The Cost of Bank Credit Financing

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Abstract: Although the credit is a conventional financing method used by any company, this tool is by far a very significant issue. The range of credits, that a bank provides, and the current policy customize this tool in order to meet the typical financing needs of the enterprises that demands it. Considering the risks, the bank takes the charge of by placing credits, the "eligibility" terms of enterprises that can get such financing being very strict. Restrictions concerning the accepted degree of liability, the accomplished level of performance or available warranties may represent real "barriers" for many companies. Of all "barriers", the high cost of some financing tools is a good case in point. In order to have a clearer picture of what this financing source is for an enterprise, I have carried out a cost analysis of these financing tools, the medium and long term credit cost and the short term credit cost.

Keywords: conventional financing method, financing tools, long term credit

Jel Classification: E51, E62

The Costs of Medium and Long Term Credits

The bank loan on medium and long terms is a loan obtained from a bank or another financial institution and it has to be repaid for a period exceeding one year. This loan is usually negotiated directly between the one who requests the loan and the bank (or another financial institution – insurance company or other creditors). The period for granting this type of loan varies.

The medium and long term loan is an important source of financing companies. It is preferable to the short-term loan because it ensures a greater degree of safety to the borrower. Rather than having the care of the short-term credit renewal, the borrower may receive a structured credit on medium or long term, so that its deadline or payback term should coincide with the economic life of the asset that will be financed. Thus, the cash flows that will be generated by the financed asset can be used to refund the loan rates.

At engaging a medium or long term loan, the company must take into account three factors: (1) the cost with interest, (2) the guarantees required by the lender and (3) the way and the terms of repayment.

The main cost of a credit is the interest which the applicant must pay over the period for which the credit has been obtained. The typical way of expressing this cost is the interest rate that the banks show for each type of credit separately. This varies depending on the type of requested credit, as well as on the period for which it is granted. For certain types of credits, banks also calculate the credit risk margin that increases the cost of the credit for the enterprises characterized by a lower degree of profitableness, respective a weaker debt service.

The interest that the banks show for credits that can be contracted do not include the commissions that the credit applicants have to pay in addition. The banks also show the annual interest rate, and as result, the interest payment calculation must take into account the period in which payments are made to the bank. In these circumstances, it is necessary to estimate the proportional interest rate pertaining to the period for which the credit is granted (rdT) having as reference the number of days (360) corresponding to the banking year.

$$rdT = rd\ an\ \ x\ T/360$$

where: T = the period for which the interest calculation is made, expressed in days.

As a result, the interest payment for a loan is determined taking into account the interest rate at which the loan was contracted, the remaining unrepaid amount and the period for which it was granted. Its size varies depending on the chosen method of repayment. The most common loan repayment way is one that requires constant payments to the bank (annuity) during the duration of the loan. There can be found, however, other methods of reimbursement, such as loan repayment in constant rates or the fixed reimbursement.

To demonstrate the three types of refunds and the calculation of the interest payment, let us consider the following example. The "X" company contracts a loan to purchase a car. The loan is worth 10,000 euros, for a period of 5 years, and the interest rate at which it was contracted is 11.5%. To simplify the calculations it is assumed that the payment is made annually by the bank.

In the case in which the loan repayment is made at the end of the lending (finally) the total interest payment that a company has to pay amounts to 5,700 euros.

Example of a final repayment loan

Table 1

Period	Unrepaid credit balance	Interest	Main repayment	Annuity
1	10,000	1,150	0	1,150
2	10,000	1,150	0	1,150
3	10,000	1,150	0	1,150
4	10,000	1,150	0	1,150
5	10,000	1,150	10,000	11,150
Total	-	5,750	10,000	15,750

Where: Interest= interest rate x unrepaid loan balance x period

Annuity= Interest + Principal repayment

In the case in which the loan repayment is made in equal rates, the total interest repayment that a company has to pay amounts to 3,450 euros.

Sample of repayment in constant rates of a loan

Table 2

Period	Unrepaid credit balance	Interest	Main repayment	Annuity
1	10,000	1,150	2,000	3,150
2	8,000	920	2,000	2,920
3	6,000	690	2,000	2,690
4	4,000	460	2,000	2,460
5	2,000	230	2,000	2,230
Total	-	3,450	10,000	13,450

If the loan repayment is made by carrying out constant payments (annuities) to the bank, the total interest payment that a company has to pay amounts to 3,666.1 euros.

Example of repayment in constant annuities of a loan

Table 3

Period	Unrepaid credit balance	Interest	Main repayment	Annuity
1	10,000.0	1,150	1,589.8	2,739.8
2	8,410.2	967.2	1,772.6	2,739.8
3	6,637.5	763.3	1,976.5	2,739.8
4	4,661.0	536.0	2,203.8	2,739.8
5	2,457.2	282.6	2,457.2	2,739.8
Total	-	3,699.1	10,000.0	13,699.1

$$A = C \times i / (1 - (1+i)^{-n})$$

Where: A – annuity payment; C- credit size; I – annual interest rate, n – number of repayment years.

Main repayment = annuity – interest

From the analysis of the three methods of reimbursement, the most expensive for the enterprise seems to be the finally reimbursement, a case in which the total interest payment over the 5 years of life of the loan is of 5,750. But if it is taken into account the value of the money in time, it may be noticed that the cost loan size is the same regardless of its method of repayment and is equal to the contractual rate interest. The cost of the loan is its internal rate of profitableness. Thus the value of the loan is equal to the present value of the annuities of payment, estimated by that actualization with the loan cost. As a result, the loan cost may be revealed from one of the three calculation relations presented below:

$$10.000 = \frac{1,150}{(1+kd)} + \frac{1,150}{(1+kd)^2} + \frac{1,150}{(1+kd)^3} + \frac{1,150}{(1+kd)^4} + \frac{11,150}{(1+kd)^5}$$

$$10.000 = \frac{3,150}{(1 + kd)} + \frac{2,920}{(1 + kd)^2} + \frac{2,690}{(1 + kd)^3} + \frac{2,460}{(1 + kd)^4} + \frac{2,230}{(1 + kd)^5}$$

$$10.000 = \frac{2,739.8}{(1 + kd)} + \frac{2,739.8}{(1 + kd)^2} + \frac{2,739.8}{(1 + kd)^3} + \frac{2,739.8}{(1 + kd)^4} + \frac{2,739.8}{(1 + kd)^5}$$

With the help of the IRR function in EXCEL, the equations' solution may be established, i.e. 0.115 respectively of 11.5%. So the cost of the loan, when the supplementary commissions that must be paid to the bank are not taken into account, is equal to the fix interest rate, for which payment interests were calculated. The way of repayment does not affect its cost.

The Impact of Contribution Economies on the Credit Cost

"In the calculation relations of the loan cost, the annuities of repayment by the enterprise have been replaced with the effective annuities "backed" by it. By reducing the state tax payment, a portion of the interest payments are "supported" by the state. Thus, in the effective annuities calculations "supported" by the enterprise, the rate of payment from the loan and the tax saving net interest are taken into account."[1]

$$10,000 = \frac{1,150 \times (1 - 16\%)}{(1 + k'd)} + \frac{1,150 \times (1 - 16\%)}{(1 + k'd)^2} + \frac{1,150 \times (1 - 16\%)}{(1 + k'd)^3} + \frac{1,150 \times (1 - 16\%)}{(1 + k'd)^4} +$$

$$+ \frac{10,000 + 1,150 \times (1 - 16\%)}{(1 + k'd)^5}$$

Where k'd is the net loan cost of the tax saving achieved by the enterprise by deducting expenses with the interests from taxable incomes.

In my opinion a reduction of the loan cost may occur if there are taken into account the savings of contribution that the enterprise can obtain them from the expenditure deductibility with the interests. Thus, on the exemplified case, the loan cost is reduced from 11. 5% to 9.66% if it is considered the profit tax of 16%.

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[1] Victor Dragotă , *Practical Approach of the Company's Finances,* Irecson Publishing House, Bucharest, 2006, p. 198;

The Cost of the Credit Adjusted with the Payable Commissions

Another cost element of a loan from the bank is indicated by the commissions. Thus, at granting a loan, its transaction commission is calculated, representing 1 – 3% of the credit value and it must be paid at the moment in which the loan is granted. Another commission calculated by the banks is that of the credit count administration that is calculated at its balance account. In the conditions in which the company repays in advance the loaned amount, it will pay a credit non-using commission representing 1-2% of the earlier repaid amount.

In the case of the credits granted by the current account, the commissions' range is larger. In this case it is in addition to the commission for the credit that the company must pay the immobilization commission, the commission for the highest debit balance, the commission for the most overrun, the offset commission. Only by taking into account all these fees, the actual cost of the loan granted by the bank can be estimated.

Subsequently I am to present the calculation of the equivalent interest rate in the case of loan repayment in constant annuities:

$$10,000 - 10,000 \times 2\% = \frac{2,739.8}{(1+k''d)} + \frac{2,739.8}{(1+k''d)^2} + \frac{2,739.8}{(1+k''d)^3} + \frac{2,739.8}{(1+k''d)^4} + \frac{2,739.8}{(1+k''d)^5}$$

$k''d = $ = annual rate of equivalent interest

This calculation assumes, in fact, the determination of the equivalent interest rate which the firm pays for the received credit. On the case of the previous exemplified loan, considering a transition commission of the credit of 2% calculated for the granted sum, there is an increase of the loan coast from 11.5% to 12.31%.

The Cost of the Loans Guaranteed by Setting up a Collateral Deposit

"The common method used to guarantee a credit received from a bank inheres in setting up a collateral deposit having a size equal to that of one or more rates that the firm has to pay. The capitalized interest for that deposit is very small and, as a result, the company has additional costs by tying its money in that deposit."[1] To show on what grounds this type of credit cost is based, in the case of the previously exemplified loan, it is assumed that the company must constitute a collateral deposit

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[1] Ileana Nişulescu , *Company Financing*, Infomega Publishing House, Bucharest, 2006, p.78.

of 5,000 euros which will be capitalized with an annual interest of 3%. The time length of the deposit creation is equal to that for which the credit is provided (in this example, it is of five years), and the opportunity cost of the invested capital in the company is of 18%.

Example of reimbursement in constant installments of a collateral deposit loan

Table 4

Period	Unrepaid credit balance	Interest	Main repayment	Annuity	Interest collateral deposit	Total of payment
1	10,000	1,150	2,000	3,150	150	3,000
2	8,000	920	2,000	2,920	150	2,770
3	6,000	690	2,000	2,690	150	2,540
4	4,000	460	2,000	2,460	150	2,310
5	2,000	230	2,000	2,230	150	2,080
Total	-	3,450	10,000	13,450	750	12,700

In case in which we take into account the tax savings, the credit cost with collateral deposit can be estimated as:

$$10,000 = \frac{(1{,}150\text{-}150) + 2{,}000 + 5{,}000 \times (18\% - 3\%)}{(1 + kd)} +$$

$$+ \frac{(920\text{-}150) + 2{,}000 + 5{,}000 \times (18\% - 3\%)}{(1 + kd)^2} +$$

$$+ \frac{(690\text{-}150) + 2{,}000 + 5{,}000 \times (18\% - 3\%)}{(1 + kd)^3} +$$

$$+ \frac{(460\text{-}150) + 2{,}000 + 5{,}000 \times (18\% - 3\%)}{(1 + kd)^4} +$$

$$+ \frac{(230\text{-}150) + 2{,}000 + 5{,}000 \times (18\% - 3\%)}{(1 + kd)^5}$$

Where: kd = the credit cost guaranteed with a collateral deposit

In my opinion, in order to estimate the cost of this type of credit, one must take account the loss that the company has by placing its capital (5,000 euros) at a rate interest of 3%, if the profitableness of its investing this money is of 18%.

The Cost of Short-Term Bank Loans

When the firm's financing needs grow, the company demands from its bank to provide additional funds in accordance with these needs. The period of granting the banking loan for short-term financing is of up to one year.

The bank interest rates do vary significantly in time, depending on the general economic conditions and on the central bank policy. When the economy is in recession, the demand of credits is typically modest in the banking system. Consequently, the interest rates for all types of credits fall off. Conversely, when the economy is gaining momentum, the demand for loans is naturally strong, and the central bank restricts the money supply; the result is an increase in interest rates.

Because interest rates of bank loans may refer to a simple interest, a formerly calculated interest (calculated and paid at the granting of the loan) and the interest paid in rates, the cost of the bank credit is also different in each of these cases.

a) **The credit costs with simple interest.** The simple interest is applied for many banking credits and in the same time, it provides the comparison base for other types of credit rates. In the case of a credit with simple interest, the borrower receives the nominal value of the credit and repays at maturity this value and the afferent interest.

The cost of a credit with simple interest is calculated in two steps[1]:

-   of all, the paid interest is calculated by using the formula:

Interest = amount of the borrower x annual rate of the interest x loan period

-   the credit cost is calculated using the formula:

[1] Ion Stancu ,*Finance, Financial Markets and Portfolio Management, Real Investments and Their Financing, Analysis and Financial Management of the Company,* Economic Publishing House, Bucharest, 2002, p .122.

$$k = \left[1 + \text{cost in the absolute sum of funding/ financing net sum }^{m} - 1 \right]$$

Where "m" is the number of time periods included in a year

For example, we suppose that a firm incurs a bank loan of 100,000 RON on a period of 120 days, for which the bank charges an annual interest of 15%. The absolute amount of the interest is determined by the formula shown as:

D = 100,000 x 0.15 x 120/360 = 5,000 RON

With the help of the formula we get the percentage cost with the loan interest:

$$K = \left[1 + 5{,}000/100{,}000 ^{360/120} \right] - 1 = \quad 15.76\%$$

To note that for a simple interest credit granted for one year or longer, the nominal rate is equal to the effective rate. If the loan has a term of less than one year, the effective rate will be higher, due to the effect of compounding.

b)   **The cost of the ante-calculated interest loan** refers to the cases in which the interest is determined and retained once the loan is committed. Therefore, the borrower receives less than the loan amount equal to the sum of the interest. In our case, the company that requested a loan of 100,000 RON will receive only 95,000 RON, and the percentage cost obtained according to the above formula is of 16.63%.

c)   **The cost of the credit with repayment in equal monthly amounts** (including both part of the loan and part of the interest) involves finding the discount factor for annuities and then, from the tables, finding the monthly rate to be multiplied by 12 so as to determine the annual rate of the interest, which is the cost of the credit.

The effective annual interest rate for a repaid credit with the interest in equal monthly rates can be approximated with the formula:

Approximate effective rate = interest / (loan amount / 2)

d)   **The cost of the credit with variable rate of the interest** is determined by using the previous formula, and in this case there must be calculated the total interest paid according to the different periods and the interest rates corresponding to them.

For example, I consider the credit of 100,000 RON for 120 days with variable interest according to the following table:

The ratio of interest	No of days	The cost with interest
15%	60	2,500
15.5%	40	1,722.222
16%	20	888.888
Total	120	5,111.110

Using the previous formula, we can find the credit cost, which in this case is of 16.13%.

e)   **The cost of the credit line** is also determined by using the previous formula, and in this case it should be added to the cost with the interest and commission determined by the neutralization of the credit line entirely, thereby achieving the cost in absolute amount. To determine the net amount of funding, the net average sum of the financing is estimated, depending on the amount committed on different periods.

To illustrate it, we assume that the firm negotiates with its bank a credit line of 200,000 RON for a period of 120 days, with an entire line neutralization commission of 0.5% per year and an interest rate of 12% per year. For the first 100 days, the company retains 100,000 RON from the line, and for the other 20 days it still undertakes 30,000 RON. There turns up the problem of calculating the total cost of the credit line. The solution requires the completion of several stages:

- the absolute amount of the neutralization commission is calculated:
    - commission of neutralization = unused amount x neutralization commission x the corresponding period
    - the commission for the first 100 days = 100,000 x 0.005 x 100/360= 138.888 lei
    - the commission for the next 20 days = 70,000 x 0.005 x 20/360 = 19.444 lei
- the interest is found
    - the interest for the first 100 days = 100,000 x 0.12 x 100/360 = 3333.333 lei

- the interest for the next 20 days = 130,000 x 0.12 x 20/360 = 866.666 lei

• the net average amount of funding is calculated

- net average amount of funding = 100,000 x 100/120 + 130,000 x 10/120 = 105,000 lei

Based on the obtained data, applying the previous formula, we find the cost of the credit line that is of 12.97%.

f)   The cost of the discount credit

The discount credit assumes the obtaining of resources from a bank or another financial institution on the grounds of trade effects held by the company. By discounting them, the company obtains resources for along the period that lasts until the maturity of the titles. Their size is equal to the value of the discounted titles for the remained period until maturity. The effective duration of the discount credit is equal to the period until the maturity of the discounted commercial effects, reduced with the number of discounted days (required for entering the money into the company account). Starting from these characteristics, the credit cost is estimated as follows:

Discount= the value of the commercial effects x the tax of the discount x duration of the credit

 360

Size of the discount credit = the value of the discounted commercial effects – Discount

The cost of the discount credit   =   Discount   × 360

Size of the discount credit   Duration of the credit – Nr. Bank days

For example, in the conditions in which an enterprise discounts commercial effects in value of 10,000 RON having a remaining maturity period of 30 days, the discount tax charged by the bank is of 14% and the number of days of offset is 3, the cost of the received discount credit is of 15.73%.

In conclusion, to present a more relevant amount of information pertaining to the debt of a company resulted from long term loans, I think that in the moment of contracting the loan, there could be adopted the solution of calculating and recording the interest for all the credit duration, with taking into account the possible fluctuations of the interest rate. In these conditions, any user of accounting information would have a precise and in the same time real image on the level of average and long term debt of the enterprise having contracted a bank credit, the interest being a distinct element within the scope of liabilities.

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