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Optimization of Resources of the Company

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Author's contribution

This whole work was carried out by author AH.

Original Research Article

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ABSTRACT

This article helps to understand that there is no theory of optimal capital structure of the company in a perfect market where there are no transaction costs, costs of bankruptcy and tax and where information is perfect. It recalls that the consideration by some authors of market imperfection factors implies that there is an optimal capital structure of the company corresponding to its maximum value. It reviews the financial conditions of the capital increase by companies. It shows that the demand of optimal debt to a debtor is based on his expectation of credit and the conditions for granting the credit, requested in terms of interest rate and repayment periods, offered by the creditor. It proposes a model for determining the optimal rent for a rental investment operation by a company.

Keywords: Bankruptcy costs; capital increase; capital structure; credit demand; interest rates; leasing; perfect information; repayment period; tax; transactions costs.

1. INTRODUCTION

The capital structure of a company is the mode of financing of its assets represented by a combination of equity and debt (Fleuriet [1]). The theory of Modigliani and Miller [2] is the basis for modern thinking on capital structure. It suggests that, in a perfect market (no transaction costs, bankruptcy costs and tax and perfect information), the mode of financing a business has no impact on its value. Other authors argue that the optimal capital structure of the company is the one that maximizes its value. The theory of trade-off (Myers [3] and Fama and French [4]) weighs the tax advantage provided by debt and inconvenience due to the danger of bankruptcy it leads and determines an optimal debt ratio.

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The second proposition of Modigliani and Miller is that the cost of equity of an indebted company is equal to the cost of equity of an unlevered company plus a premium of financial risk. Thus, the higher the leverage, represented by the ratio of debt to total funding, increases, while the burden of individual risks (De Servigny [5]) is shifted between different categories of investors, the total risk is retained and therefore no additional value is created.

In traditional system of taxation (Handous [6]), the tax deductibility of interest makes debt interesting which implies that the cost of capital decreases as the proportion of debts in the capital structure increases. The optimal capital structure is such that equity is zero.

If the capital structure is not significant in a perfect market, imperfections that exist in the real world must be the cause of its meaning (Bhattacharya [7] and Jaffee and Modigliani [8]).

Relations between shareholders and bondholders, characterized by asymmetric information, are agency relations which it follows costs that would not exist if the company was financed entirely by equity and are called agency costs due to debt.

Jensen and Meckling [9] showed how an unlevered firm could, by increasing its debt ratio, reduce the agency costs of equity and increase its total value.

Pecking order theory does not exclude the existence of an optimal level of debt but lowers the rate. The consideration of agency costs lowers the optimal debt ratio relative to that presented by the theory of trade-off (Myers and Majluf [10], Charreaux [11] and Goffin [12]).

I will proceed in the following a review of the literature regarding the financial terms of a capital increase by a company and I will show that the demand for credit by a debtor is based on its expectation of credit and the conditions for granting the latter set by the creditor represented by the interest rate and the number of repayment periods and that the optimal leasing rent is based on the profit for the company that pays it, the number of rents and the purchasing cost of the investment conceded.

2. CAPITAL INCREASE

Traditional financial theory, as was summarized by Eglem, Mikol and Stolowy [13], considers that the two factors of investments motivations resulting in an increase in the capital of an anonymous company are represented by its high or low distribution policy of dividends but, so that its market value in the second case be increasing so that its resale value in time n P_n is relatively high, on the basis that on the time 0 its market value is such that

$$P_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n}{(1+k)^n} + \frac{P_n}{(1+k)^n}$$

where k is the internal rate of return or discount rate for future income of its owners and that speculators are more motivated to invest in what results in the increase in the capital of companies listed on the stock market than in that of family businesses unlisted in compliance with regulations that these ones are limited liability companies or partnerships.

If the dividends D to be distributed to the owners of the company subsequent to the date of completion of a capital increase are each of them equal to the last dividend distributed, then

this one leads to a dilution effect in the form of reduced dividend per share according whether it is an anonymous or another company resulting in the decrease of its financial profitability or of the rate of the report of its dividends on its equity and may cause an effect of increase of its borrowing capacity if the creditworthiness of their debtors is estimated by banks by the debt ratio or the ratio of equity to each of these ones on its debts.

It follows that given the trade regulations, capital increases in cash are traditionally carried out mainly by current and potential shareholders of anonymous companies, those in kind mainly by the other types of companies and exceptionally by the merging companies, those by incorporating reserves and those by incorporating debts require the issuance of bonus shares resulting logically in the decrease of the market value of the share of the company that makes them.

The issuance premium p_e of a capital increase share of an anonymous company by cash contributions is the excess of its issuance price P_e on its nominal value NV representing its value net of repayment of accumulated profits not yet distributed as dividends or gross of cumulative losses and the basis of the count of statutory interest as a fixed component of the distributed dividend so that if x is the number of shares outstanding at the date of the capital increase, P_e tends to the accounting value of its existing share represented by the ratio of its equity EQ on x or to its market value P on this one and $P_e^{'}$ is the issuance price corresponding to the maximum dilution of dividends recognized by its owners as if d is the expected dividend per share at the end of the year following this one, then

$$\Delta EQ = P_e^{'}\Delta x$$

$$d = \frac{D}{x + \Delta x}$$

$$\Delta x = \frac{D}{d} - x$$

$$P_e^{'} = \frac{\Delta EQ}{\Delta x} = \frac{\Delta EQ}{\frac{D}{d} - x}$$

$$P_e^{'} < P_e < \frac{EQ}{x} \quad ou \quad P$$

The former shareholders require that $P_e > P_e^{'}$ and the new ones that

$$P_e < \min\left(\frac{EQ}{x}, P\right)$$

the issuance price offered by the company is fair to be as

$$P_e = \frac{1}{2}\left[P_e^{'} + \min\left(\frac{EQ}{x}, P \right) \right]$$

which requires that this one be in a situation of relative profitability that is to say that its financial rate of return

$$r = \frac{D}{EQ} > r_f$$

where r_f is the highest interest rate on investments available for

$$\frac{D}{EQ} = r_f + \Delta r = r_f + \frac{\Delta D}{EQ}$$

$$\Delta D = \left(\frac{D}{EQ} - r_f \right) EQ = D - r_f EQ$$

$$d = D - \Delta D = D - \left(D - r_f EQ \right) = r_f EQ$$

in regime of no rationing of bank deposits hoped later to the date of its constitution but of rationing expected of investments in securities of participation in the capital of companies.

If V and $V^{'}$ are its accounting values before and after the capital increase, then

$$V^{'} = \frac{Vx + P_e \Delta x}{x + \Delta x}$$

As $P_e < V$ is a necessary condition to motivate subscribers, $V^{'} < V$ and the right of subscription attached to an old share is $RS = V - V^{'}$ so that if an old shareholder holding y shares will not want to be harmed he can either subscribe $P_e \ (y/x)\Delta x$ new shares or sell his subscription rights by detaching each RS and if the capital has increased by $(\Delta x / x) = \alpha\%$ existing shareholders are not harmed if each of them has the priority to purchase $\alpha\%$ of the number of shares he holds in the form of new titles and if each of the new shareholders buys $(100/\alpha)\%$ of the number of new securities he buys in the form of RS.

If its capital increase is rather by incorporation of reserves R, then its value after this one in regime of distribution of bonus shares is

$$V^{'} = \frac{Vx}{x + \Delta x} < V$$

where

$$\Delta x = \frac{R}{NV}$$

and the right of attribution attached to an old share is $RA = V - V'$ so then if $R/(NVx) = \beta\%$ then the old shareholder may provide the management of this one $(100/\beta)\%$ RA to receive each free share or sell them to him so that a new shareholder buys it from them to maintain equity between the old and new shareholders.

If the capital increase of this one is by incorporation of reserves R and contributions in cash $P_e \Delta x_2$ and issuance of Δx_1 and Δx_2 shares such as

$$\Delta x_2 = \frac{D}{r_f EQ} - x$$

first then

$$RA = V - \frac{Vx}{x + \Delta x_1}$$

so that if $R/(NVx) = \beta\%$ then the holder of an old share receives a new share against $(100/\beta)\%$ RA then

$$RS = V - \frac{Vx + P_e \Delta x_2}{x + \Delta x_1 + \Delta x_2}$$

so then if $\Delta x_2 / (x + \Delta x_1) = \alpha\%$ then the old shareholders are not harmed if each of them has the priority to purchase $\alpha\%$ of the number of shares he holds in the form of new shares and if each new shareholder buys $(100/\alpha)\%$ of the number of new titles that he buys in the form of RS .

If the capital increase of this one is by incorporation of debts DE or because it is insolvent vis-à-vis its creditors or that the convertibility of these ones as it was originally agreed to be lifted by these ones by reference to the repayment conditions of bank loans for debts other than these ones in order to arouse them to become its owners in regime of increase of its expected financial profitability especially by the decrease in interest expenses, then

$$\frac{Vx + DE}{x + \Delta x} = V$$

$$\Delta x = \frac{DE}{V}$$

and the creditor up to $\gamma\%DE$ receives $\gamma\%\Delta x$ free shares of the same nominal value as that of each old share.

Based on what Vernimmen [14] described, if $EQ_1^{'}, EQ_2^{'},..., EQ_n^{'}$ are the values of equity of the companies $1,2,...,n$ each represented by a reassessment by its owners according to financial criteria of the excess of its reassessed asset on its debts or of its market capitalization ie of the product of the number of its shares outstanding and of its last market price at the date of completion of a merger of the company 1 the absorbent and as the owners of the n companies have agreed to leverage their unused production capacities and that I consider unjust to replace their accounting equity $EQ_1, EQ_2,..., EQ_n$, then the weight of each company $i = 2,3,...,n$ compared to that of this one or relative weight between them is

$$\eta_{1i} = \frac{EQ_i^{'}}{EQ_1^{'}}$$

and gives its old owners

$$\frac{EQ_1^{'}}{\sum_{i=1}^{n} EQ_i^{'}} = \frac{1}{\frac{EQ_1^{'} + \sum_{i=2}^{n} EQ_i^{'}}{EQ_1^{'}}} = \frac{1}{1+\sum_{i=2}^{n} \eta_{1i}} 100\%$$

securities of the new company and those of the former

$$\frac{EQ_i^{'}}{\sum_{i=1}^{n} EQ_i^{'}} = \frac{\eta_{1i}}{\frac{\sum_{i=1}^{n} EQ_i^{'}}{EQ_1^{'}}} = \frac{\eta_{1i}}{1+\sum_{i=2}^{n} \eta_{1i}} 100\%$$

of these ones so that if N_i is the number of shares of ownership of the company i before the merger, then they will be exchanged against

$$\frac{\frac{EQ_i^{'}}{EQ_1^{'}}}{N_1} = \frac{EQ_i^{'}}{EQ_1^{'}} N_1$$

of the company 1 and the exchange ratio is one security of the company i against n_i securities of the company 1 as

$$n_i = \frac{\frac{EQ_i^{'}}{EQ_1^{'}} N_1}{N_i} = \eta_{1i} \frac{N_1}{N_i}$$

under an increase of its capital by this one by issuing ΔN_1 securities such as

$$\Delta N_1 = \frac{\sum_{i=2}^{n} EQ_i^{'}}{\frac{EQ_1^{'}}{N_1}} = N_1 \sum_{i=2}^{n} \eta_{1i}$$

The capital increase by incorporation of reserves and increasing the nominal value of each of old shares of R/x could prevent an increase in the volatility of the market price of the share that is to say its risk by the non increase of its liquidity in relation to increasing of the number of outstanding shares allowing that the capital increase of the corresponding company in relatively favorable conditions for it is requested by investors especially in regime of increased inflation on the basis of criteria for choosing traditional investments.

The capital increase by incorporation of reserves is unnecessary because the market value of the share is the same before and after this one by which the balance sheet loses the possibility of comparative analysis by the investor of the potentials of companies on basis of the ratio

$$\frac{EQ - SC}{SC}$$

where SC is the social capital of each of them that must be complementary to the financial profitability ratio D/EQ.

The partial divisibility of securities of mobilization of claims resulting in the possibly partial liquidity of these ones on a fair financial market has no impact on the traditional conditions of capital increase of companies in terms of the incentive for current and potential investors since this one is supposed to respect these ones by achieving the balance between supply and demand of securities in accordance with the constraint of the majority participation in the social capital of each of them of its managers owners.

Bond issuers always arrange for the emission price of each of them E is greater than or equal to the nominal value of the shares to which they are convertible NV I do not know why except that the value of each of those shares immediately after the conversion of these N bonds must be at least equal to the old value of each share V that is to say if

$$\Delta V = \frac{EQ - NVx}{x}$$

then

$$\frac{Vx+EN}{x+N}\geq V$$

$$E\geq V$$

$$\frac{(NV+\Delta V)x+EN}{x+N}\geq V$$

$$E\geq NV+\Delta V$$

$$E\geq NV$$

The regulation of issuance and negotiation conditions of receivables securities has for pretentiousness the increase of the investment by mobilizing savings of economic agents whose needs in terms of investment conditions are supposed to be different and variable and which are recommended by specialized financial intermediaries.

3. DEBT

If $\tilde{B}$ is the normal random variable whose possible values are the benefits received before loans or credits obtained periodicities by a company, before rents under a leasing of investment and before tax at the rate τ and $\tilde{D}$ that which possible values are the maximum dividends received by its owners in the regime of absence of periodicities of loans or credits and rents of leasing, then the justification of insolvency risk under an optimal loan or credit repayable with constant periodicities, I have shown that it is more beneficial to the debtor that the amount repayable by constant amortization or in fine [15], to allow to minimize its updated disbursements and so that the banks or creditors know optimize the conditions of repayments of loans that they give and which it wishes to benefit during an under annual period in the year 1 is the respect of the condition that

$$\left[\gamma E_0\left(\tilde{B}\right)-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)\geq\max_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)$$

where φ_t is the rental income remaining to pay leasing companies, $D_t^{'}$ and $I_t^{'}$ are the repayment and the interest of old loans, D_t is the periodicity of its repayment of the principal of additional debt, I_t its interest during the under annual period t later than the under annual period 0 of the obtaining of the loan or the credit, n the number of its periodicities fixed by the creditor and γ the coefficient of periodicity requested by the debtor represented by the ratio of the number of days of the periodicity available on the number of days of the year which requires that $\max(\varphi_t)$, $\min\left(I_t^{'}\right)$ and $\max\left(D_t^{'}\right)$ are those corresponding to the under annual period 1 requested such that if $T\leq 0$ then T is the index of years in the

calculation formulas of $E_0\left(\widetilde{D}\right)$ and if b_0 exists then $E_0\left(\widetilde{D}\right)=\overline{d}_0$ if not $E_0\left(\widetilde{D}\right)=\overline{d}_{-1}$ such as if the investment financed is of renewal of its production capacity

$$\left[\gamma\frac{1}{\left|\min(T)\right|}\sum_{T=\min(T)}^{-1}b_T-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)\geq\max_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)$$

$$\left[\gamma\frac{1}{\left|\min(T)\right|}\sum_{T=\min(T)}^{-1}b_T-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)$$

$$=\left[\gamma\overline{b}_{-1}-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)$$

$$=\left[\gamma\frac{\left|\min(T+1)\right|\overline{b}_{-2}+b_{-1}}{\left|\min(T)\right|}-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)$$

$$=\left[\gamma\frac{\frac{1}{1-\tau}\left(\left|\min(T+1)\right|\overline{d}_{-2}+d_{-1}\right)}{\left|\min(T)\right|}-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)$$

$$=\left[\gamma\frac{E_0\left(\widetilde{D}\right)}{1-\tau}-\max_{t=1,2,\ldots,n}(\varphi_t)-\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)\geq\max_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)$$

$$\gamma E_0\left(\widetilde{D}\right)-\left[\max_{t=1,2,\ldots,n}(\varphi_t)+\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)\geq\max_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)$$

and not, as I will show later,

$$\gamma E_0\left(\widetilde{D}\right)-\left[\min_{t=1,2,\ldots,n}(\varphi_t)+\max_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)\geq\min_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)$$

and this one is deemed to be free to use only its resources immediately after dividends distribution so that its expected credit ratio under a request for a debt in general and an ordinary bond in particular is

$$\upsilon=\frac{\gamma E_0\left(\widetilde{D}\right)}{\left[\max_{t=1,2,\ldots,n}(\varphi_t)+\min_{t=1,2,\ldots,n}\left(I_t^{'}+I_t\right)\right](1-\tau)+\max_{t=1,2,\ldots,n}\left(D_t^{'}+D_t\right)}$$

$$= \frac{\gamma E_0\left(\tilde{D}\right)}{\left[\max_{t=1,2,\ldots,n}(\varphi_t) + \min_{t=1,2,\ldots,n}\left(I_t^{'}\right)\right](1-\tau) + I_1(1-\tau) + \max_{t=1,2,\ldots,n}\left(D_t^{'}\right) + D_1}$$

and not

$$\omega = \frac{\gamma E_0\left(\tilde{D}\right)}{\left[\min_{t=1,2,\ldots,n}(\varphi_t) + \max_{t=1,2,\ldots,n}\left(I_t^{'} + I_t\right)\right](1-\tau) + \min_{t=1,2,\ldots,n}\left(D_t^{'} + D_t\right)}$$

$$= \frac{\gamma E_0\left(\tilde{D}\right)}{\left[\min_{t=1,2,\ldots,n}(\varphi_t) + \max_{t=1,2,\ldots,n}\left(I_t^{'}\right)\right](1-\tau) + I_n(1-\tau) + \min_{t=1,2,\ldots,n}\left(D_t^{'}\right) + D_n}$$

If the amount of own resources $EQ_0^{'}$ is intended to finance the expansion of the production capacity of the debtor of EQ_0 of equity at the time of obtaining of this one and if $E_0\left(\tilde{B}'\right)$ is its expectation of profit cashed and $E_0\left(\tilde{D}'\right)$ that of dividends cashed corresponding to this one on use of its former production capacity before periodicity of borrowing, rent of leasing and tax, then

$$E_0\left(\tilde{B}\right) = \left(1 + \frac{EQ_0^{'}}{EQ_0}\right) E_0\left(\tilde{B}'\right)$$

and

$$E_0\left(\tilde{D}\right) = \left(1 + \frac{EQ_0^{'}}{EQ_0}\right) E_0\left(\tilde{D}'\right)$$

and for investments of creations of companies by the concerned economic agents together with investments of diversification by the existing companies

$$E_0\left(\tilde{D}\right) = \frac{EQ_0}{\left|\min(T)\right|(m+q)} \sum_{T=\min(T)}^{-1} \sum_{i=1}^{m+q} \frac{D_{iT}}{EQ_{iT}}$$

on the basis that $m+q$ is the number of listed and unlisted companies of the subsector s to which the created or diversifying companies are supposed to belong and where EQ_0 is the amount of equity or of the equity that financed an investment of diversification of each of

these ones at the date of its constitution or performance by it of this investment of diversification, whose expected dividend of the company is the sum of that of the existing business and that of this one, and D_{iT} and EQ_{iT} represent dividends distributed and equity of the company i in respect of the year T distributing at least one dividend D prior to the year 2 with T going to 0 for a company i when there is for it $\left|\min(T)\right|+1$ observations of D and EQ.

Although the standardization of mathematical expectation m by the standard deviation σ derives its economic justification of the need to choose to undertake the action that induces the maximum desired result m adjusted for risk σ, decision making in the context of reaching a preset target is just to be on the basis of reconciliation between this one and the mathematical expectation of the random variable which it is a possible value because the decision maker in such a situation had better be nor pessimistic substituting that one by $m-\sigma$ neither optimistic by replacing it by $m+\sigma$.

The debtor of a bank loan, of a credit or of a common bond would gain to maximum to set up the conditions for repayment of the debt in terms of its repayment period n in respect of the equality

$$\left\{\gamma E_0\left(\tilde{B}\right)-\min_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]-\max_{t=1,2,\ldots,n}\left(\varphi_t\right)\right\}(1-\tau)-\max_{t=1,2,\ldots,n}\left[D_t\left(r_e\right)+D_t^{'}\right]=\beta\gamma E_0\left(\tilde{D}\right)+\gamma R \qquad (1)$$

where β is the share of expected annual dividend in borrowing and leasing regime in the annual maximum dividend expected in the absence of borrowing and leasing and R the annual allocation to reserves corresponding to $E_0\left(\tilde{D}\right)$.

The ordinary or common bond borrower chooses to set the conditions for repayment of its debt vis-à-vis bondholders or creditors in respect of the equality (1) which maximizes its expected solvency and not on the basis of the equation as

$$\left\{\gamma E_0\left(\tilde{B}\right)-\min_{t=1,2,\ldots,n}\left(\varphi_t\right)-\max_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]\right\}(1-\tau)-\min_{t=1,2,\ldots,n}\left[D_t\left(r_e\right)+D_t^{'}\right]=\beta\gamma E_0\left(\tilde{D}\right)+\gamma R$$

because

$$\max_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]>\min_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]$$

$$-\tau\max_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]<-\tau\min_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right]$$

$$\max_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right](1-\tau)+\min_{t=1,2,\ldots,n}\left[D_t\left(r_e\right)+D_t^{'}\right]<\min_{t=1,2,\ldots,n}\left[I_t\left(r_e\right)+I_t^{'}\right](1-\tau)+\max_{t=1,2,\ldots,n}\left[D_t\left(r_e\right)+D_t^{'}\right]$$

$$-\max_{t=1,2,\ldots,n}\left[I_t(r_e)+I_t^{'}\right](1-\tau)-\min_{t=1,2,\ldots,n}\left[D_t(r_e)+D_t^{'}\right]>-\min_{t=1,2,\ldots,n}\left[I_t(r_e)+I_t^{'}\right](1-\tau)-\max_{t=1,2,\ldots,n}\left[D_t(r_e)+D_t^{'}\right]$$

$$\left\{\gamma E_0\left(\tilde{B}\right)-\min_{t=1,2,\ldots,n}(\varphi_t)-\max_{t=1,2,\ldots,n}\left[I_t(r_e)+I_t^{'}\right]\right\}(1-\tau)-\min_{t=1,2,\ldots,n}\left[D_t(r_e)+D_t^{'}\right]>$$

$$\left\{\gamma E_0\left(\tilde{B}\right)-\min_{t=1,2,\ldots,n}\left[I_t(r_e)+I_t^{'}\right]-\max_{t=1,2,\ldots,n}(\varphi_t)\right\}(1-\tau)-\max_{t=1,2,\ldots,n}\left[D_t(r_e)+D_t^{'}\right]$$

To extract the debt demand equation of the debtor from the equation (1), it is necessary that the minimum periodic interest and the periodic repayment of the principal of the debt corresponding to it are there functions of the rate of interest and of the maturity of this one that I have demonstrated that they are counted conversely than traditionally [15].

$$\min_{t=1,2,\ldots,n}\left[I_t(r_e)\right]=I_1=D_1(1+r_e)-D_1$$

$$=D_1 r_e$$

$$=Cr_e^{\,2}\frac{(1+r_e)^{n-1}}{(1+r_e)^n-1}$$

$$\max_{t=1,2,\ldots,n}\left[D_t(r_e)\right]=D_1=Cr_e\frac{(1+r_e)^{n-1}}{(1+r_e)^n-1}$$

$$\left\{\gamma E_0\left(\tilde{B}\right)-\min_{t=1,2,\ldots,n}\left[I_t(r_e)+I_t^{'}\right]-\max_{t=1,2,\ldots,n}(\varphi_t)\right\}(1-\tau)-\max_{t=1,2,\ldots,n}\left[D_t(r_e)+D_t^{'}\right]=\beta\gamma E_0\left(\tilde{D}\right)+\gamma R$$

$$\left[\gamma E_0\left(\tilde{B}\right)-D_1 r_e-I_1^{'}-\varphi_1\right](1-\tau)-D_1-D_1^{'}=\beta\gamma E_0\left(\tilde{D}\right)+\gamma R$$

$$(1-\beta)\gamma E_0\left(\tilde{D}\right)-\gamma R=\left[r_e(1-\tau)+1\right]D_1+Z$$

where

$$Z=\left[\varphi_1+I_1^{'}\right](1-\tau)+D_1^{'}$$

and Z represents the principal repayment of arrears and net financial expenses of tax to be paid corresponding to them during the period t of repayment of the debt to incur increased by the maximum annual rent payable to leasing companies

$$D_1=\frac{(1-\beta)\gamma E_0\left(\tilde{D}\right)-\gamma R-Z}{r_e(1-\tau)+1}=Cr_e\frac{(1+r_e)^{n-1}}{(1+r_e)^n-1}$$

$$\frac{(1+r_e)^n-1}{(1+r_e)^{n-1}} = Cr_e \frac{r_e(1-\tau)+1}{(1-\beta)\gamma E_0(\tilde{D})-\gamma R-Z} \quad (2)$$

From equation (2), it follows that the maximum requested credit corresponding to n^* and r_e^* set by the creditor is

$$C^* = \frac{(1+r_e^*)^{n^*}-1}{r_e^*(1+r_e^*)^{n^*-1}} \frac{(1-\beta)\gamma E_0(\tilde{D})-\gamma R-Z}{r_e^*(1-\tau)+1}$$

and the repayment schedule of this one requested by the debtor is on the basis that

$$D_t^* = C^* r_e^* \frac{(1+r)^{n^*-t}}{(1+r)^{n^*}-1}$$

$$p^* = D_t^*(1+r_e^*)^t$$

$$I_t^* = p^* - D_t^*$$

where p^* is the optimal constant periodicity of repayment of C^*.

If $\beta = 0.5$, $\gamma = 0.5$, $E_0(\tilde{D}) = 200\ \ 000$, $Z = 10\ \ 000$, $R = 10\ \ 000$, $r_e^* = 0.05$, $n^* = 15$ and $\tau = 0.2$, then

$$C^* = \frac{1.05^{15}-1}{0.05\times 1.05^{14}} \frac{0.5\times 0.5\times 200\ \ 000 - 0.5\times 10\ \ 000 - 10\ \ 000}{0.05\times 0.8+1}$$

$$= 10.899 \times \frac{35\ \ 000}{1.04} = 366\ \ 793$$

4. THE SPECIFICITY OF THE BOND AND THE CAPITAL INCREASE

Traditionally, bond holders are motivated to exercise the option of convertibility once for a bond of all bonds issued of the same nominal value its redemption value $E < V$ the value of a share of those of which they are convertible prior to their conversion and the borrower is deemed to make the necessary effort to motivate the earliest possible bond holders to become its owners for they hope to cash $V - E$ speculatively on the financial market before the maturity of the loan or achieve a relatively high return on their investment but this one is optimally possible to be exercised only vis-à-vis the administration of this one that must

implement it in accordance with the constraint of management law of the company manager in the shares of which they have agreed to be convertible.

Logically, anonymous companies which equity and the rates of returns of these ones are above regulatory minimum amounts may be listed on the financial market and permitted to finance by common or convertible bonds into shares on this one provided that this one informs on its request each of these ones on the equity per share of the company of the shares of which they are convertible at each repayment date of the loan under which they were issued so that if the conversion bonds option is exercised, then the social capital of the company concerned must increase by the nominal value of the convertible bonds.

The manager owner of the company which have whole interest to maximize the expected benefit net of tax of this one and to spend the maximum possible of its expected dividends is logically motivated to achieve the increase in its social capital only if he has the means to participate in it in order to maintain his relative majority that is to say vis-à-vis of each of his partners and maximize his expected wealth.

The capital increase of his company is just for him to be a form of priority funding to enable him to get across its share in its equity from $\alpha EQ/EQ$ to

$$\frac{\beta\left(EQ+\Delta\vec{E}Q\right)}{EQ+\Delta\vec{E}Q}\ ,\quad \beta\geq\alpha$$

because if he did not have the financial means to participate in a capital increase of this one in those terms, then the increase of its capital in the financial market even if it allows him to preserve his right to manage it do not allow him to preserve his expected wealth demotivating him to manage the additional resources of his current and potential partners and the development of his business in the form of extension of its current production capacity without counterpart in terms of expected dividends that would lead him to borrow sacrificing some of the expected return of his total investment during the repayment period of his loan for more than recover it later and maximize his expected wealth for a share in the equity of this one

$$\frac{\alpha\left(EQ+\Delta\vec{E}Q\right)}{EQ+\Delta\vec{E}Q}$$

where $\Delta\vec{E}Q$ is the increase in equity from the date of the loan.

5. LEASING

Investors whose ratio of equity to credits, they could increase if their rates are not relatively high, is low or whose projects are not eligible to be funded by bank loans may use leasing companies whose purpose is to rent goods to economic agents who have under a contract the opportunity to purchase them at its term at a price agreed at its establishment date.

Usually, the collected rent by a leasing company at the title of a good available to an economic agent is represented by the ratio of its purchase cost to the number of periods of collection of the rents plus a margin arbitrarily fixed by this one.

This method of evaluation of the price of the rent of goods to investors poses, besides the problem of its rationing, that of the insufficiency of the margin to absorb the costs of managing the leasing company in a position of weakness of its activity level.

Its deficit is, like any business not intended to produce at full capacity, possibly inevitable.

The constant periodic rent φ^* of optimal allocation of resources of the two parties would be determined as a solution of the optimization program

$$\max_{\varphi} \pi = n(B-\varphi)(n\varphi - A), \quad nB > A$$

$$\frac{\partial \pi}{\partial \varphi} = n^2\left(B-\varphi^*\right) - n\left(n\varphi^* - A\right) = 0$$

$$n^2 B - 2n^2\varphi^* = -nA$$

$$\varphi^* = \frac{n^2 B + nA}{2n^2} = \frac{1}{2}\left(B + \frac{A}{n}\right)$$

$$\frac{\partial^2 \pi}{\partial \varphi^2} = -2n^2 < 0$$

where B is less than or equal to the expected cashed profit, corresponding to the periodicity of payment of the rents, before rent φ gross of tax of the beneficiary company achieved by the exploitation of its total assets, the periodicity is requested by the tenant of the investment and is that of the settlement of its debts and depends on his needs in terms of cash flows, n is le number of rents fixed by the leasing company and A is the cost of purchase by this one of the leased assets.

6. CONCLUSION

The purpose of this paper is to show how a debtor determines his demand for credit knowing the interest rate and maturity that are offered to him and the terms of repayment of arrears in the best conditions of solvency and how he calculates the optimal rent for a leasing transaction of an investment.

φ^* should not be less than φ expected by the leasing company because otherwise the rental demand in question will not be satisfied.

Financing methods could complement with respect of optimality conditions and if the request for funding calculated is below the cost of assets to finance then the investment cannot be made.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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