a client (disbursement or interest).

(11) *Note (description)* – it contains a short description of a cash flow at a particular period.

(12) *Net cash flow* – it represents a sum of principal payments (column 6), interest (column 7) and other payments (column 8) (positive cash flow) reduced by a sum of loan disbursement (column 3) and other disbursements (column 4) (negative cash flow)

at a particular period. All the balances reported in columns 3 to 9 carry a positive sign. Net cash flow may be positive or negative - a positive sign implying net inflow of funds to a credit institution (payments) and a negative sign implying net outflow of funds from a credit institution (disbursements).

(13) *Discounted net cash flow* – the balances obtained by discounting net cash flows from column 12 at the annual percentage rate of loan cost by applying the following formula

$$NCF_k \left(1 + \frac{APR}{100}\right)^{-\frac{d}{t}},$$ should be entered in this column.

NCF_k stands for a net cash flow at a particular time, while APR in the discount factor denotes the annual percentage rate. $\frac{d}{t}$ in the exponent represents the sum of the three components:

(1) number of days from time 0 date to 31 December of the same year, as a proportion of the number of days in the time 0 year,
(2) number of years between the year of the cash flow that is being discounted and time 0 year, excluding these two years,
(3) number of days between the date of the period in which the cash flow that is being discounted occurs and 31 December of the previous year, as a proportion of the number of days in the year of the cash flow that is being discounted.

The equation for computing $\frac{d}{t}$ may be expressed as follows:

$$\frac{d}{t} = \left[\frac{yyyy(0).12.31. - dat(0)}{t(0)}\right] + \left[yyyy(k) - yyyy(0) - 1\right] + \left[\frac{dat(k) - (yyyy(k) - 1).12.31.}{t(k)}\right]$$

t(0) = 1 + yyyy(0).12.31.-yyyy(0).01.01.

t(k) = 1 + yyyy(k).12.31.-yyyy(k).01.01.

dat(0) is time 0 date, while dat(k) is the date of the period in which the cash flow that is being discounted occurs.

Since *APR* is the rate to be calculated, the methodology for its calculation is given below.

The repayment plan ends with the line item *Total*, which follows the last cash flow in the final period. In this line item, in the column *Discounted cash flow*, all discounted net

cash flows from the individual time periods are added together. *APR* is an approximation, rounded to 2 decimal places, of the equation

$$\sum_k \left[NCF_k \left(1 + \frac{APR}{100} \right)^{-\frac{d}{t}} \right] = 0 \,.$$

The obtained *APR* is used for computing the effective interest rate according to the equation

$$EIR = APR \times \frac{TDLD}{TDLD - TDSDF} \,,$$

where *TDLD* and *TDSDF* are explained under items 14 and 15.

(14) *Discounted loan disbursements* – in this column, discounted values of loan disbursements from column 3 are reported. The previously obtained *APR* is used, and it is discounted to time 0 by applying the equation

$$DLD_k = \left[\left(LD_k \right) \left(1 + \frac{APR}{100} \right)^{-\frac{d}{t}} \right] \,,$$

where DLD_k denotes discounted loan disbursement at a particular period, LD_k loan disbursement at a particular period, while other symbols have the same meanings as in item 13. The sum of discounted loan disbursements, $TDLD = \sum_k DLD_k$, which is used to compute the effective interest rate, described in item 13, is shown at the intersection of the line item *Total* and column *Discounted loan disbursements*.

(15) *Discounted security deposit flows* – in this column, discounted values of security deposit flows from column 10 are reported. The previously obtained *APR* is used, and it is discounted to time 0 by applying the equation

$$DTSP_k = \left[\left(TSP_k \right) \left(1 + \frac{PGS}{100} \right)^{-\frac{d}{t}} \right] \,.$$

where $DSDF_k$ denotes discounted security deposit flow at a particular period, SDF_k security deposit flow at a particular period, while other symbols have the same meanings as in item 13. The sum of discounted security deposit flows, $TDSDF = \sum_k DSDF_k$, which is used to calculate the effective interest rate, described in item 13, is shown at the intersection of the line item *Total* and column *Discounted security deposit flows*.

The repayment plan that is presented to a client should not contain auxiliary columns 12 to 15 and the annual percentage rate, which are used for the calculation of the effective interest rate. The repayment plan that is enclosed with the loan documentation should contain these columns and APR as well.

Example 1

A hypothetic example for completing the repayment plan for a loan is given below.

A client considers taking out a loan with the credit institution in the amount of the kuna equivalent of EUR 100,000.00. The loan application fee of HRK 1,400.00 is paid by the client on 1 May 2007. The payment of the granted amount is requested on 1 July 2007. After the client has been granted the loan and before the client withdraws the loan, the client is obliged to pay a security deposit in the amount of HRK 100,000.00. After the loan repayment, the credit institution will refund the credit deposit to the client, increased by 1% annual interest (computed by applying the end-of-period interest rate). If the loan is granted, the client will have to pay an origination fee of HRK 10,000.00. This is a front-end fee and should be paid immediately after the loan is granted on 1 June 2007. When the loan enters repayment, the client should pay interim interest, which is calculated as the regular agreed, end-of-period, fixed rate of interest of 8%, by applying the equivalent method. Therefore, HRK 4,849.72 of interim interest should by paid by the client on 1 August 2007. The first instalment (equal annuity) of HRK 101,112.47 falls due on 1 November 2007. The other instalments mature every three months, until 1 August 2009 (a total of 8 instalments). In the course of loan repayment, the credit institution also charges a flat-rate fee once a year for loan management and delivery of statements (so-called account servicing) in the amount of HRK 25 and a transaction fee for loans indexed to foreign currency of 0.4% of the sum of all payments during the respective year. These fees are payable with every fourth instalment. The loan payment and repayment is carried out at the midpoint exchange rate of the CNB that amounts to HRK 7.395318 as at the date of the repayment plan. In calculating interest, in accordance with the general terms and conditions of the credit institution relating to loans, the credit institution applies the British method (number of calendar days in a month and actual number of days in a year).

The repayment plan in the table calculator is presented below:

	AM banka d.d.		Tel: 01 123 4567												
	Cerigradska 3		Fax 01 765 4321												3 April 2007
	10100 Zagreb														

Currency	HRK indexed to foreign currency			Instalment in HRK	101,112.47	Loan amount in HRK	739,531.80	CNB midpoint exchange rate		7.395318		**Annual percentage rate (%)**	**9.81**	**Effective interest rate (%)**	**10.04**
Nominal interest rate (%)	8.00		Fixed	Instalment in F/c	13,672.50	Loan amount in F/c	100,000.00								

Time period	Maturity date	Loan disbursement	Other disbursements	Instalment	Principal payment	Interest payment	Other payments	Outstanding loan balance	Security deposit flows	Note (description)	Net cash flow	Discounted net cash flow	Discounted loan disbursement	Discounted security deposit flows
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
0	1 May 2007						1,400.00	0.00		Loan application fee	1,400.00	1,400.00	0.00	0.00
1	1 June 2007						10,000.00	0.00	100,000.00	Loan origination fee and payment of security deposit	10,000.00	9,920.81	0.00	99,208.12
2	1 July 2007	739,531.80						739,531.80		Loan payment at the midpoint exchange rate	-739,531.80	-728,052.48	728,052.48	0.00
3	1 August 2007					4,849.72		739,531.80		Interim interest	4,849.72	4,736.63	0.00	0.00
4	1 November 2007			101,112.47	86,626.69	14,485.78		652,905.11		1. instalment	101,112.47	96,451.91	0.00	0.00
5	1 February 2008			101,112.47	88,358.80	12,753.67		564,546.31		2. instalment	101,112.47	94,204.93	0.00	0.00
6	1 May 2008			101,112.47	90,326.78	10,785.69		474,219.52		3. instalment	101,112.47	92,061.24	0.00	0.00
7	1 August 2008			101,112.47	90,206.40	9,263.28	1,642.80	384,013.13		4. instalment (including loan servicing fee and transaction fee)	101,112.47	89,920.33	0.00	0.00
8	1 November 2008			101,112.47	93,611.26	7,501.21		290,401.87		5. instalment	101,112.47	87,829.20	0.00	0.00
9	1 February 2009			101,112.47	95,424.15	5,688.33		194,977.72		6. instalment	101,112.47	85,784.78	0.00	0.00
10	1 May 2009			101,112.47	97,419.00	3,693.47		97,558.72		7. instalment	101,112.47	83,848.92	0.00	0.00
11	1 August 2009			101,112.47	97,558.72	1,910.96	1,642.80	0.00	-102,179.78	8. instalment (including loan servicing fee and transaction fee), as well as refund of security deposit increased by interest	101,112.47	81,893.70	0.00	-82,758.14
Total		**739,531.80**	**0.00**	**808,899.78**	**739,531.80**	**66,082.38**	**14,685.60**		**-2,179.78**		**85,617.70**	**0.00**	**728,052.48**	**16,449.98**

Note: The disclosed effective interest rate is valid as at the date of drawing up the repayment plan. The instalment includes principal payment, interest payment, loan servicing fee and transaction fee. The midpoint exchange rate of the CNB valid as at the date of drawing up the repayment plan was used in loan payment and repayment as well as in the effective interest rate calculation.

Signature of authorised person

Example 2

The data in example 2 are identical to the data in example 1, except that instead of one exchange rate two different exchange rates are used, one upon payment and one upon repayment. Example 2 is given below:

A client considers taking out a loan with the credit institution in the amount of the kuna equivalent of EUR 100,000.00. The loan application fee of HRK 1,400.00 is paid by the client on 1 May 2007. The payment of the granted amount is requested on 1 July 2007. After the client has been granted the loan and before the client withdraws the loan, the client is obliged to pay a security deposit in the amount of HRK 100,000.00. After the loan repayment, the credit institution will refund the credit deposit to the client, increased by 1% annual interest (computed by applying the end-of-period interest rate). If the loan is granted, the client will have to pay an origination fee of HRK 10,000.00. This is a front-end fee and should be paid immediately after the loan is granted on 1 June 2007. When the loan enters repayment, the client should pay interim interest, which is calculated as the regular agreed, end-of-period, fixed rate of interest of 8%, by applying the equivalent method. Therefore, HRK 4,864.27 of interim interest should by paid by the client on 1 August 2007. The first instalment (equal annuity) of HRK 101,112.47 falls due on 1 November 2007. The other instalments mature every three months, until 1 August 2009 (a total of 8 instalments). In the course of loan repayment, the credit institution also charges a flat-rate fee once a year for loan management and delivery of statements (so-called account servicing) in the amount of HRK 25 and a transaction fee for loans indexed to foreign currency of 0.4% of the sum of all payments during the respective year. These fees are payable with every fourth instalment. The loan payment and is carried out at the buying exchange rate of the CNB, totalling HRK 7.373132 as at the date of the repayment plan, while the loan repayment is carried out at the selling exchange rate of the CNB, totalling HRK 7.417504, as at the date of the repayment plan. In calculating interest, in accordance with the general terms and conditions of the credit institution relating to loans, the credit institution applies the British method (number of calendar days in a month and actual number of days in a year).

The repayment plan in the table calculator is presented below:

AM banka d.d.	Tel: 01 123 4567													
Cerigradska 3	Fax: 01 765 4321													3 April 2007
10100 Zagreb														
Currency	HRK indexed to foreign currency		Instalment in HRK	101,415.79	Loan amount in HRK	737,313.20	CNB buying rate		7.373132	**Annual percentage rate (%)**	**10.38**	**Effective interest rate (%)**	**10.64**	
Nominal interest rate (%)	8.00	Fixed	Instalment in F/c	13,672.50	Loan amount in F/c	100,000.00	CNB selling rate		7.417504				

Time period	Maturity date	Loan disbursement	Other disbursements	Instalment	Principal payment	Interest payment	Other payments	Outstanding loan balance	Security deposit flows	Note (description)	Net cash flow	Discounted net cash flow	Discounted loan disbursement	Discounted security deposit flows
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
0	1 May 2007						1,400.00	0.00		Loan application fee	1,400.00	1,400.00	0.00	0.00
1	1 June 2007						10,000.00	0.00	100,000.00	Loan origination fee and payment of security deposit	10,000.00	9,916.46	0.00	99,164.62
2	1 July 2007	737,313.20						741,750.40		Loan payment at the mid point exchange rate	-737,313.20	-725,242.20	725,242.20	0.00
3	1 August 2007					4,864.27		741,750.40		Interim interest	4,864.27	4,744.66	0.00	0.00
4	1 November 2007			101,415.79	86,886.56	14,529.24		654,863.84		1. instalment	101,415.79	96,489.76	0.00	0.00
5	1 February 2008			101,415.79	88,623.86	12,791.94		566,239.99		2. instalment	101,415.79	94,119.44	0.00	0.00
6	1 May 2008			101,415.79	90,597.75	10,818.05		475,642.24		3. instalment	101,415.79	91,860.99	0.00	0.00
7	1 August 2008			101,415.79	90,477.07	9,291.07	1,647.65	385,165.17		4. instalment (including loan servicing fee and transaction fee)	101,415.79	89,608.35	0.00	0.00
8	1 November 2008			101,415.79	93,892.08	7,523.71		291,273.09		5. instalment	101,415.79	87,410.95	0.00	0.00
9	1 February 2009			101,415.79	95,710.40	5,705.39		195,562.69		6. instalment	101,415.79	85,265.42	0.00	0.00
10	1 May 2009			101,415.79	97,711.24	3,704.55		97,851.45		7. instalment	101,415.79	83,236.41	0.00	0.00
11	1 August 2009			101,415.79	97,851.45	1,916.69	1,647.65	0.00	-102,179.78	8. instalment (including loan servicing fee and transaction fee), as well as refund of security deposit increased by interest	101,415.79	81,189.74	0.00	-81,801.36
Total		**737,313.20**	**0.00**	**811,326.34**	**741,750.40**	**66,280.63**	**14,695.31**		**-2,179.78**		**90,277.41**	**0.00**	**725,242.20**	**17,363.26**

Note: The disclosed effective interest rate is valid as at the date of drawing up the repayment plan. The instalment includes principal payment, interest payment, loan servicing fee and transaction fee. Upon loan payment, i.e. upon the calculation of amounts in columns 3 and 4 the buying rate of the CNB was used, valid as at the date of drawing up the repayment plan, while upon loan repayment, i.e. upon the calculation of amounts in column 5 and 8 the selling rate of the CNB was used, valid as at the date of drawing up the repayment plan. Both exchange rates are included in the calculation of the effective interest rate.

Signature of authorised person

4.3 Calculation of the effective interest rate on deposits

Similarly to the calculation of the effective interest rate on loans, the effective interest rate on deposits is computed from the repayment plan (e.g. by using the table calculator). The repayment plan consists of the following columns:

(1) *Time period* – denotes an ordinal number of the period in which a particular cash flow occurs. Time 0 is the period when the first cash flow occurs. The final period is the one in which the final cash flow occurs.

(2) *Maturity date* – denotes a date when a particular cash flow occurs. It is important to indicate the exact date, since the actual (calendar) number of days in a month and a 365/366-day year are used for calculating the effective interest rate. In calculating and reporting the effective interest rate on deposits that are periodically paid in/withdrawn (e.g. housing savings, pension savings, annuity savings, etc.), a client should be required to state the date of expected payments/withdrawals (if payments/withdrawals are periodical). In most cases, a credit institution itself would be capable of determining the dynamics of payments/withdrawals, since it prepares the annuity savings plans, etc., where the payment/withdrawal dates are precisely indicated.

(3) *Deposit payment* – the payable amount of deposit, or part of deposit (instalment) should be entered in this column, under the time period, or on the date, when it is certain that the payment will be made, i.e. when the client expects to place a deposit. In the case of deposits paid in instalments, the target amount of deposit should be indicated in the repayment plan. In the event of payment in instalments, the repayment plan should also make reference to the fact that these are the expected payments.

(4) Credits – amounts credited to the client's deposit account should be entered in this column (e.g. amount of accrued interest, government incentives, bonuses accrued in the course of contractual relation, etc.).

(5) *Other payments* – other payments made by a depositor (funds owner) on the basis of the concluded deposit contract (e.g. account management fee) should be entered in this column.

(6) *Deposit withdrawal* – the amount of withdrawn deposit should be entered in this column, under the time period, or the date when it is certain that the withdrawal will occur (e.g. upon the expiry of the deposit contract).

(7) *Interest disbursement* – the amount of interest disbursed in the agreed periods should be entered in this column.

(8) *Debits* – amounts debited against the client's deposit account (e.g. debiting the account management fee against deposit).

(9) *Other disbursements* – other disbursements by a credit institution to a depositor on the basis of the concluded deposit contract should be recorded in this column (e.g. disbursement of deposit premium, as a result of fulfilment of particular conditions by the depositor and similar disbursements). If a credit institution disburses a premium (bonus) on deposit, the percentage of the premium, or a flat-rate amount of the premium, should be indicated in the repayment plan.

(10) *Deposit balance* – the deposit balance at a particular period is entered in this column. It corresponds to the amount of deposit paid, increased by the accrued interest, or other accruals, and reduced by fees debited by the credit institution against this account. For the purpose of the effective interest rate calculation, the total amount of deposit with accrued interest is considered to be disbursed upon the expiry of the deposit contract.

(11) *Note (description)* – contains a short description of a cash flow at a particular period.

(12) *Net cash flow* – a sum of deposit payments (column 3) and other payments (column 5) (positive cash flow) reduced by the sum of deposit withdrawal (column 6), interest disbursement (column 7) and other disbursements (column 9) (negative cash flow) in a particular period. For the purpose of this Instruction, credits (column 4) and debits (column 8) are not included in the calculation of the net cash flow. All the amounts reported in columns 3 to 10 carry a positive sign. Net cash flow may be positive or negative - a positive sign implying net inflow of funds to a credit institution (payments) and a negative sign implying net outflow of funds from a credit institution (disbursements). For the purpose of the effective interest rate calculation, it is considered that the available deposit will be withdrawn by the depositor upon the expiry of the time deposit contract, together with the accrued interest and other disbursements (e.g. premium).

(13) *Discounted net cash flow* – the balances obtained by discounting net cash flows from column 12 at the appropriate effective interest rate by applying the following formula

$$NCF_k\left(1+\frac{EIR}{100}\right)^{-\frac{d}{t}}$$, should be entered in this column.

NCF_k stands for a net cash flow at a particular time. $\frac{d}{t}$ in the exponent represents the sum of the three components:

(1) number of days from time 0 date to 31 December of the same year, as a proportion of the number of days in the time 0 year,
(2) number of years between the year of the cash flow that is being discounted and time 0 year, excluding these two years,
(3) number of days between the date of the period in which the cash flow that is being discounted occurs and 31 December of the previous year, as a proportion of the number of days in the year of the cash flow that is being discounted.

The equation for computing $\frac{d}{t}$ may be expressed as follows:

$$\frac{d}{t} = \left[\frac{yyyy(0).12.31.-dat(0)}{t(0)}\right] + \left[yyyy(k)-yyyy(0)-1\right] + \left[\frac{dat(k)-(yyyy(k)-1).12.31.}{t(k)}\right]$$

t(0) = 1+yyyy(0).12.31.-yyyy(0).01.01.

t(k) = 1+yyyy(k).12.31.-yyyy(k).01.01.

dat(0) is time 0 date, while dat(k) is the date of the period in which the cash flow that is being discounted occurs.

Since the effective interest rate is the rate to be calculated, the methodology for its calculation is given below.
The repayment plan ends with the line item *Total*, which follows the last cash flow in the final period. In this line item, in the column *Discounted cash flow*, all discounted net cash flows from the individual time periods are added together. The effective interest rate is an approximation, rounded to 2 decimal places, of the equation

$$\sum_k \left[NCF_k \left(1+\frac{APR}{100}\right)^{-\frac{d}{t}}\right] = 0 .$$

The repayment plan that is presented to a client should not contain auxiliary columns 12 and 13, which are used for the calculation of the effective interest rate. The repayment plan that is enclosed with the loan documentation should contain these columns.

Example 3

A hypothetic example for completing the repayment plan for a time deposit is given below.

A client considers placing a time deposit of EUR 100,000,00.00 with a credit institution. A deposit would be paid in the entire amount on 1 May 2007 and would

mature in two years. The interest rate on a 2-year time deposit in the above stated amount is fixed, 5% per annum, in accordance with the credit institution's deposit policy, calculated and accrued annually, at the end of the period. Together with the interest accrual, the credit institution charges account management fee once a year. This fee amounts to a kuna equivalent of EUR 5 per annum. It is debited by a credit institution against the depositor's account. If a depositor keeps the time deposit with the credit institution during the entire agreed period, a premium of 1% of the originally deposited amount is also paid. Accordingly, after two years, on 1 May 2009, EUR 112,249.75 is available to the depositor. In interest calculation, in accordance with the credit institution's general terms and conditions relating to deposits, the credit institution applies the British method (number of calendar days in a month and actual number of days in a year).

The repayment plan in the table calculator is presented below:

AM banka d.d.	Tel: 01 123 4567											
Cerigradska 3	Fax: 01 765 4321											3 April 2007
10100 Zagreb												
Currency	EUR			Nominal interest rate (%)							**Effective interest rate (%)**	**5.95**
Deposit amount	100,000.00			5.00	Fixed			Premium (%)	1.00			

Time period	Maturity date	Deposit payment	Credits	Other payments	Deposit withdrawal	Interest disbursement	Debits	Other disbursements	Deposit balance	Note (description)	Net cash flow	Discounted net cash flow
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
0	1 May 2007	100,000.00		5.00					100,000.00	Deposit payment and fees for concluding the savings contract	100,005.00	100,005.00
1	1 May 2008		5,000.00				5.00		104,995.00	Interest accrual and periodic account management fee debits	0.00	0.00
2	1 May 2009				104,990.00	5,249.75	5.00	2,010.00	0.00	Periodic account management fee debits and deposit withdrawal with the interest earned and premium	-112,249.75	-100,005.00
Total		**100,000.00**	**5,000.00**	**5.00**	**104,990.00**	**5,249.75**	**10.00**	**2,010.00**			**-12,244.75**	**0.00**

Note: The disclosed effective interest rate is valid as at the date of drawing up the repayment plan.   Signature of authorised