THE EVALUATION AND THE PREVISION OF THE FINANCIAL RISK

EVALUAREA ŞI PREVIZIUNEA RISCULUI FINANCIAR

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Abstract: *The purpose of the present paper is the evaluation and prevision of the financial risk using the mathematical models. The financial risk, or the risk of capital, is bounded by the mode in which the enterprise's results changes according to its financial structure - that means that an increase of the borrowed capitals will lead, because the fact that these capitals generates (through the interest) financial expenses, to an increase of the financial risk level and vice versa. The two capital expressions which are available for a firm (own and borrowed capitals) are different looking their remuneration level (the borrowed capital remuneration is smaller than the own capitals one). In that case, is normal, for the enterprise, to use, for the profitableness increase, borrowed capitals. The situation supposes an automatic increase of the financial risk. The fact has negative effects for the shareholders which will demand an increase of the own capitals which will cover the one of the risk.*

Rezumat: *Prezenta lucrare îşi propune reliefarea realizarea unei evaluări şi pre-viziuni ale riscului financiar cu ajutorul modelelor matematice. Riscul financiar sau de capital este legat de modalitatea în care variază rezultatele întreprinde-rii în raport cu structura financiară a acesteia în sensul că o majorare a capi-talurilor împrumutate va conduce, datorită faptului că acestea sunt purtătoare de dobânzi ce vor lua pentru firmă forma unor cheltuieli financiare, la o majo-rare a nivelului riscului financiar şi vice versa. Cele două expresii ale capita-lurilor de care dispune o societate (proprii şi împrumutate) prezintă diferenţe în ceea ce priveşte nivelul lor de remunerare în sensul că, de regulă, remunerarea capitalurilor împrumutate este inferioară celei a capitalurilor proprii. În aceste condiţii este normal ca întreprinderea să recurgă, pentru creşterea rentabilităţii, la capitaluri împrumutate. Situaţia atrage după sine însă o creştere automată a riscului financiar fapt ce îi nemulţumeşte pe acţionarii care se văd îndreptăţiţi să solicite o creştere a rentabilităţii capitalurilor proprii care să o acopere pe cea a riscului.*

MATERIAL AND METHOD

The financial risk or the capital one is bounded by the mode in which the results of the enterprise vary according to its financial structure. In other words, an increase of the borrowed capital will lead, because of the interests who takes, for the firm the aspect of certain financial expenses (for a risk increase and vice versa). The two expressions which exists for the firm capital (own and borrowed) presents differences looking their remuneration in sense that the remuneration of the borrowed capitals is inferior to the one of the own capitals. In these conditions, is normal for the enterprise to resorts, for the profitableness increase, to the borrowed capitals. The situation suppose, automatically, an increase of the financial risk which mean the stockholders

dissatisfaction. The last one requests an increase of the own capitals profitableness over the one of the risk.

RESULTS AND DISCUSSIONS

The efficiency of the indebted policy express, according the financial profitableness, depends by the relation which exists between the economic profitableness and the interest's instalment, such as the following cases: for the situation when the economic profitableness is superior to the interest's instalment, the increase of the indebted degree will lead to the increase of the financial profitableness; for the case when the economic profitableness is inferior to the interest's instalment, the increase of the enterprise's indebted degree will suppose the decrease of the financial profitableness.

Met in the speciality literature as capital risk, the financial risk appears as effect of the enterprise's appeal to the alternative which suppose the finance of its activity through credits. For the financial risk valuation, the economic-financial analysis use the *financial lever coefficient* which will quantify the financial exercise's clear result modification, for the situation of the exploitation's result modification. The impact of the financial expenses over the financial lever coefficient is making evident even by it's determination mode, according to the equation:

$$\mathbf{FLC = (\Delta\ CR/CR)/\ (\Delta ER/ER),}$$

where: FLC represent the financial lever coefficient; ΔCR - the relative variation of the clear result; CR - the financial exercise's clear result; ΔER - the relative variation of the exploitation activity's result; ER - the xploitation's result.

The non implication of the financial incomes and of the extraordinary result in the ordinary activity lead, for the financial lever coefficient, to the following formula[1]:

$$\mathbf{FLC = (ER - FE + FI - ExtR)(1-i),}$$

where: FE represent the financial expenses; FI - the financial incomes; ExtR - the extraordinary result.

Because the exploitation activity do not suppose financial and extraordinary elements, if we give up to it for the relation which describe the financial exercise's clear result we will obtain the expression: **FLC = ER / (ER – FE)**

The last relation make evident the impact of the financial expenses over the financial lever coefficient (when the financial expenses increase, the financial lever coefficient increase and have as effect, the risk increase). In other words we can say that the financial lever coefficient represents nothing else than the image of the effects produced over the financial profitableness by the enterprise's loans contraction. According to the modifications of the financial lever coefficient calculus elements, that coefficient can takes the following values: **FLC = 1** (for the case when the ER – FE = ER – in that case, the financial expenses are zero because the enterprise do not use the indebted policy to finance its activity; in these conditions the financial risk does not exists and the clear result register a similarly evolution with the one of the exploitation's

[1]Petrescu Silvia, Mironiuc Marilena, *Analiza economico-financiară, Teorie şi aplicații*, Editura Tiparul, Iaşi, 2002, p. 220.

result (ICR = IER); **CLF = 0** (in that case, the relation which describe the financial lever coefficient is zero when its denominator goes to the infinite, or when the numerator is zero; for the first case, how the exploitation's result have, always, a finite value, exists the possibility of that interpretation only for the case when the financial expenses are very big, fact which suppose a very big financial risk; **CLF** $\rightarrow \infty$ (is the case who suppose the existence of a zero denominator, in the relation which describe the financial lever coefficient; in other words, the exploitation's result is absorbed by the financial expenses, for its remuneration; in that case, the financial risk value is maximum and the enterprise's survival is in danger).

An other approach for the financial risk is the one which suppose the calculus and the comparison of a chain of financial profitableness instalments. That instalments category includes: the financial profitableness instalment (FR), the economic profitableness instalment (EcR) and the interest's instalment (II). As calculus mode, these instalments can be calculated in the following mode:

$$\mathbf{FR = Rexe / OC,}$$

where: FR represents the financial profitableness instalment; Rexe - the exercise's result (rough or clear); OC - own capitals.

The values of that economic profitableness instalment offers informations looking the activity's finance mode and can be determined in the following mode:

$$\mathbf{ER = ER / A}$$

where: ER represents the economic profitableness instalment; ER - the exploitation result. The bound which exists between the two instalments make reference to the enterprise's possibility to be indebted, for the financial profitableness improvement. In other words, if the economic profitableness is bigger than the interest's instalment, the indebt can be a mode to improve the enterprise's profitableness, the last one registering a similar evolution as the indebt degree; if the economic profitableness is smaller than the interest's instalment, then, an increase of the enterprise's indebt degree have, as consequence, the decrease of the financial profitableness. The pro or against vote gave to the indebt appears as effect of the financial lever index analysis (IFL) defined as report between the financial profitableness instalment and the economic profitableness one (a value bigger than 1 for that index means the fact that the enterprise can appeal to the indebt).

For the previsioning of the financial risk of an enterprise must be crossed the following stages: the own capitals prevision; the clear profit prevision; the establish of the regression equation form who describe the dependence of the own capitals by the clear profit; the determination of the financial lever coefficient; the calculus of the previsioned values for the financial risk. The necessary dates for prevision was taken from the balance-sheets and the profit and loss accounts. Datele necesare pentru previziune au fost preluate din bilanțurile și respectiv din conturile de profit on the period 2001 - 2007.

The criteria used for the determination of the most appropriate adjustment model used for previsions are presented in table 1.

Table 1

The criteria used for the determination of the most appropriate adjustment model used for previsions

Criteria used to choose the adjustment proceedings				
1. We compare the medium value of the adjusted series with the median value of the real terms of the series				
Median	The adjustment model (the media of the series)		The deviation (media – median)	Commentaries
140,82	linear	153,00	12,18	After the analysis we can say that the smallest deviation in repost the median is characteristic to the parabolic model
	parabolic	145,00	4,18	
	exponential	148,67	7,85	
	power	155,33	14,51	
	hyperbolic	161,50	20,68	
2. We compare the "b" parameter of the regression equation with the medium growth with chain basis				
The medium growth	The parameter of the regression equation equationparametrul ecuației de regresie (b)			Commentaries
	The model	The value	The deviation	The smallest deviation correspond to the linear model
21,82	linear	20,00	1,82	
	parabolic	4,00	17,82	
	exponential	1,15	20,67	
	power	0,37	21,45	
	hyperbolic	-74,00	95,82	
3. We compare the growth medium index with the "b" parameters of the regression equation				
The medium	The parameter of the regression equation (b)			
	The model	The value	The deviation	The smallest deviation correspond to the exponential model
1,14	linear	20,00	18,86	
	parabolic	4,00	2,86	
	exponential	1,15	-0,01	
	power	0,37	0,77	
	hyperbolic	-74,00	75,14	
4. The graphic comparison of the deviations between the adjusted values and the empiric one				
5. The calculus of the deviations sum (absolute values) between the adjusted dates and the empiric one				
The model	The empiric	Adjusted values	The deviation	The smallest value of that sum will indicates the appropriate adjustment model
linear	100,00	93,00	7,00	
	109,87	113,00	-3,13	
	137,68	133,00	4,68	$\Sigma(y - \hat{y}) = 60,72$
	140,82	153,00	-12,18	
	169,01	173,00	-3,99	
	181,18	193,00	-11,82	
	230,92	213,00	17,92	
parabolic	100,00	103,00	-3,00	$\Sigma(y - \hat{y}) = 42,74$
	109,87	113,00	-3,13	
	137,68	127,00	10,68	

Criteria used to choose the adjustment proceedings				
	140,82	145,00	-4,18	
	169,01	167,00	2,01	
	181,18	193,00	-11,82	
	230,92	223,00	7,92	
exponential	100,00	97,75	2,25	
	109,87	112,41	-2,54	Σ(y – ŷ) = 43,26
	137,68	129,27	8,41	
	140,82	148,67	-7,85	
	169,01	170,97	-1,96	
	181,18	196,61	-15,43	
	230,92	226,10	4,82	
power	100,00	93,00	7,00	Σ(y – ŷ) = 74,68
	109,87	120,19	-10,32	
	137,68	139,64	-1,96	
	140,82	155,33	-14,51	
	169,01	168,69	0,32	
	181,18	180,47	0,71	
	230,92	191,06	39,86	Σ(y – ŷ) = 156,27
hyperbolic	100,00	106,00	-6,00	
	109,87	143,00	-33,13	
	137,68	155,33	-17,65	
	140,82	161,50	-20,68	
	169,01	165,20	3,81	
	181,18	167,67	13,51	
	230,92	169,43	61,49	
6. The calculus of the variation coefficient				
Σ(y – ŷ) =				The smallest variation coefficient characterised the appropriate model; for the present case this model is the parabolic one
The model	The value			
linear	60,72	media –	0,42	
parabolic	42,74		0,29	
exponential	43,26		0,30	
power	74,68		0,52	
hyperbolic	156,27		1,08	

The establishing of the regression equation form who describes the dependence between the own capitals and the clear profit; the regressive model is described through the equation: $y = a_0 + a_1x_1$. The values for different combination of "x" and "y" are presented in table 2.

Table 2

Values of the x and y variables

Years	y_i (OC)	x_i^2	x_i (CP)	x_iy_i
2001	527,50	678,60	26,05	13.741,38
2002	579,54	6.059,07	77,84	45.111,39
2003	726,28	53.638,56	231,60	168.206,45
2004	742,80	471,32	21,71	16.126,19
2005	891,51	1.088,34	32,99	29.410,92
2006	955,71	7.373,66	85,87	82.066,82
2007	1.218,09	149.877,38	387,14	471.571,36

-	Σy_i = 5.641,43	Σx_i^2 = 219.186,93	Σx_i = 863,20	$\Sigma x_i y_i$ = 826.234,51

After the calculus for the "a_0" and "a_1" coefficients determination, the regression equation will be: y = 663 + 1,16x. We also present, in table 3, the values who are necessary to determine the future values for the financial lever coefficient.

Table 3

The future values of the financial lever coefficient

Elements	2008	2009	2010
CP*(mii lei)	411,400	584,080	810,440
ER (mii lei)	222,410	300,790	424,660
Active	5.179,400	6.275,510	8.495,080
FR	0,303	0,375	0,455
ER	0,043	0,047	0,049
ΔCP/CP	0,060	0,300	0,280
ΔER/ER	0,230	0,240	0,290
I_{FL}	7,500	7,600	9,100
FLC	0,260	1,250	0,970

CONCLUSIONS

The CP prevision through the multi factorial linear regression method will be obtained taking account that, in the base year (2001), the value of the clear profit was 26,05 thousands lei.; the own capitals will be determined in the same manner, taking account that, in the base year (2001), its value was 527,5 thousands lei.

The dates looking the exploitation result was determined according to the base year when the ER_{2001} = 39,32 thousands lei.

If we determine, for the anterior dates, the financial lever index, we can see that the future values of it are over unit.

According to these results, we can say that the enterprise can be indebted in future, but carefully, to not limit its financial independence.

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