

## Interest Rates

## and Bank

## Spreads

Information up to June 2016

4L BANCO CENTRAL L- DO BRASIL

Frequently Asked Questions Series

## "Frequently Asked Questions" Series

## Central Bank of Brazil

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## Interest Rates and Bank Spreads ${ }^{1}$

This paper is part of the Banco Central do Brasil's "Frequently Asked Questions" series (FAQ). This series, which is produced by the BCB's Investor Relations and Special Studies Department (Gerin), provides information on economic topics of interest to investors and the general public.

The Banco Central do Brasil (BCB) is producing this series as part of its ongoing efforts to enhance the transparency of the Brazilian economic policy and the effectiveness in communicating its actions.

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# Interest Rates and Bank Spreads 

## Interest - concept, types and conversions

## 1. What is interest? What are and how are interest rates calculated?

Interest is the remuneration of capital owed to the lender. The borrowed funds are available to the borrower for a certain period, during which the lender can't use them. It is said, therefore, that interest is a "reward" received by lenders for delaying consumption.

In more formal terms, interest is the return on capital employed (capital initially borrowed). Mathematically, we have:

$$
\begin{aligned}
& \text { Capital initially borrowed }=\mathrm{C} \\
& \text { Final amount received by the lender }=\mathrm{M} \\
& \text { Interest }(\mathrm{J})=\mathrm{M}-\mathrm{C}
\end{aligned}
$$

The interest rate (i), by its turn, is the ratio between the amount of interest received (J) and the capital employed (C).

$$
\begin{aligned}
& \text { Interest rate (i) }=\left[\frac{\mathrm{J}}{\mathrm{C}}\right] \times 100 \\
& \text { Interest rate (i) }=\left[\frac{\mathrm{M}}{\mathrm{C}}-1\right] \times 100
\end{aligned}
$$

For example, if a financial institution lends R\$10,000 to John, and 12 months later John pays R\$ 13,500 to the financial institution to fully repay the debt, we have:

$$
\begin{gathered}
\text { Interest rate (i) }=\left[\frac{\mathrm{M}}{\mathrm{C}}-1\right] \times 100 \\
\text { Interest rate (i) }=\left[\frac{13,500}{10,000}-1\right] \times 100 \Rightarrow \\
\text { Interest rate }(\mathrm{i})=35 \Rightarrow 35 \%
\end{gathered}
$$

So in this example, the interest rate charged by the financial institution was $35 \%$ per year.

## 2. What are the types of interest rates charged to the borrower?

Interest rates can be classified according to the capitalization system and to the existence of indexing. These two classifications are not mutually exclusive: a loan can have fixed or floating interest rates capitalized by the method of simple or compound interest.

Figure 1-Interest Rates Classification Criteria


Source: Gerin.

## 3. What is the difference between simple and compound interest? Which one may the financial institution charge the customer?

The interest rate is simple when the amount of interest is charged on the capital originally borrowed (principal). On the other hand, the interest rate is compound when the interest is added to the principal of a deposit or loan so that the added interest also earns interest from then on.

In most countries of the world, including Brazil, the vast majority of loans are made with compound interest. Brazilian law allows the financial institution to charge simple interest or compound, as long as it is clear in the contract which is the type used.

## 4. How to convert monthly interest rates into annual interest rates?

In the case of compound interest, the conversion of monthly interest rates (\% per month) on annual interest rates (\% per year) is performed by the following formula:

$$
\text { Interest rate }(\% \text { p.y. })=\left\{\left[\frac{\text { Interest rate }(\% \text { p.m. })}{100}+1\right]^{12}-1\right\} x 100
$$

Example: suppose a $1.68 \%$ monthly interest rate. Which is the corresponding annual interest rate?

$$
\text { Interest rate }(\% \text { p.y. })=\left\{\left[\frac{1.68}{100}+1\right]^{12}-1\right\} x 100 \cong 22.13 \% \text { p.y. }
$$

In the case of simple interest, the conversion of monthly interest rates (\% per month) on annual interest rates (\% per year) is performed by multiplying the monthly rate for 12.

$$
\text { Interest rate }(\% \text { p.y. })=\text { Interest rate }(\% \text { p.m.) }) 12
$$

## 5. How to convert monthly interest rates into annual interest rates?

In the case of compound interest, the conversion of annual (\% p.y.) interest rates on monthly interest rates (\%p.m.) is performed by the following formula:

$$
\text { Interest rate }(\% \text { p.m. })=\left\{\left[\frac{\text { Interest rate }(\% \text { p.y. })}{100}+1\right]^{1 / 12}-1\right\} x 100
$$

Example: suppose a $23.26 \%$ annual interest rate. Which is the corresponding monthly interest rate?

$$
\text { Interest rate }(\% \text { p.m. })=\left\{\left[\frac{23.26}{100}+1\right]^{1 / 12}-1\right\} x 100 \cong 1.76 \% \text { a.m. }
$$

In the case of simple interest, the conversion of annual (\% p.y.) interest rates on monthly interest rates (\%p.m.) is performed by dividing the annual rate by 12 :

$$
\text { Interest rate }(\% \text { p.m. })=\frac{\text { Interest rate }(\% \text { p.y. })}{12}
$$

## Interest Rate Charge in Brazil

## 6. What is the maximum interest rate that can be charged on each loan in

 Brazil?Interest rates are freely negotiated between financial institutions and borrowers in non earmarked credit operations. It stands out among these operations: overdrafts, personal loans, credit card, working capital and acquisition of goods.

In earmarked credit operations, which include rural credit, real estate and with BNDES funds, interest rates are subject to limits. In housing loans under the SFH ${ }^{2}$, the interest rate can't exceed $12 \%$ p.y. + TR33. Rural credit and BNDES loans have specific limits for each program or line of credit.

Interest rates of payroll-deducted loans for INSS beneficiaries ${ }^{4}$ are also subject to limits defined in INSS regulations.

## 7. May a financial institution charge different interest rates to different customers, even though they both take the same line of credit on the same day? If yes, why?

Yes. The financial institution may charge different interest rates to different customers using their own criteria, which mainly involve the customer's payment capacity and the customer's credit history. Long-time customers, especially those with no late payment history, usually take cheaper loans.

## 8. What is the difference between the interest rate charged to the borrower and the effective total cost (CET)?

Total Effective Cost (CET) is the rate that corresponds to all charges and expenses incurred in a credit transaction or financial lease for credit borrowers.

The CET, regulated by Resolution 3.517 of December 6, 2007, includes not only the interest rate but also tariffs, taxes, insurance and other expenses charged, representing the conditions in force at the date of calculation.

## Click here to know more about CET (in Portuguese).

[^0]
## 9. How has the average interest rate on bank loans evolved?

The average interest rate on bank loan stood at $32.6 \%$ per year ${ }^{5}$ in June 2016. However, interest rates varies greatly among credit categories. As shown in Figure 2, average nonearmarked interest rates stood at $52.2 \%$ per yeaŕ, while average earmarked interest rates stood at $11.0 \%$ per year?

Figure 2- Average Interest Rates, by Credit Category (in \% per year, June 2016)


Source: BCB, Monetary Policy and Financial System Credit Operations Press Release.
Over the past five years, interest rate rose 4.6 percentage points from 28.0\% per year in June 2011 to $32.6 \%$ per year in June 2016 . The increase occurred both in credit to individuals (from $37.2 \%$ p.y. to $41.8 \%$ p.y. ${ }^{9}$ ) and also in corporate credit (from $19.8 \%$ p.y. to $21.8 \%$ p.y. ${ }^{10}$ ).

[^1]Chart 1- Average Interest Rate, \% per year (up to June 2016)


Source: BCB.

## 10. How do I know the interest rate charged by any financial institution, in each line of credit?

The Central Bank provides a list (in Portuguese) of the average interest rates charged by financial institutions in different types of credit. These rates represent the effective average cost of credit transactions for customers, composed of the interest rates actually charged by financial institutions in their credit operations, plus taxes and other costs to the client.

It is important to note, however, that financial institutions are free to charge different interest rates to different customers (as explained in Question 7). Therefore, this list serves as an initial reference.

To know exactly the interest rate applicable to your case, you must ask each financial institution directly.

## Funding Rate and Bank Spread

## 11. What is funding rate?

The funding rate is the fee paid by financial institutions in financial investments - savings, Certificate of Deposit (CDB, in Portuguese ${ }^{11}$ ), etc-, with the purpose of raising funds to provide loans.

The funding rate depends (among other factors):

[^2]- On the instrument the financial institution uses to raise funds: in Brazil, demand deposits do not have funding cost (since the bank does not pay compensation to the depositor). The CDB and savings, on the contrary, have cost - which corresponds to the interest rate paid by the financial institution to the investor;
- On the financial institution: in general, bigger financial institutions raise funds at lower rates and vice versa;
- On macroeconomic conditions: the funding rate may rise or fall depending on market expectations about the Selic rate, for example;
- On the credit line: in the earmarked credit, in general, the fundraising is regulated and its cost is associated with pre-established criteria.


## 12. What is bank spread?

Bank spread is the difference between lending and funding rate. It is measured in percentage points (p.p.).

$$
\text { Bank Spread }=\text { Lending Rate }- \text { Funding Rate }
$$

For example, if a financial institution raises funds through a CDB which funding rate is $12 \%$ per year and lent money to a client with an interest rate of $23 \%$ per year, then the bank spread of this operation is 11 percentage points:

$$
\text { Bank Spread }=23 \%-12 \%=11 \text { percentage points }
$$

The bank spread does not equal the financial institution profit. The financial institution uses the spread to pay administrative costs and taxes, make provision for the case of default, among other expenses. What remains after the payment of these expenses corresponds to the profit of the financial institution in that particular loan.

It is also worth mentioning that the bank spread statistics are estimates which result from the difference between interest rates of loans (informed by the financial institutions) and estimates for the average cost of funding (based on financial market indicators that reflect the average cost of money at any given time).

## 13. How has bank spread evolved?

The average bank spread in Brazil reached 22.7 p.p. in June $2016^{12}$. As with interest, in Brazil bank spread varies widely depending on the borrower. The average spread in corporate loans (12.0 p.p. in June 2016) ${ }^{13}$ is less than half the spread of loans to individuals ${ }^{14}$ ( 31.8 p.p. in the same month - see Chart 2).

[^3]Chart 2 - Total Bank Spread and Bank Spread Breakdown (June 2011 X June 2016)


Source: BCB. From left to right in the chart, SGS 20783, 20785, 20784, 20786, 20809, 20787, 20825, 20837 e 20826.

## 14. Why is bank spread in loans to individuals so different from bank spread in loans to companies?

Among other factors, credit quality, as expressed by delinquency rates, helps to explain the difference in spreads between the two types of borrowers. As shown in Chart 3, the percentage of default rate ${ }^{15}$ for individuals ( $4.0 \%$ in June $2016{ }^{16}$ ) is much higher than the percentage of nonperforming loans from companies ( $3.0 \%{ }^{17}$ ).

[^4]Chart 3 - Nonperforming Loans (\% of outstanding credit, June 11 X June 16)


Source: BCB. From left to right in the chart, SGS 21082, 21084, 21083, 21085, 21112, 21086, 21132, 21145 e 21133.

## Other Questions about Interest Rates and Bank Spread

## 15. What has the BCB been doing to reduce interest rates and bank <br> spreads?

The evolution of bank spreads also depends on the macroeconomic scenario. The spread tends to increase when the outlook is unfavorable and the default rates are high. Moreover, the evolution of average bank spreads depends, in part, on the evolution of each line of credit which composes the total outstanding credit. If, for example, typically low-spread lines of credit rise above the average, the average bank spread tends to fall.

The Central Bank has been dedicated to the diagnosis of the causes of high spreads charged by financial institutions in its loans, as part of the project "Interest Rates and Bank Spreads in Brazil". This project has proposed a series of long-term measures aimed at reducing the cost of credit in the country ${ }^{18}$.

The main focus of the BCB efforts as part of the strategy to reduce interest rates and banking spreads are:

- Promoting increased competition and transparency in the credit market.
> Access to relevant information on clients is essential to enable financial intermediaries to adequately evaluate their credit risk;

[^5]> From the borrowers' point of view, accurate and complete information about borrowing costs and contractual conditions allows easier comparison of different credit offers available (see , in that regard, Question 8 on CET).

- Increasing the effectiveness of contracts enforcement, enabling banks to reduce losses associated with defaults. The inefficient legal enforcement of contracts inhibits the supply of credit by inducing banks to be more restrictive in the selection of clients and increasing the risk premium demanded from all the borrowers ${ }^{19}$.


## 16. What is the effect of legal insecurity or legal risk on credit and bank spreads?

Legal insecurity (i.e. excessively long judicial processes in the event of default) limits the credit supply and increases the spread. This occurs through two channels: an increase in financial institutions' administrative costs (mainly the legal and credit risk areas) and a decrease in the certainty of payment, even with collateral. The latter channel pressures the risk premium - the additional fee included in the spread to cover nonpayment.

In recent years, several measures have been approved by the government and the legislative, aimed at reducing the default risk and the costs associated with the slowness of judicial recovery processes. Following are some of these initiatives:

- Approval of the payroll-deducted loans legislation;
- Approval of the new bankruptcy law and changes in the National Tax Code;
- Creation of the Banking Credit Note in order to reduce credit and legal risks;
- Expansion of the types of lending that can be conducted using chattel mortgage contracts (the property being financed is transferred to the creditor until the loan is fully paid back);
- Incentives to micro-credit and credit unions; and
- Reform of the Judiciary.


## 17. Where can I find out more about interest rates and bank spreads?

Once per year, the BCB publishes (in Portuguese) the "Credit and Banking Economy Report", which includes the most complete data available on the subject.

The BCB website has also several Working Papers and Technical Notes on credit and bank spreads. The links are presented below:

## Technical Notes

18 - O Spread Bancário segundo Fatores de Persistência e Conjuntura (in Portuguese) - Sérgio Mikio Koyama and Márcio I. Nakane (Apr/02)

[^6]19 - Os Determinantes do Spread Bancário no Brasil (in Portuguese) - Sérgio Mikio Koyama and Márcio I. Nakane (Apr/02)

20 - Derivativos de crédito - Uma Introdução (in Portuguese) - Fani Léa Cymrot Bader (Apr/02)
21 - Resenha sobre o Spread Bancário (in Portuguese) - Fani Léa Cymrot Bader and Victorio Yi Tson Chu (May/02)

## Working papers

46 - The Determinants of Bank Interest Spread in Brazil
Tarsila Segalla Afanasieff, Priscilla Maria Villa Lhacer and Márcio I. Nakane (Aug/02)
62 - Taxa de Juros e Concentração Bancária no Brasil (in Portuguese) - Eduardo Kiyoshi Tonooka and Sérgio Mikio Koyama (Feb/03)

108 - O Efeito da Consignação em Folha nas Taxas de Juros dos Empréstimos Pessoais (in Portuguese) - Eduardo A. S. Rodrigues, Victorio Chu, Leonardo S. Alencar and Tony Takeda (Jun/06)

110 - Fatores de Risco e o Spread Bancário no Brasil (in Portuguese) - Fernando G. Bignotto and Eduardo Augusto de Souza Rodrigues (Jul/06)

242 - Determinantes do Spread Bancário Ex-Post no Mercado Brasileiro (in Portuguese) -José Alves Dantas, Otávio Ribeiro de Medeiros and Lúcio Rodrigues Capeletto (May/11)

257 - Cooperativas de Crédito: taxas de juros praticadas e fatores de viabilidade (in Portuguese) Clodoaldo Aparecido Annibal and Sérgio Mikio Koyama (Nov/11)

## 18. Where can I get updated data on interest rates and bank spreads?

Each month, the "Monetary Policy and Financial System Credit Operations" Central Bank's press release provides updated data on outstanding credit, grants, interest rates, interest rates, terms, bank spreads, default rates, among others.

The Central Bank also offers Microsoft Excel® worksheets with the main economic indicators. Credit indicators are in Chapter II - Currency and Credit.

For complete time series, go to the Time Series Management System (SGS). Choose "by subject" on the left side of the screen, and then select "credit indicators".


[^0]:    ${ }^{2}$ Housing Financial System (Sistema Financeiro de Habitação). Click here to know more (in Portuguese)
    ${ }^{3}$ Reference Rate
    ${ }^{4}$ INSS means National Institute Social Security. INSS Beneficiaries are retired, invalid and other pensioners who receive monthly income from INSS

[^1]:    ${ }^{5}$ Monetary Policy and Financial System Credit Operations Press Release, Table13 or SGS 20714.
    ${ }^{6}$ Monetary Policy and Financial System Credit Operations Press Release, Table13A or SGS 20717
    ${ }^{7}$ Monetary Policy and Financial System Credit Operations Press Release, Table13B or SGS 20756
    ${ }^{8}$ Monetary Policy and Financial System Credit Operations Press Release, Table13 or SGS 20714
    ${ }^{9}$ Monetary Policy and Financial System Credit Operations Press Release, Table13 or SGS 20716
    ${ }^{10}$ Monetary Policy and Financial System Credit Operations Press Release, or SGS 20715

[^2]:    ${ }^{11}$ Bank Certificate of Deposit (CDB) is a bond issued by the financial institution. It is similar to the certificate of deposit (CD) in the USA.

[^3]:    ${ }^{12}$ Monetary Policy and Financial System Credit Operations Press Release, Table 13 or SGS 20783
    ${ }^{13}$ Monetary Policy and Financial System Credit Operations Press Release, Table 13 or SGS 20784
    ${ }^{14}$ Monetary Policy and Financial System Credit Operations Press Release, Table 13 or SGS 20785

[^4]:    ${ }^{15}$ Default rate is calculated by BCB as the the amount of arrears exceeding ninety days and not written off as losses, divided by total outstanding credit.
    ${ }^{16}$ Monetary Policy and Financial System Credit Operations Press Release, Table 1 or SGS 21084
    ${ }^{17}$ Monetary Policy and Financial System Credit Operations Press Release, Table 1 or SGS 21083; total nonperforming loan rate in SGS 21082

[^5]:    ${ }^{18}$ Some of the measures proposed by the Central Bank are in the following documents (available in Portuguese):
    "Economia Bancária e Crédito - Avaliação de 4 anos do projeto Juros e Spread Bancário", chapter III
    "Economia Bancária e Crédito - Avaliação de 5 anos do projeto Juros e Spread Bancário", chapter IV

[^6]:    ${ }^{19}$ An example of the Central Bank's actions in this field is its presence as a Friend of the Court (amicus curiae), in the judgment of the legality of compound interest, which occurred in 2015 in the Supreme Court. The speech of the Central Bank of Attorney General in the Supreme Court (in Portuguese)plenary reinforces the importance of legal certainty for the reduction of spreads.

