

METHODS USED BY BANKS WHEN TAKING MEDIUM TERM AND LONG TERM FINANCING DECISIONS

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Abstract:

Banks contribute through their work to financial developments as they ensure at least the necessary structure for the market economy. The lending activity of banks takes place in accordance with the national regulations specific to each country individually and it supports the facilitation of the business conduct as well as of the one belonging to non-financial clients. The lending methodology varies from one bank to another depending on the national policy of each one and also on the policies specific to the Central Bank existent in each country. The loan lending process requires a detailed analysis on the behalf of the bank so as to cover the default risk. The purpose of this paper is to examine the possible methods used by banks with the purpose of estimating the cash flows and the related growth rates for those medium-term and long-term loans granted to legal entities.

Key words: credit, risk, analysis method, cash flow, growth rates

JEL classification: C02, G21

1. Introduction

The Lending operation (Bosno C., Dardac N, 2002) is the act by which the bank provides to the- or they submit to the obligation of making available to customers the requested funds or of a commitment by signing for them.

The literature provides various definitions of the concept of 'bank loan'.

While French economists refer (Masson J, 1998) to the credit specific to small and medium entities, they define it as "the amount of money which an entity gets from a bank when the circulating asset within the balance sheet is not entirely funded by receipts from suppliers and from various creditors and when such a failure is not covered by the working capital".

A broader definition of the credit is given within the documents of the European Central Bank: "... the relationship between a person or a legal entity named 'creditor', who grants a loan of money or selling goods / services on credit to another person named borrower, generally at a rate determined by the risk assumed by the creditor or by debtor's reputation ". In Romania, the official definition of the credit is given by the OUG 99/2006 on credit institutions and capital adequacy , as it follows: "The credit represents any payment commitment made in return for the right to refund the paid amount of money as well as the correspondent interest rate or any other expense related to this amount, or any extension of the maturity of a debt and any purchase commitment of a security that incorporates a claim or other right when paying an amount of money."

In the case of those medium and long term loans, which are granted to those customers who are legal entities, banks are required to perform an analysis on firm's forecast. The way in which this is done varies from one bank to another depending on the internal politics of each. In this paper, we set as objective to approach possible methods which banks can use when performing the analysis on firm's forecasts in a theoretical as well as a practical manner.

2. The analysis of the firm's forecasts

The goal of the analysis of the firm's forecasts is to identify the risk which banks grant for, to determine all the sources of credit recovery as well as shareholders' degree of business sustainability.

The analysis has to rely on a series of pieces of information regarding the evolution and the perspective of the branches and sectors of activity which shall correspond to the needs of the banking society and its clients. These are the pieces of information that banks should rely on when taking medium-term and long-term financing decisions.

Any society is represented, on one hand, by a number of tangible and intangible assets and on the other hand, by various other development opportunities reflected in investments made or projects which can be achieved in the future. Hence, we conclude that the value of the society is set by the amount of the assets that it holds as well as by the added value resulted from future projects.

Even though banks demand to clients a series of documents as: the analysis of the cash flow, the projection of the investments, marketing research, investment programs, etc., the share of the firm's future analysis within the lending decision is minimal. The analysis of the firm's history relying on credit worthiness and collateral underlie the financing decision even in the case of the investments. We can say that this approach to the credit analysis led many banks to wrong decisions and it got to an accumulation of a large number of overdue loans in their portfolio.

The banking entities perform forecasts based on the analysis of the cash-flow in the case of credits granted for exploitation activities as well as based on the investment program of the credits granted for investment activities.

The cash-flow emphasizes the final goal of an economic activity: the achievement of a cash-flow through which the invested capital is recovered within the economic process in question. The cash-flow's structure has as objective the analysis of the entity's financial independence and its ability to get indebted with the purpose of granting future needs for current operations. The cash-flow assures the connection between the balance sheet and the profit and loss account issued by the entity for two consecutive periods and its analysis allows the credit analyst to evaluate the amount of cash generated by its use.

For the credit analysts, the analysis of the cash-flow is the most relevant indicator for establishing the failure of an entity. For a bank, the analysis of this indicator is very important because the payment of debts, wages and duties isn't possible without a cash-flow. The cash-flow doesn't mean profit. For example, a low profitability or in decrease wouldn't necessary bring to a low cash-flow. If the society sells very less from its own production, it can generate cash from the sale of the equipments. Moreover, if stocks of end products are sold, but there's no supply with raw materials, in this case, the society preserves its cash-flow, comparatively with another society which has the same profit margin, but which doesn't preserve its cash-flow because it continues to purchase raw materials. The credit analyst must understand the cash-flow and he/she must be more interested in this than in the profit itself because the reported profit can be easier "embellished" than the cash-flow.

The investment program is used as an analysis instrument of the firm's forecasts by banks in the case of the credits granted for investments. This program has as goal the identification of the investment needs correspondent to the trader and the presentation of the resources assembly which the society holds, with the purpose of establishing the need to be financed by bank.

As far as the analysis of the suggested investment program is concerned it's not enough to estimate its financial flows. It's necessary to study at the same time the correlation between the flows and the interaction between the current investments and

the opportunities regarding future investments (treated generally through real options). The program consists of a quantitative study as well as a qualitative one.

1. *The qualitative study.*

First, the investment program will be analyzed and argued from the following perspectives:

- commercially: does the investment respond to the order? Or will it contribute to the improvement of the existent product? Or will it assure the subsequent development of the entire society?
- financially: which is the share of the financed investment within the total of society's investment program?
- profitability: will the investment allow a profitability improvement?

2. *The quantitative study*

It's about the study of the forecasts related to the lending period, the society's needs and resources, depending on the pieces of information supplied by the leader of the society which requests the credit. This is issued based on the financial statements and on the extra-accounting pieces of information, as starting point, during the upcoming years. Therefore, it's a timetable of the ins and outs of capital which affect the balance sheet's structure: the assets and the increase of the necessary working capital, the estimation of own funds and the necessary resources for being attracted.

As far as the setting up of the cash-flow's growth rate is concerned used within the assessment of the investment projects, there can be more versions and patterns, each one of them starting from one of the following elements:

- The extrapolation of the historic growth rates
- Estimations of the growth rate achieved by experts
- The fundamental politics of the company

The idea of using a composite growth rate is accepted in order to achieve as realistic values as possible. Damodaran stated that the success of an assessment consists in mixing the achieved estimations of the experts concerning the growth rate with the fundamental elements within the policies of the entity.

3. Mathematical methods used regarding the growth rate forecast

Further on, we present the three patterns regarding the growth rate forecast:

1. *The growth rate forecast based on historic pieces of information*

- the average of the historic growth rates:

$$\sum_{t=-n}^{-1} g_t / n \quad , \quad \text{where } g_t = \text{the growth rate for year } t$$

It has as disadvantage the subjective choice of time.

- the geometric average of the relative change of the profit per share (EPS):

$$[EPS_0 / EPS_{-n}]^{(1/n)} - 1$$

Disadvantage: the geometric average neglects the evolution of the EPS within the interval (-n, 0)

- The pattern of lineal regression:

$$EPS_t = a + b * t,$$

where b= EPS' complete modification

- The pattern of log-lineal regression:

$$\ln (EPS_t) = a + b * t,$$

where b = EPS' relative modification

The lineal and the log-lineal patterns have both the advantage that they don't contain the calculation of errors (shocks) which is put in the explanation of the actual value.

The extrapolation of the historic growth rates must be achieved with caution as these are influenced by: the variation of the growth rates from the past, the dimension of the entity and major changes within its policies, the economic cycle, etc.

- The patterns ARIMA-type

The patterns ARIMA-type require long term series, which are most of the time unavailable.

II. The forecast of the growth rates achieved by experts

- Pieces of information specific to the company (which became public after the last report of the financial results);
- Macroeconomic results on growth rates (estimates regarding the evolution of the GDP (gross domestic product), of the interest's rate, inflation rate);
- Pieces of information regarding the competitors (projects, actions for the future);
- Privileged pieces of information (information that investors don't have access to);
- Public pieces of information (other indicators apart from the net profit and EPS) for performance measurement.

III. Elements causing profit growth

- Taking into consideration the share's reinvestment rate basis (b) and the profitability of the equities (ROE):

$$g_t = CPR_{t-2} * \frac{ROE_t - ROE_{t-1}}{RN_{t-1}} + b * ROE_t$$

$$g_t \text{ (the growth rate of the net result)} = (RN_t - RN_{t-1}) / RN_{t-1}$$

$$RN_{t-1} = CPR_{t-2} * ROE_{t-1} \text{ and } RN_t = (CPR_{t-2} + b * RN_{t-1}) * ROE_t$$

$$g_t = \frac{(CPR_{t-2} + b * RN_{t-1}) * ROE_t - CPR_{t-2} * ROE_{t-1}}{RN_{t-1}} =$$

$$= \frac{CPR_{t-2} * (ROE_t - ROE_{t-1}) + b * RN_{t-1} * ROE_t}{RN_{t-1}} = CPR_{t-2} * \frac{ROE_t - ROE_{t-1}}{RN_{t-1}} + b + ROE_t$$

and CPR = the accounting value of the equities

whenever $ROE_{t-1} = ROE_t \Rightarrow g_t = b * ROE_t$

- The effect of the financial lever on ROE:

$$ROE = ROA + DAT / CPR * [ROA - R_d * (1 - \tau)]$$

$$ROA = EBIT * (1 - \tau) / AT = [RN + \text{int } \text{erest_rates} * (1 - \tau)] / AT,$$

where:

- AT = the accounting value of total assets;

ROA = the economic profitability rate or the rate of the total assets ;

DAT/ CPR = the financial lever

R_d = interest rate

- The growth rate of capital's cash flow is $g = b * ROE$ and for the firm's cash flows is $g = b * ROA$

The application of the patterns presented above involves caution in regards to their interpretation. By using a regression pattern in which the dependent variable is the growth rate, Chan, Karceski and Lakonishok performed a study for the American companies rated during 1951-1998. The conclusion which they reached after the study was that there is certain predictability in regards to sales, but this doesn't necessarily involve an increase to the same extent of the incomes because the increase of incomes can be influenced by big discounts and different commercial policies.

The growth rate incomes' long term predictability is very low and the pattern proposed by the three authors previously mentioned emphasizes only 3% from the five year variation of incomes. The economic explanation is that the pressure of the competitors corrects the extremely high growth rates of profitability by the presence of new competitors and extremely low by giving up non-profitable activities. In a competitive environment, profitability's adjustment towards an average rate, on industry or economy is possible faster if this is somewhere under the average and further from this. (Fama E. F., French K. R., 2000)

The companies which have a lower profitability are motivated to allocate resources for the efficient use or to reproduce technology or products to more profitable competitors. This tendency can be explained taking into consideration the accounting decisions, so that, the companies which use conservatory policies have the tendency to report immediately losses, while the profits are allocated on many periods and that's why the profitability tends to change faster when it's lower.

In the industries with high long-term growth rates (example: technology or the pharmaceutical products), the persistence on long-term of these rates refers to sales, while for the variables related to incomes, the persistence of the growth rates isn't so powerful).

Neither do the rates regarding the market value prove to be a better solution because they don't have the ability to make the difference between the companies with high future growth rates and the ones with low growth rates. The assessment on market is done taking into consideration the historic rates: the companies which registered in the past high growth rates are highlighted with big market values while the companies with low historic growth rates are emphasized by a low market value.

Once the growth rates of the cash-flows and the setting up of the updating rate are estimated, it's required to use the updating method of the available cash-flows. This method doesn't take into consideration the incertitude of the pattern's parameters and hence a underestimate of future cash-flows and of the value of the project as well as of the updating rate's value in case the last is calculated as an internal profitability rate. Actually, the estimated financial flows are higher than the value subsequent to the current cash-flow's extrapolation multiplied by an estimated growth rate.

Therefore, future cash-flows can't be estimated in an independent manner for each year individually, because of the serial autocorrelation of the growth rates (g_t). In order to correct this inconvenient, Booth proposes a pattern which can capture the incertitude of the growth rate on the value of the future financial cash-flows.

The easiest process which captures this characteristic is:

$$\text{AR}(1): g_t = (1 - \rho) * g + \rho * g_{t-1} + \varepsilon_t, \text{ where:}$$

ρ - the serial correlation coefficient;

ε - the alleatory error, usually distributed with Zero average and dispersion σ^2

The estimated value of the cash-flow after a while is:

$$E(CF_1) = E(CF_0 * (1 + g_1)), \text{ and after two periods is:}$$

$$E(CF_2) = E(CF_0 * (1 + g_1) * (1 + g_2)) = CF_0 * (1 + E(g_1)) * (1 + E(g_2)) + CF_0 * \text{cov}(g_1, g_2)$$

The attention of the author is oriented towards the growth pattern in one stage, belonging to Gordon, in which the growth rate is constant $E(g_t) = g$, that means :

$E(CF_2) = CF_0 * (1 + g)^2 + CF_0 * \rho * \sigma^2$ and it is notable that in case the growth rates are correlated positively ($\rho > 0$), $E(CF_2)$ will be bigger than $CF_0 * (1 + g)^2$, estimated without taking into consideration the autocorrelation.

Starting from the same hypothesis, Booth sets up a generalized pattern which has a constant growth rate :

$$E(CF_T) = E(CF_{T-1}) * (1 + g) + \text{cov}(CF_{T-1}, g_T)$$

Developing this expression, it results that the value of the coefficient CF_0

is:

$$CF_0 = 1 + g + \rho * \rho^2 + (1 + g)^2 * \rho^2 * \sigma^2 + (1 + g)^2 * \rho^3 * \sigma^2 + \dots + (1 + g)^{T-2} * \rho^{T-1} * \sigma^2$$

This coefficient can be written as a sum of an arithmetical progression as it follows:

$$CF_0 * \left[1 + g + \frac{\rho * \sigma^2}{(1 - (1 + g) * \rho)} \right] = CF_0 * (1 + g^*)$$

where g^* = the growth rate adjusted in accordance with the autocorrelation coefficient and the dispersion of the alleatory error.

This adjusted rate g^* isn't the growth rate itself but one built so that it comprises the impact of the growth rate's incertitude from the first period on the estimated value of all future cash-flows.

The other terms can be written again in a similar way so that :

$$E(CF_T) = CF_0 * (1 + g^*)^T$$

The assessment pattern from only one period has the same form, just that this time it's used the adjusted growth rate:

$$VA = \frac{CF_0 * (1 + g^*)}{k - g^*}$$

where VA – the updated value of the cash-flows

k- the updated rate of financial flows

4. Case study

In order to classify the patterns aforementioned, we'll consider the case of a society that has as scope of activity the production of plastic products and it pursues to purchase a production line at a cost of 10.100 euro. Its use will generate an extra cash-flow, which, at the moment of the acquisition is assessed at 950 euro and which will grow annually with a constant rate of 5%. The updating rate of the financial flows for this project is estimated at 15%. Whenever the growth rates are correlated (we'll consider 3 values for ρ , as it follows : 0,2; 0,4 și 0,6), and the deviation, squared average can have values of 5%, 10%, respectively of 15%, we'll have to take into consideration the possibility to achieve the investment in two situations :

Situation I : When there's a negligence of the incertitude regarding the growth rate (Gordon's classic pattern) :

The updated value will be calculated by the following formula in accordance with Gordon's pattern :

$$VA = \frac{CF_0 * (1 + g^*)}{k - g^*} = \frac{950 * (1 + 0,05)}{0,15 - 0,05} = 9.975euro$$

In comparison with the cost of the production line which is 10.100 euros there is a negative difference of 125 euro showing up, fact which leads to the rejection of the decision regarding the achievement of the analyzed project.

$$VAN = 9.975euro - 10.100euro = -125 euro$$

where VAN = the net value surplus brought by the investment in the production line

Situation II When the incertitude of the growth rate is taken into consideration (Booth pattern). First, the adjusted growth rate will be determined, for the case of the average values for deviation and the correlation coefficient ($\rho = 0,4$ and $\sigma = 10\%$)

From the formula :

$$CF_0 * \left[1 + g + \frac{\rho * \sigma^2}{(1 - (1 + g) * \rho)} \right] = CF_0 * (1 + g^*)$$

It results that the adjusted growth rate will be determined by the following formula :

$$g^* = \left[g + \frac{\rho * \sigma^2}{(1 - (1 + g) * \rho)} \right]$$

Substituting the data from the aforementioned formula, we obtain:

$$g^* = \left[0,05 + \frac{0,4 * 0,1^2}{(1 - (1 + 0,05) * 0,4)} \right] = 0,05689 = 5,69\%$$

The updated value will be calculated by the following formula:

$$VA = \frac{CF_0 * (1 + g^*)}{k - g^*} = \frac{950 * (1 + 0,0569)}{0,15 - 0,0569} = \frac{1004,055}{0,0931} = 10.785euro$$

Under these circumstances VAN = 10.785 euro - 10.100 euro = 685 euro. We obtained a positive value which changes the initial decision and the adoption of the project can be recommended. The achieved scenario is an average one and implies risks in regards to the accomplishment of forecasted cash-flows. This is the reason why the analysis must be extended and for the extreme values that ρ and σ can take, in order to have an overall image on the sensitivity of this project when changing these parameters, under these conditions of incertitude. The results of the calculus will be summarized in figure no. 1.

Section I : The adjusted growth rate g^* (%)

σ	ρ		
	0,2	0,4	0,6
0,05	5,06	5,17	5,41
0,1	5,25	5,69	6,62
0,15	5,7	6,55	8,65

Section II : VAN for the analyzed project (Euro) :

σ	ρ		
	0,2	0,4	0,6
0,05	- 60	63	342
0,1	155	685	1.987
0,15	701	1.879	6.151

Figure no.1 - The investment analysis of the project in accordance with Booth's pattern

In section I the values of the adjusted growth rate can be found for each from the nine possible scenarios concerning the correlation coefficient and the dispersion. We can notice from the performed calculations that the adjusted growth rate is superior to 5%, value which was previously estimated. It fits between 5,06% and 8,65%. The strongest is the autocorrelation and the higher is the dispersion, the more important is the adjustment.

Section II emphasizes the surplus of net value brought from the investment within the line production which is necessary to the society specialized in obtaining plastic products. The calculations show that only in case error's autocorrelation is weaker than $\rho = 0,2$ and the dispersion lower than $\sigma = 5\%$, is the VAN negative. This fact is due to that scenario closer to Situation I, in which the uncertainty concerning the evolution of the growth rate was ignored. In the rest of the cases, VAN is positive and is bigger and bigger once with the growth of ρ , respectively σ .

5. Conclusions

The lending decision depends on various factors as we've previously mentioned during this presentation. The estimation of the cash-flows and of their growth rates, in the case of the analysis of long-term and medium-term credits represents an extremely important step. The more accurate are the estimations regarding elements from the cash-flow's determining pattern, respectively the updating rate, the higher is the quality of the achieved results. Banks can use various methods in regards to the analysis of the cash-flow, but the environment in which the variables included in the mathematical pattern act is crucial for the quality of the results. In case the economic environment is uncertain, it is difficult to perform a reliable analysis which can help to granting a medium-term or long-term credit, in the case of non-financial clients.

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BIBLIOGRAPHY

1. Bosno, C. ; Dardac, N. 2002. *Banking management*, The Economic Publishing House, Bucharest City, Romania,
2. Booth L., 2003 „Discounting Expected Values with Parameter Uncertainty”, *Journal of Corporate Finance*, vol.9, no5(October),505-519;
3. Chan L. K. C Karceski J., Lakonishok J., 2003 „The Level and Persistence of Growth Rates”, *The Journal of Finance*, vol 58, No.2(pril) 643-684;
4. Damoradan A., 1994 „Damoradan on Valuation. Security Analysis for Investments and Corporate Finance”, John Wiley Sons Inc., New York;

5. Damoradan A., 2002 „*Investment Valuation. Security Analysis for Investment and Corporate Finance*” John Wiley & Sons Inc, New York;
6. Damoradan A., 2002 „*Investment Valuation*”, Second Edition, John Wiley & Sons Inc., New York;
7. Fama E. F., French K., R. 2000 „*Forecasting Profitability and Earnings*” The Journal of Business, Vol 73, No2
8. Myron G. J., Shapiro E., 1956 „*Capital Equipment Analysis. The Required Rate of Profit*”, Management Science, vol 3, March 102-110;
9. Masson, J., *Les credits bancaires aux entreprises*, La Revue Banque, Paris 1988, pg .38
10. The legal status of the European Central Bank, chapter. « Credits », page no. 58
11. Law no. 227/2007 approving Government Emergency Ordinance no.99/2006 on credit institutions and capital adequacy