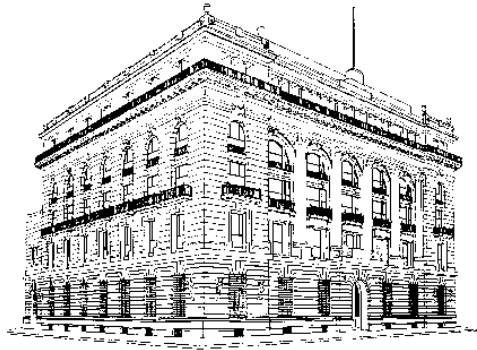


Credit and Total Annual Cost (CAT)



BANCO DE MEXICO

**National Financial
Education Week**

October 2009

«This document was prepared for educational purposes only in order to promote financial culture and should not therefore be used for any other».



1. Background

2. Credit

3. Total Annual Cost (CAT)

4. Amortization table

5. Fees

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1. Background

Banco de México's goals are:

- To supply the Mexican economy with domestic currency.
- To preserve the stability of the domestic currency's purchasing power.
- To foster **the healthy development of the financial system.**
- To promote **the smooth functioning of the payment systems.**



1. Background

Banco de México issues provisions related to:

- **Monetary and foreign exchange** regulation.
- The **healthy development of the financial system**.
- The smooth **operation of the payment systems**.
- **Protecting the public interest**.

Congress and financial authorities have established diverse rules and regulations to protect the interests of financial system users*.

*Each regulation applies to a specific area. For this reason, the numbers contained in this presentation may not be applicable to a specific entity.



1. Rules and regulations

Under the **Act of Transparency and Promotion of Competition in Guaranteed Credit**,* mortgage lenders must:

- ✓ Publish the Total Annual Cost (CAT).
- ✓ Make a firm offer (binding) that is valid for 20 days.
- ✓ Allow for prepayments on mortgage loans.
- ✓ Substitute the entity granting the loan when the borrower can obtain a new loan under better terms and conditions (lender substitution).

* Official Federal Gazette, December 30, 2002 and rules pertaining to June 30, 2003.



1. Rules and regulations

- Under the **Law for the Transparency and Regulation of Financial Services (LTOSF)** lenders must:
 - ✓ Publish the CAT.
 - ✓ Publish annual interest rates.
 - ✓ Not charge interest in advance.
 - ✓ Register loan fees and agreements with Banco de México and CONDUSEF, respectively.
 - ✓ If payment falls on a non-bank working day, it must be accepted the following day without incurring a penalty.



1. Rules and regulations

- In June 2009, the **LTOSF** was amended to include more financial service user protection measures:
 - ✓ More regulatory attributes are conferred to CONDUSEF.
 - ✓ A loan may be granted only after the borrower's payment viability has been established.
 - ✓ The credit limit on cards cannot be raised without the clients' prior consent.
 - ✓ Fees may not be charged on an overdraft or attempt to overdraw.
 - ✓ New cards may only be delivered to customers that have requested them.



1. Rules and regulations

- ✓ When a credit card is cancelled, the payment obligation prevails under the previously agreed terms.
- ✓ Minimum payment amounts must be enough to ensure there is no negative amortization and that the debt is paid off within a reasonable timeframe.
- ✓ In the event the payment date falls on a non-working day, payment can be made the following day.
- ✓ Clients can change banks by simply visiting the new bank which will take care of all relevant paperwork.
- ✓ Banks may only get in touch with customers at their place of work, and if they have authorization to do so.



1. Rules and regulations

Federal Consumer Protection Law (Articles 66 and 69).

As part of all loan transactions, customers must be informed of:

- The amount and detail of any charge, number of payments, frequency and total amount payable.
- The right to settle a debt before maturity with a reduction in interest.
- The CAT ([Article 6 of the FCPL](#)).
- Interest will be calculated on the basis of [outstanding balances](#).



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2. What is a loan?

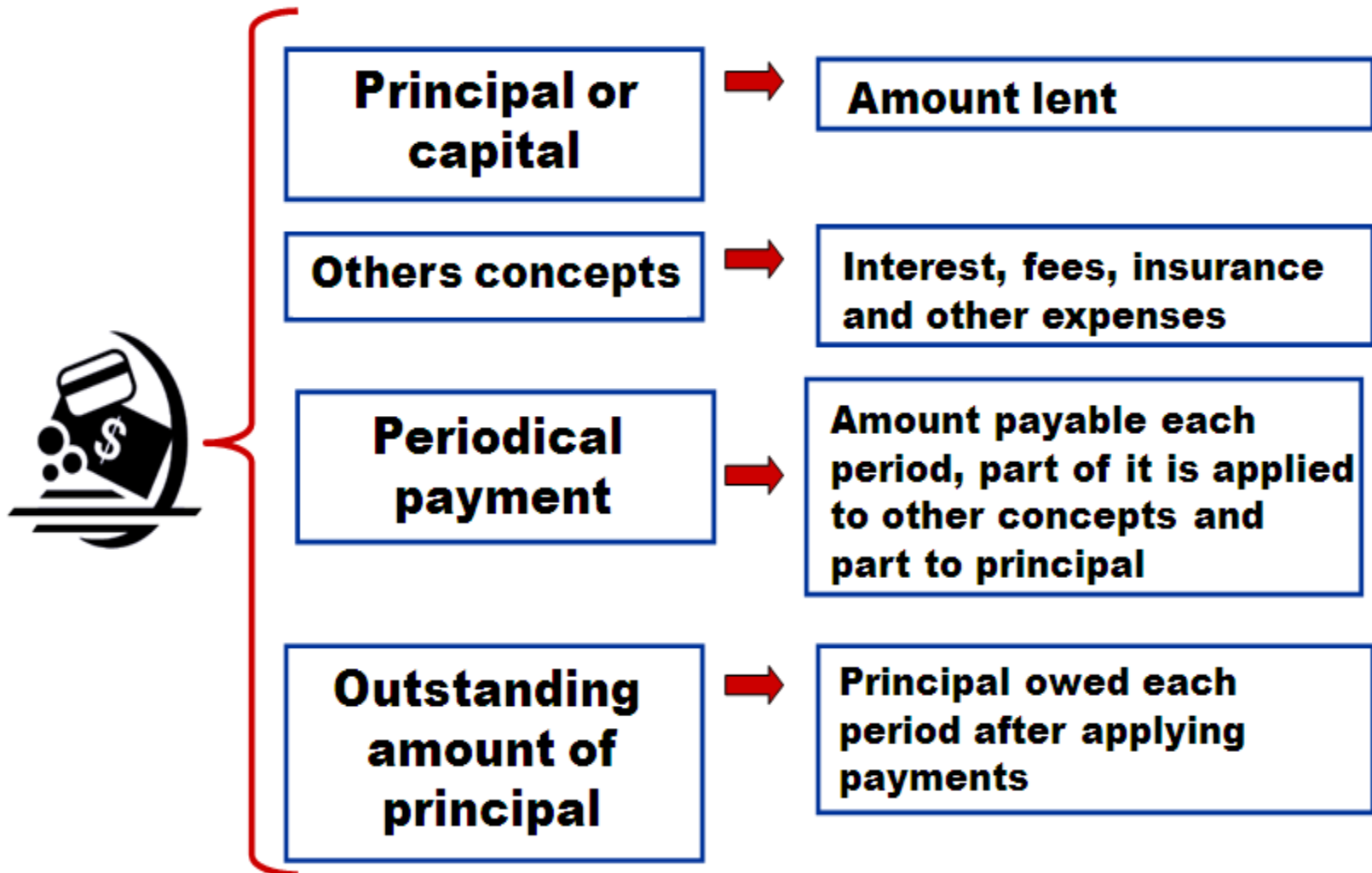
It is an agreement between two parties in which one of them (**the lender**) lends a certain amount of money to the other (**the borrower**).

Loans are formalized in agreements which establish:

- The term.
- The payments.
- When payments will be made.
- Fees and insurance.
- Other conditions that must be fulfilled.



2. What does a loan consist of?





2. Credit granting

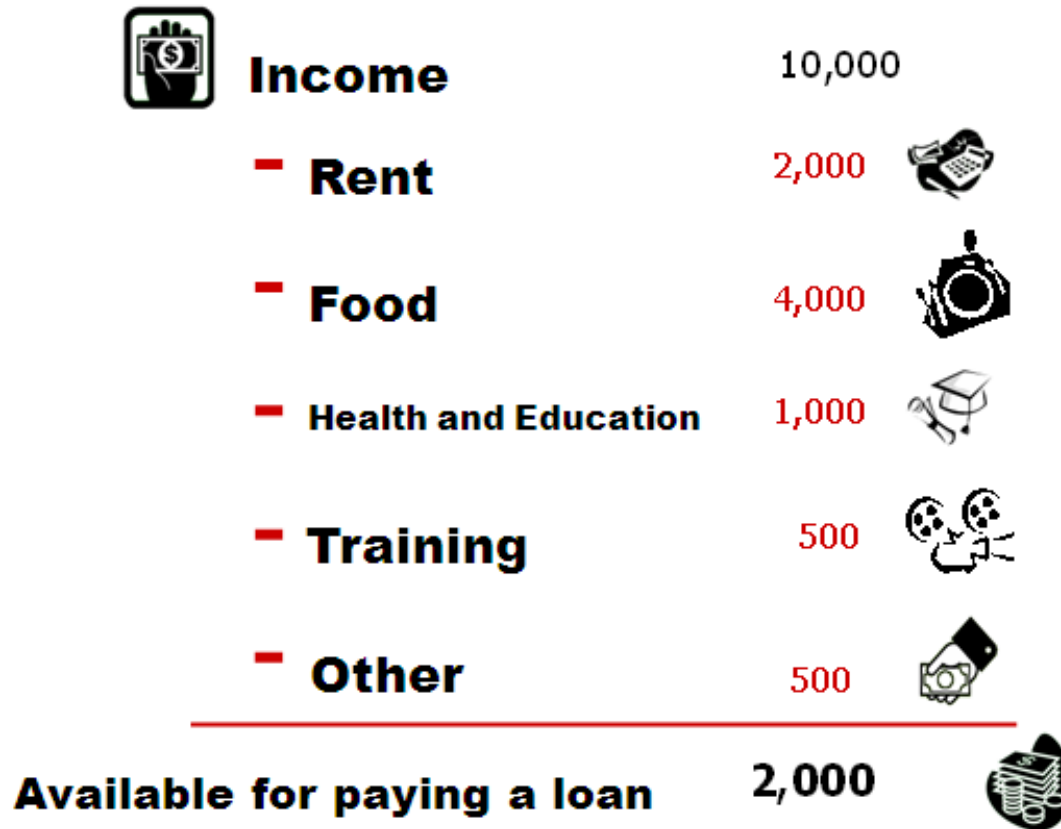
In order to grant a loan, the lender takes the following factors about the borrower into account:

- **Payment capacity.**
- **Solvency and assets.**
- **Level of debt.**
- **Credit history.**
- **Job stability.**



2. What is payment capacity?

Disposable income for paying a loan or for saving.









2. What are assets and solvency?

Assets: the difference between the value of an individual's goods and debts.

Solvency: an individual's capacity to pay.



2. Personal balance sheet

Asset or Good		Liability or Debt	
 Account	5,000	Loans {	Payroll 20,000
 Car	60,000		Car 20,000
 Home	300,000		Home 100,000
			<hr/> 140,000
			Assets
		 Capital	225,000
Total	365,000	Total	365,000



2. Level of debt

There are different ways of indicating the level of debt:

- As a percentage of income:

- total debt-related payments divided by total income

$$2,000 / 10,000 = 20\%$$

A healthy credit practice consists of extending a new loan only when the borrower's level of debt is below 30 percent or equal to 30% of household income.

- As a percentage of assets:

- total debt divided by total assets

$$120,000 / 365,000 = 33\%$$

A reasonable level is below 50%



2. Credit Information Companies

Credit Information Companies (CIC) receive and manage information from people that have had a loan and a record payment history (positive or negative) as well as outstanding loan balances.

Financial institutions (banks, sofoles, sofomes, etc.) and retailers (department stores, mobile phone companies, etc.) provide CICs with information.



2. How do you choose a loan?

- Visit several lenders. They consult your credit history, which, if positive, may give you access to greater loan amounts on better terms.
- By comparing different CATs for the same type of loan.
- In the case of mortgage loans, by requesting the **binding offer**.



2. Binding offer

Financial institutions provide them for free at the customer's request. They bind them, for a period of 20 calendar days, to respect* all financial variables offered in mortgage loans.

We recommend requesting the **binding offer** from among several institutions and choosing the most appropriate one. Make sure the terms coincide with those of the binding offer when signing the agreement.

*With some exceptions.



2. Aspects to consider

When requesting a loan:

The loan agreement should include a title page containing the CAT, the main terms and conditions of the loan (interest rate, total amount payable, fees, etc.). It should be **carefully reviewed** to ensure it coincides with the loan offer.

Institutions should provide a loan amortization table containing the date and detail of each of the payments that will be made as well as the outstanding balance of principal.



2. Contract title page

TAC	ANNUAL INTEREST RATE	LOAN AMOUNT	TOTAL AMOUNT PAYABLE	FEES
Total Annual Cost				Amounts and Clauses
For informative and comparable purposes 26.82% Fixed	24% Fixed 36% in arrears	\$ 20,000.00 Pesos, local currency	Estimated in contract \$24,012.72	Initial fee 0 Prepayment 0 Collection 0 Other 0 Clause 23
Interest calculation methodology: <i>interest will be calculated for each period on the outstanding decreasing balance of the loan</i>				
Loan term: 1.5 years.				
Payments will be as follows:				
<u>Number</u> 18	<u>Amount</u> Includes VAT so there may be some small variations in the payment, 1,334.04 Fixed	<u>When payments are made</u> On the last day of each month (monthly)		
<i>Be mindful of your payment capacity, generally speaking it should never exceed 35% of your income. Costs related to debt in arrears are very high.</i>				
Authorization: my personal data may be used for marketing purposes: <input type="radio"/> YES <input checked="" type="radio"/> NO				
GUARANTEE: the customer has provided the following loan guarantee:				
Asset	Description		Reference	
Personal guarantee of Mr.xxxxx			Public property register no.:	
Doubts, clarifications and claims. The claims procedure set forth in Article 23 of the Law for the Transparency and Regulation of Financial Services is described in clause XII 27. The claim should be lodged with the User Attention Special Unit located at: Domicile: Telephone: Hot line: From inside Mexico:				



2. Aspects to consider

During the life of the loan:

Institutions should provide proof of receipt for each payment as well as an up-to-date loan statement.

It should be borne in mind that **prepayments** can be made on loans to reduce principal and thereby pay less interest. **Early payments** that are applied to immediately following ones can also be made.



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3. Total Annual Cost (CAT)

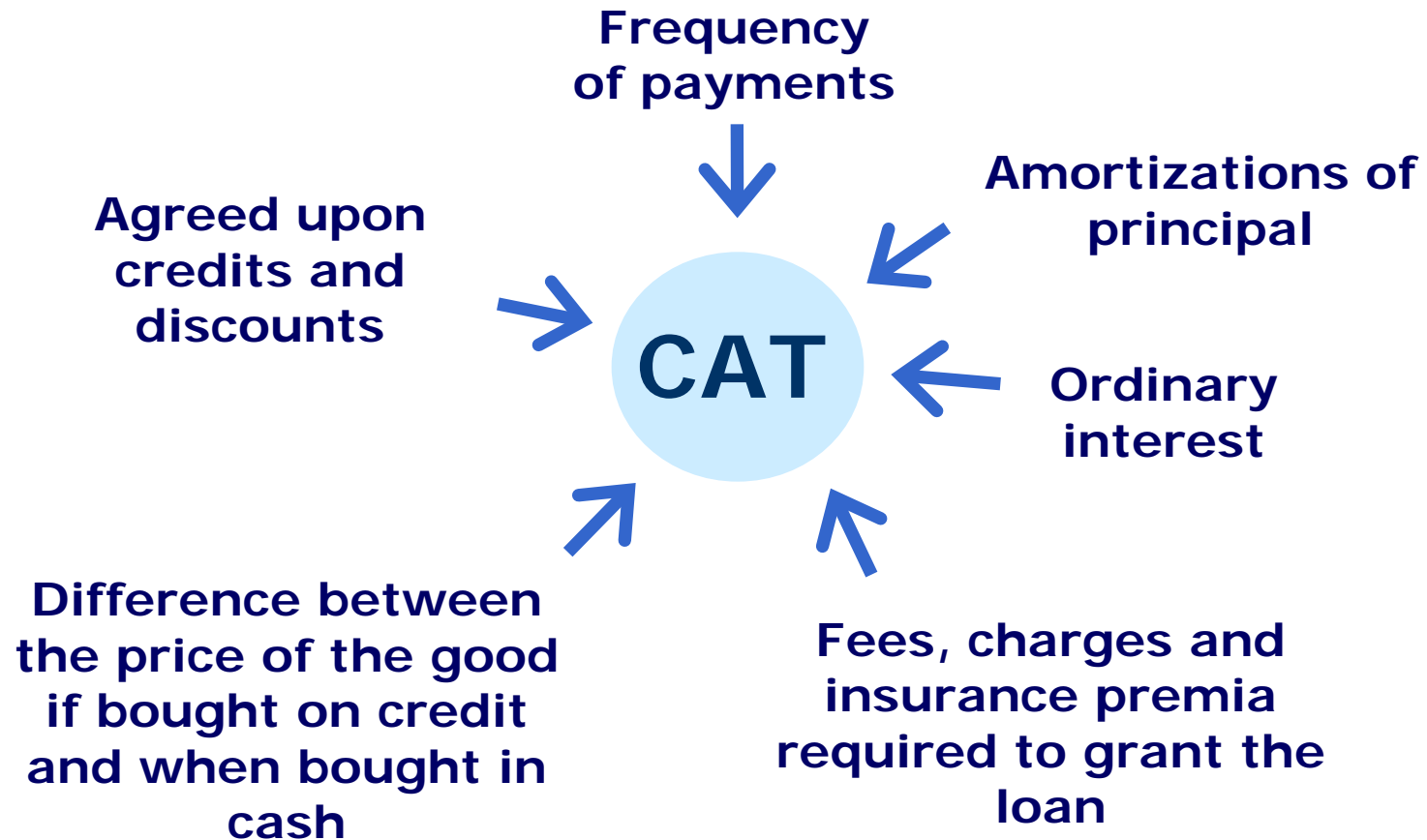
What is the Total Annual Cost?

- It measures the cost of financing by including all costs and expenses inherent to the loan.
- As it is an annual percentage, comparisons can be made between different lenders. It assumes a 12 month performing loan.

[How is it calculated?](#)



3. What does the CAT include?





3. Total Annual Cost

The CAT is the most important indicator for comparing the cost of loans. However, there are other factors that should also be taken into account including:

- Size of the payment.
- Payments' frequency.
- Loan term.
- Type of interest rate (fixed, variable, UDIs, etc.)

The **lowest CAT** of loans that meet the customers' financing needs and payment capacity **should be chosen**.



3. Changes to the CAT

The formula and methodology did not change, only some assumptions.

1. Interest rate.

- ✓ In the case of advertising and publicity, the CAT will be calculated on the basis of the average interest rate for the loan product.
- ✓ The agreements will use the interest rate specific to the product and customer.
- ✓ The statement will use the customer's own individual interest rate.



3. Changes to the CAT

2. The VAT is not included in the calculation of the CAT.

- ✓ Some loans are not currently subject to this tax, and it is not standard practice throughout Mexico.
- ✓ In advertising, material interest rates and fees are mentioned before VAT.
- ✓ “Without VAT” should appear.

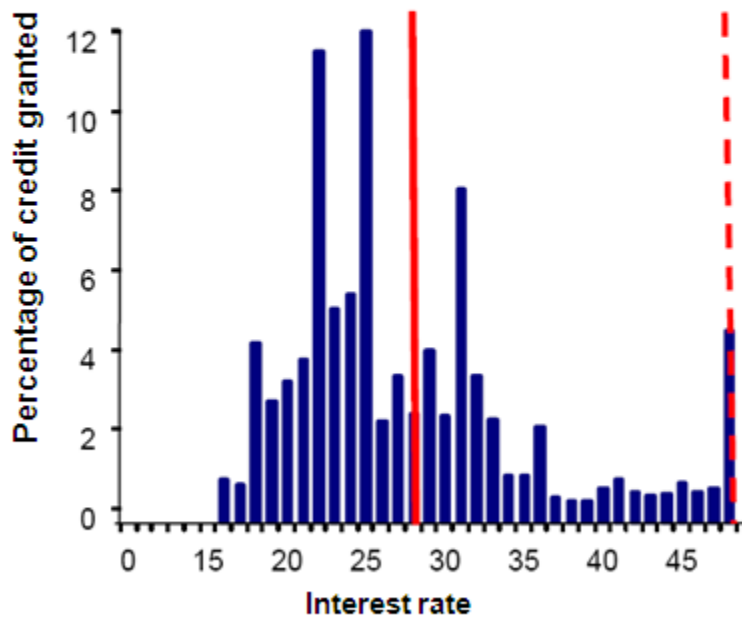


3. Changes to the CAT

Average interest rate

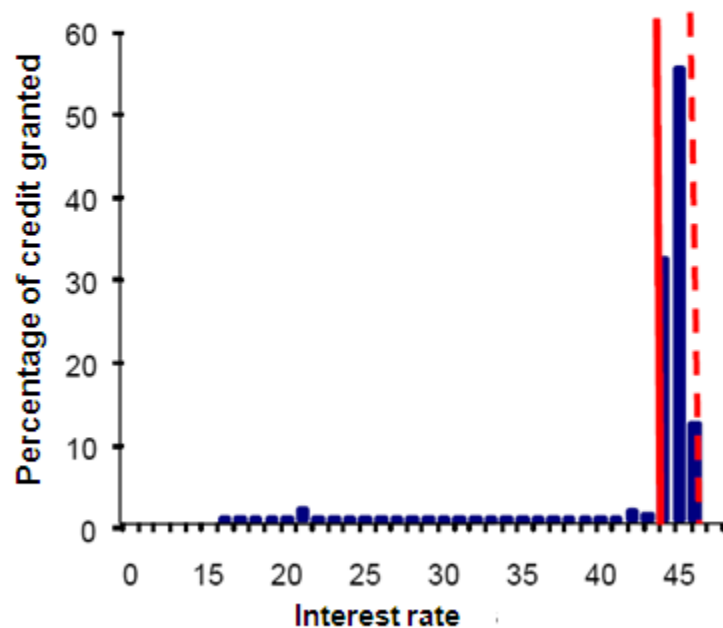
Example for a credit card

	Rate *	CAT*
Maximum	48%	62%
Average	28%	34%



Bank 1

	Rate *	CAT*
Maximum	46%	59%
Average	44%	56%



Bank 2

*w/o VAT



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4. Amortization table

The amortization table should contain at least the following concepts for each of the periods:

- Amount to be credited to principal.
- Amount of ordinary interest.
- If necessary, interest VAT.
- If necessary, fees or obligatory insurance premia.
- The total amount the customer must pay for each period (sum of the concepts included).
- The Outstanding Balance of Principal for the period considered calculated by subtracting the amount credited to the Principal from the Outstanding Balance of Principal.



4. Amortization table

10,000 peso loan payable in 12 month installments at a 35% interest rate

Month	Initial balance	Interest payment	VAT on interest*	Principal payment	Total payment	Outstanding balance of principal
0	10,000.00	-	-	-	-	10,000.00
1	10,000.00	291.67	37.64	692.97	1,022.27	9,307.03
2	9,307.03	271.46	35.03	715.79	1,022.27	8,591.24
3	8,591.24	250.58	32.34	739.36	1,022.27	7,851.88
4	7,851.88	229.01	29.55	763.71	1,022.27	7,088.17
5	7,088.17	206.74	26.68	788.86	1,022.27	6,299.31
6	6,299.31	183.73	23.71	814.84	1,022.27	5,484.47
7	5,484.47	159.96	20.64	841.67	1,022.27	4,642.80
8	4,642.80	135.42	17.47	869.39	1,022.27	3,773.42
9	3,773.42	110.06	14.20	898.01	1,022.27	2,875.40
10	2,875.40	83.87	10.82	927.59	1,022.27	1,947.82
11	1,947.82	56.81	7.33	958.13	1,022.27	989.68
12	989.68	28.87	3.72	989.68	1,022.27 -	0.00

* In order to calculate the VAT on real interest in accordance with the VAT Law for financial system entities, an annual inflation rate of 4.89% as of September, 2009 was used. This figure is available at: <http://www.banxico.org.mx/>



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5. Fees

Fees must be clearly established in the agreement as follows:

- Concept.
- Origin.
- Amount, percentage, or how they are calculated.
- When they must be paid.
- Fees must correspond to actual events.

Fees are paid when required.

The institution may lend more money in order to pay them.



5. Would you like to know more?

Banco de México's web page contains information related to:

1. CAT calculators for fixed-rate and variable rate loans, credit cards and mortgage loans.
2. Bank product features, rates and fees.
3. Interest rates on long-term investments.
4. Basic bank accounts which charge no fees.

<http://www.banxico.org.mx/sistema-financiero/index.html>



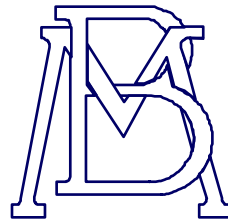
5. Would you like to know more?



www.condusef.gob.mx



www.profeco.gob.mx



www.banxico.org.mx

[Continued...](#)

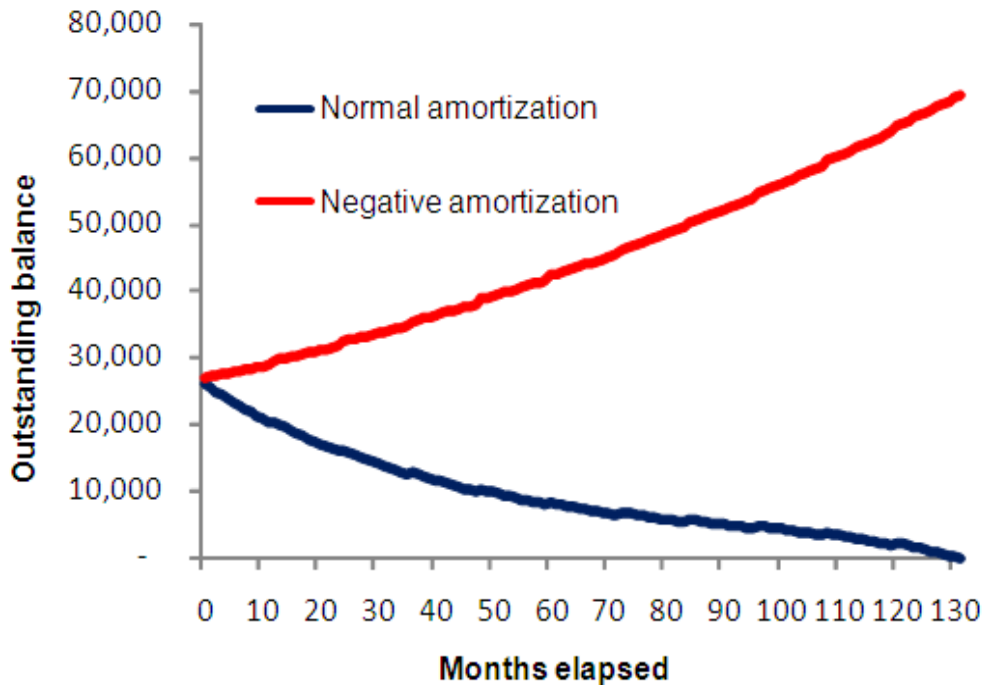


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Negative amortization

Occurs when the outstanding balance on a loan increases over time. It happens when periodical payments are not enough to cover the interest and other concepts related to a loan (fees, insurance and expenses).



Normal and negative credit card amortization.

Credit line: 25,000

Annual fee: 440.00 w/o VAT

Interest rate: 30% and 60%, respectively.

Minimum payment: 5% of the balance.

LTOSF: Banco de México will regulate the minimum payment by ensuring there are no negative amortizations and that the debt is paid off within a reasonable period of time.



CAT calculation formula

The CAT is value i , expressed as a percentage, which satisfies the following equation:

$$\sum_{j=1}^M \frac{A_j}{(1+i)^{t_j}} = \sum_{k=1}^N \frac{B_k}{(1+i)^{s_k}}$$

Where:

M = Number of drawdowns.

j = Consecutive number identifying each drawdown.

A_j = Amount of the j -th drawdown.

N = Total number of payments.

k = Consecutive number identifying each payment.

B_k = Amount of the k -th payment.

t_j = Time interval expressed in years and parts of the year between the date on which the agreement came into effect and the date of the j -th drawdown.

s_k = Time interval expressed in years and parts of the year between the date on which the agreement came into effect and the date of the k -th payment.



Formula explanation

Left side: Represents the sum of the credit drawdowns taken to present value and considering their frequency during the year.

$$\sum_{j=1}^M \frac{A_j}{(1+i)^{t_j}} = \sum_{k=1}^N \frac{B_k}{(1+i)^{s_k}}$$

Sum total

Drawdown amount

Present value

Parts of the year

Example: A \$15,000 loan (A), which is fully drawn when the agreement is signed (period zero). Replacing:

$$\text{Drawdowns} = \sum_{j=1}^1 \frac{A_1}{(1+i)^{t_1}} = \frac{15,000}{(1+i)^0} = 15,000$$



Formula explanation

Right side: Represents the sum of the loan payments taken to present value and considering their frequency during a one year period.

$$\sum_{j=1}^M \frac{A_j}{(1+i)^{t_j}} = \sum_{k=1}^N \frac{B_k}{(1+i)^{s_k}}$$

Diagram annotations:

- Amount of each payment:** Points to the term B_k in the numerator of the right-hand sum.
- Present value:** Points to the denominator $(1+i)^{s_k}$ of the right-hand sum.
- Parts of the year:** Points to the exponent s_k in the denominator of the right-hand sum.
- Sum total:** Points to the entire right-hand side of the equation.

Example: The \$15,000 loan will be paid off in 24 monthly payments of \$962.33 each. There is also a \$100 commission payable when the agreement is signed. Replacing:

$$\text{Payments} = \sum_{k=1}^{25} \frac{B_1}{(1+i)^{s_1}} + \frac{B_2}{(1+i)^{s_2}} + \dots + \frac{B_{25}}{(1+i)^{s_{25}}} = \frac{100}{(1+i)^{\frac{0}{12}}} + \frac{962.33}{(1+i)^{\frac{1}{12}}} + \dots + \frac{962.33}{(1+i)^{\frac{24}{12}}}$$



Formula explanation

Both sides of the formula are combined. In order to obtain the CAT, the numerical value of i satisfied by the equation is found:

$$15,000 = 100 + \frac{962.33}{(1+i)^{\frac{1}{12}}} + \frac{962.33}{(1+i)^{\frac{2}{12}}} + \dots + \frac{962.33}{(1+i)^{\frac{23}{12}}} + \frac{962.33}{(1+i)^{\frac{24}{12}}}$$

$$i = .5736$$

Therefore, the CAT corresponding to this loan is the value of i expressed as a percentage:

$$CAT = 57.36\%$$

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Source: <http://www.banxico.org.mx/sistemafinanciero/CalculoCAT.pdf>

* This equation is solved using numerical methods such as bisection and the Newton method.



Interest: This is the price paid for the funds. It is stated as a percentage.

$$\text{Interest} = \text{Loan amount} * \frac{\text{Annual interest rate}}{360} * \text{Days in period}$$

$$\text{Annual interest rate} = \frac{\text{Interest amount / loan}}{\text{Days in period}} * 360$$

To know whether an interest rate is reasonable, it should be compared with inflation, other interest rates and the 28-day Cete rate (reference rate).



Methods of charging interest

Lending institutions charge interest by applying one of the two most common methods:

- 1. Interest on outstanding balances:** it is calculated each period on the decreasing balance of unpaid principal. The periodical payment includes both interest for the period and an increasing percentage of the principal.
- 2. Global interest^{a/}:** it is calculated on total principal at the beginning of the loan and during its life without taking into account the reduction in principal for each period. There are two modalities:
 - ✓ **Without interest capitalization.** Interest is not added to the initial amount of the principal. To determine the periodical payment, capital and interest are divided by the number of payments. Each payment includes a constant part of both principal and interest.
 - ✓ **With interest capitalization^{b/}.** The interest is added or capitalized with the principal at the beginning of the loan and is considered part of it. Periodical payments are calculated by dividing this amount by the number of payments to be made. When early payments are made interest is paid which has not yet been accrued.

a/ **Not allowed by** PROFECO (Art. 69).

b/ **Not allowed by** LTOSF (Art. 9).

In the case of the global interest method, the lending institution can announce a lower interest rate than that lent if the interest were calculated on outstanding balances, and charge customers more interest.



Outstanding balances

Personal loan for \$10,000

Interest rate: 42% annually w/o VAT

Initial fee: \$200 w/o VAT.

13 weekly payments of \$813.42

Week	Initial balance	Interest	Principal payment	Fee	Payment	Outstanding balance on principal	Net flow of funds
0	10,000.00			200.00		10,000.00	- 9,800.00
1	10,000.00	80.77	732.65		813.42	9,267.35	813.42
2	9,267.35	74.85	738.57		813.42	8,528.78	813.42
3	8,528.78	68.89	744.54		813.42	7,784.24	813.42
4	7,784.24	62.87	750.55		813.42	7,033.69	813.42
5	7,033.69	56.81	756.61		813.42	6,277.08	813.42
6	6,277.08	50.70	762.72		813.42	5,514.36	813.42
7	5,514.36	44.54	768.88		813.42	4,745.48	813.42
8	4,745.48	38.33	775.09		813.42	3,970.39	813.42
9	3,970.39	32.07	781.35		813.42	3,189.03	813.42
10	3,189.03	25.76	787.66		813.42	2,401.37	813.42
11	2,401.37	19.40	794.03		813.42	1,607.34	813.42
12	1,607.34	12.98	800.44		813.42	806.90	813.42
13	806.90	6.52	806.90		813.42	0.00	813.42

Total amount payable: 10,774.48

Weekly IR: 1.1%
Annual IR: 57.4%
CAT: 77.1%



Outstanding balances vs. Global interest

	Outstanding balances	Global balances	Outstanding balances		Global interest		
			Week	Payment	Pending balance	Payment	Pending balance
Loan amount :	10,000.00	10,000.00	0	200.00	10,000.00	200.00	11,050.00
Initial fee:	200.00	200.00	1	813.42	9,267.35	850.00	10,200.00
Interest rate:	42.0%	42.0%	2	813.42	8,528.78	850.00	9,350.00
Payment:	813.42	850.00	3	813.42	7,784.24	850.00	8,500.00
Total amount payable:	10,774.48	11,250.00	4	813.42	7,033.69	850.00	7,650.00
CAT :	77.1%	147.8%	5	813.42	6,277.08	850.00	6,800.00
			6	813.42	5,514.36	850.00	5,950.00
			7	813.42	4,745.48	850.00	5,100.00
			8	813.42	3,970.39	850.00	4,250.00
			9	813.42	3,189.03	850.00	3,400.00
			10	813.42	2,401.37	850.00	2,550.00
			11	813.42	1,607.34	850.00	1,700.00
			12	813.42	806.90	850.00	850.00
			13	813.42	0.00	850.00	0.00

Using the **same interest rate**, the global interest methodology is **more expensive** and the outstanding balance can include interest not yet accrued.

The **CAT** enables the customer to decide which is the cheaper option.

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Rules and regulations

The Federal Consumer Protection Act states:

“Article 6. ...

Before entering into a loan agreement, the lender shall inform **the consumer of the Total Annual Cost (CAT)** in annual percentile terms.

This article takes Total Annual Cost to mean financing costs which, for informative and comparable purposes, include all costs and expenses related to a loan. The Total Annual Cost will be calculated using **the methodology established by Banco de México** for the type of loan considered in force on the calculation date.”

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Would you like to know more?

Law for the Transparency and Regulation of Financial Services.

<http://www.diputados.gob.mx/LeyesBiblio/pdf/LTOSF.pdf>

Act of Transparency and Promotion of Competition in Guaranteed Credit.

<http://www.diputados.gob.mx/LeyesBiblio/pdf/256.pdf>

General provisions of Articles 11, 12 and 13 of the LTOSF applicable to adhesion contracts, advertising, account statements and transaction receipts of:

Regulated financial entities.

http://www.cnbv.gob.mx/circularesbancarias.asp?circ_id=1&anio=2007&circ_asunto

Unregulated SOFOM.

http://www.condusef.gob.mx/PDF-s/marco_juridico/disp_sofomes.pdf

Commercial entities.

<http://www.profeco.gob.mx/juridico/DISPOSICIONES%20PFC27MAYO08.pdf>

Circular 21/2009 on the Total Annual Cost (CAT)

<http://www.banxico.org.mx/sistemafinanciero/disposiciones/dispDirigidasInstitucionesCredito/dispDirigidasInstitucionesBancaMultiple/Circular%2021-2009%20Reglas%20CAT.pdf>



Would you like to know more?

Circular 13/2007 limiting the charge of unaccrued interest.

<http://www.banxico.org.mx/tipo/disposiciones/OtrasDisposiciones/Circular%2013-2007.html>

Circular 14/2007 regarding interest rates.

<http://www.banxico.org.mx/tipo/disposiciones/OtrasDisposiciones/Circular%2014-2007.html>

Circular 16/2007 regarding early payments.

<http://www.banxico.org.mx/tipo/disposiciones/OtrasDisposiciones/Circular%2016-2007.html>

Circular 18/2007 regarding fee registration.

<http://www.banxico.org.mx/tipo/disposiciones/OtrasDisposiciones/Circular%2018-2007.html>

General Rules in the Act of Transparency and Promotion of Competition in Guaranteed Credit issued by the Ministry of Finance and Public Credit (SHCP).

<http://www.banxico.org.mx/ccth11/ReglamentoLT.htm>

Financial system glossary.

<http://www.banxico.org.mx/sistemafinanciero/didactico/glosariosisfin.pdf>