Financial Risk of Indebted Companies: A Study of the Impact of Financial Structure and the Earnings Growth

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The choice of a financial structure by the companies is a strategic decision which frames their use of the fund resources. The companies that are financially well-off resort directly to the equity capital by opting for a perfect autonomy. It also turns out that this is an obvious option, rather than using external resources which come along with financial expenses.

In this article, we are interested in indebted companies and their growth and the impact of the latter on the βeta of their representative stocks. In order to answer this problem, an empirical study was conducted on a panel of 44 Moroccan companies listed on the Casablanca Stock Exchange between 2008 and 2019. Based on the results obtained, we have shown that the level of indebtedness and earnings growth do not have a significant influence on the financial risk measured by the βeta of the companies studied. In this case, we come back to a neutrality of the financial structure and the earnings growth on the βeta displayed by these companies.

Keywords: debt, financial structure, financial risk, cost of capital, earnings growth

INTRODUCTION

In an environment where any financial resource is important for financing the creation of wealth and hence the increase in the value of the company, debt is imposed on companies **(Molay, 2010)**, whose ability to self-finance its commitments or new investments, remains insufficient. The coverage of needs by medium- and long-term debt for certain companies, whatever the nature of this debt, will put the company in situations of insolvency in relation to bondholders and consequently may cause its value to vary according to the level of debt chosen, or even according to its exposure to the risk of bankruptcy.

For the company, debt is a resource that allows it to adjust its current and future needs in the event of inability to cover the desired financing or future investments **(Beattie, et al., 2006)**. Thus, the financial structure of a company with debt influences its value within the framework of imperfect financial markets, which leads us to focus on this structure, especially for firms whose debt is important to cover their need for funds **(Aivazian, et al., 2005)**, and to verify whether the option of taking on debt at a given level will enable the firm to increase or decrease its value.

Resorting to debt is a multifaceted signal **(Ross, 1977)**, it is the result of an expression of need for financing in the face of growth opportunities **(Ding, et al., 2020)**, but it can also be understood by others as a sign of financial difficulties. Signaling can also extend to the growth of the company's earnings. At stronger rates, the company's βeta is positively affected **(Vernimmen; Letter No. 23)**.

Financial theory as a set of theoretical approaches, develops a whole range of tools for financial decision making. It makes it possible to understand the impact of these decisions on the variation in value **(Modigliani & Miller, 1958)**, in the presence, of course, of the idea of optimizing the resources involved **(Leland, 1994)**. Portfolio theory was charting a new course for finance **(Fama & French, 2005)**, notably with the work of **William F. Sharpe in 1964** and the modern portfolio management that relate each individual asset to the risk of all the assets in the market, thus revitalizing the CAPM.

Through this article, we seek to study the impact of financial structure and earnings growth on the financial risk of indebted companies.

Debt financing generates additional financial risk, which is identified as a component of the company's overall risk and is measured by its βeta.

Based on our problem statement, there are a number of important questions that intrigue us. If the source of debt financing influences the company's value, what then will be the financial risk of the company's stock? Does a leveraged/indebted βeta not move in parallel with the company's gearing? If as a first step a deleveraged βeta refers to the risk of the share in the absence of debt, would we have a collinearity of this leveraged value with respect to the company's financial structure?

Apart from economic risks, financial risks may relate to variations in flows that directly affect the financial sphere. The growth in earnings presents a quality of information relative to the flows of results that the company generates. Will the magnitude of their growth rate be positively or negatively correlated with the company's βeta?

Based on the research problem statement, already spelt out, we were able to come up with two research hypotheses $\boldsymbol{H_1}$ and $\boldsymbol{H_2}$ for which:

$\boldsymbol{H_1}$*: The more indebted the company is, the greater would be the increase in its financial costs, thus positively affecting the company's βeta.*

$\boldsymbol{H_2}$: *The higher the earnings growth rate, the higher would be the company's βeta. As a result, the greater the flows, the greater the value of the company and subsequently it would be sensitive to any market changes.*

The βeta variable is considered as a dependent variable, which we will need to explain by the choice of the financial structure ($\boldsymbol{H_1}$), and at the same time to explore whether or not it depends on the valuation of net results ($\boldsymbol{H_2}$).

Thus, in order to answer these different questions and hypotheses, we will first present the variables of the study, their identifications, measurements, and codifications, and then we will turn to the empirical study, discussion and analysis of the results obtained.

THE STUDY VARIABLES: IDENTIFICATIONS, MEASUREMENTS, AND CODIFICATIONS

In our analysis, two explanatory variables will be studied, namely: The measure of the level of indebtedness that will be quantified by the gearing of the company, and the growth rate of the earnings. The dependent variable representing the financial risk will be qualified by the company's leveraged βeta.

The Measurement of Beta as an Additional Financial Risk

The βeta coefficient measures the volatility of the profitability of a stock or a stock portfolio relative to the market. According to the market model: The profitability of a stock/security ($\boldsymbol{i}$) at time ($\boldsymbol{t}$) is given by:

$$\boldsymbol{r_{i,t}} = \propto_{\boldsymbol{i}} + \boldsymbol{\beta_i r_{mt}} + \boldsymbol{\varepsilon_{i,t}}$$

where:

$\boldsymbol{r_{i,t}}$: is the profitability of a stock i in t.
$\boldsymbol{r_{mt}}$: is the profitability of the market in t.
$\boldsymbol{\varepsilon_{i,t}}$: is the error term specific to stock i in t.
$\propto_{\boldsymbol{i}}$: is a constant.

The Beta is obtained by calculating the covariance of the profitability of the stock ($\boldsymbol{i}$) with respect to that of the market ($\boldsymbol{m}$), divided by the standard deviation of the market's profitability over a well-defined reference period:

$$\boldsymbol{\beta_i = \frac{cov(r_i; r_m)}{\sigma_{rm}}}$$

The beta estimated according to the CAPM model, allows us to have a sensitivity of the stock to a financial structure including a debt, called a leveraged βeta. In the absence of debt or by deleveraging the beta, the value obtained is called deleveraged beta.

In this case, and in a universe with taxation, the relationship between $\boldsymbol{\beta_{leveraged}}$and $\boldsymbol{\beta_{unleveraged}}$ is expressed as follows **(Franck Bancel, et al., 2014)**:

$$\boldsymbol{\beta_{unleveraged} = \frac{\beta_{leveraged}}{1 + \left[(1 - t_{is})\frac{V_d}{V_{cp}}\right]}}$$

with:

$\boldsymbol{t_{is}}$: IS rate ; $\boldsymbol{V_d}$: Net value of debts ; $\boldsymbol{V_{cp}}$: Equity value.

Our analytical direction is towards the possibility of finding collinearity between the $\boldsymbol{\beta_{leverage}}$d of firms and their gearing. If the financial risk component exists, leverage exerts a risk effect, which is materialized by the difference between the $\boldsymbol{\beta_{leveraged}}$ and the $\boldsymbol{\beta_{unleveraged}}$[1].

As far as we are concerned, and in relation to the use of βeta in financial practice, we have opted for a 5-year βeta to be compared in the relationship we are studying, with the gearing and then with the growth rate of the net income of the companies studied.

Gearing

The "gearing" variable allows us to directly assess the companies' βêta. In our study, it will be calculated as follows:

$$\boldsymbol{Gearing^2 = \frac{Net\ M\ and\ LT\ debt}{Equity}}$$

We can also use the debt ratio wherein $R = \frac{Net\ financial\ debt}{CP + net\ financial\ debt}$, whose variation is also related to the gearing. Our choice is based on the direct calculation of the βeta, regrouping the gearing, which will allow the direct verification of this correlation.

Regarding financial debts, we considered those of the medium and long term, excluding net cash, to assess the fair value of the debt.

Changes in Net Income/Earning

In the case of flow-based valuations, the choice between income flows and cash flows remains very delicate. In this our study, and in the light of the financial literature that guides this choice, the growth rate of earnings remains a variable retained by financial analysis and company valuation organizations.

In this regard, and in relation to the financial literature, we would like to still point out that indebted companies show a βeta that has a positive correlation with their gearing. At the same time, for valuation methods based on flows (income flows or cash flows), the higher the income growth rate, the higher the βeta.

Coding of the Variables in the Study

The following table groups the main variables that will guide the tests related to our empirical study:

TABLE 1
CODING OF THE STUDY VARIABLES

Variables	Estimation method	Nature of the variable	Assigned code
Beta	$\frac{Cov(r_i; r_m)}{\sigma_{rm}}$	Explained variable	$\boldsymbol{y_1}$
Gearing	$\frac{Net\ M\ and\ LT\ debt}{Equity}$	Explanatory variable	$\boldsymbol{x_1}$
Change in net income	$\left(\frac{R_2 - R_1}{R_1}\right) \times 100$	Explanatory variable	$\boldsymbol{x_2}$

Source: Compiled by authors.

Thereafter we proceed to a successive confrontation between the variable $\boldsymbol{y_1}$, and $\boldsymbol{x_1}$ *and* $\boldsymbol{x_2}$ respectively to specify the nature of the relationship between the various variables.

THE EMPIRICAL STUDY

After identifying the nature of the panel used, we will then present the results and discussions relating to the econometric study.

The Study Sample

In our study, we used accounting data from companies listed on the Casablanca Stock Exchange (Morocco), which until January 31, 2020, constitute 74 companies spread over 25 different business sectors (see Appendix 1).

For special cases (banks and insurance companies), merger or eradication from the stock exchange, or insufficient summary statements for the chosen study horizon, we have retained 44 companies that will constitute our sample over a period from 2008 to 2019, and which are as follows:

TABLE 2
THE SHARE OF INDEBTED AND NON-INDEBTED COMPANIES IN THE SAMPLE

	Total companies in the sample	**Non-indebted companies**	**Indebted companies**
Number of companies	44	6	38
Number of observations (over 12 years)	528	72	456
Percentages by sub-sample	**100%**	**14%**	**86%**

Source: Compiled by authors.

In the majority, 86% of the companies in our sample resort to debt at different levels to cover their capital needs and face am indebted structure.

TABLE 3
THE SHARE OF COMPANIES WITH MORE THAN 50% IN DEBTS

	Total indebted enterprises in the sample	**Companies with more than 50% debt(*)**	**Companies with less than 50% debt**
Number of companies	38	3	35
Percentages by category	100%	8%	92%

Source: Compiled by authors.
(*) In relation to the financial structure (debts + Equity).

It should also be noted that among the indebted companies, we find 8% of companies that do not have financial autonomy (Debt/Debt+Equity ≥50%). This means that, even in the presence of debt, **the companies in the sample rely more on equity while remaining closer to financial autonomy**.

Presentation and Discussion of Econometric Results

The econometric results obtained are estimates linked to Fisher statistics on a hypothesis test that is related to assumptions on the coefficients of the variables studied **(Bourbonnais, 2015)**.

In this context, as explained earlier, the more indebted a company is ($\boldsymbol{x_1}$), the higher its β ($\boldsymbol{y_1}$) would be ($\boldsymbol{H_1}$). At the same time the higher the earnings growth rate ($\boldsymbol{x_2}$) the higher the β ($\boldsymbol{y_1}$) would be ($\boldsymbol{H_2}$).

The sub-panel gathered from the main sample, will be useful for a first confrontation between $\boldsymbol{y_1}$ $\boldsymbol{and}$ $\boldsymbol{x_1}$ on the one hand, and then between $\boldsymbol{y_1}$ $\boldsymbol{and}$ $\boldsymbol{x_2}$ on the other hand, in order to specify the panel behavior and its homogeneity.

The values of the Fisher statistic $\boldsymbol{F_1, F_2}$ $\boldsymbol{and}$ $\boldsymbol{F_3}$ related to the study of the hypotheses $\boldsymbol{H_1}$ and $\boldsymbol{H_2}$ are gathered in the following tables:

TABLE 4
ESTIMATED VALUES OF F_1, F_2 AND F_3 AND THEIR P-VALUES

Research Hypothesis	Study variable		Number of Companies N	Number of years T	Exogenous Variables K	Fisher F								
						F1			F2			F3		
	Variable to be explained	Explanatory Variable				Estimated by Eviews	Calculated	P Value	Estimated by Eviews	Calculated	P Value	Estimated by Eviews	Calculated	P Value
H1	Y1	X1	44	8	1	64.42830	1.3201	4.00E-138	2.43203	1.4264	9.47E-06	105.30307	1.4199	100E-158
H2	Y1	X2	44	8	1	51.79273	1.3201	1.90E-126	0.85240	1.4264	0.731	104.90172	1.4199	1.80E-158

Source: Compiled by authors.

TABLE 5
DETERMINATION OF THE NATURE OF THE STUDIED SUB-PANELS BY CONFRONTED VARIABLE

Research Hypothesis	Study variable		Number of companies N	Number of years T	Exogenous variables K	According to Fisher's statistic			According to the P value of F			Nature of the panel		
	Variable to be explained	Explanatory Variable				Study of H(01)	DE Study of H(02)	Study of H(03)	Study of H(01)	Study of H(02)	Study of H(03)	Test 1	Test 2	Test 3
H1	Y1	X1	44	8	1	R	R	R	R	R	R	*	TH	-
H2	Y1	X2	44	8	1	R	T	R	R	T	R	*	Test 3	IEM

Source: Compiled by authors.
with:

R : Rejected;
T : True;
IEM: Individual effect model;
TH : Total heterogeneity.

For the first hypothesis, the comparison between y_1 and x_1 showed that the panel (y_1x_1), shows a **total heterogeneity** for which there is no possible link in time between y_1 and x_1. For the panel (y_1x_2), according to the results of the estimations, it is said to have an individual effect $(y_{2;it} = a_{it} + a'x_{2;it} + \varepsilon_{it})$, for which we note that the constant values a_{oi} differ among individuals, while the coefficients a_i' ($a_i' = a'$) of the explanatory variables are constant. Consequently, we note the absence of a perfect link over time between the variable to be explained y_1, and the explanatory variables x_1 and x_2.

This study's problem statement has led us to explain it through two hypotheses H_1 and H_2. For this reason, we used the gearing (x_1) as an explanatory variable of the company's financial structure, and hence the financial risk related to the debt, as well as the growth rate of the earnings (x_2) as an element that also influences the company's βeta.

Going back to H_1, we cannot confirm that debt directly impacts the βeta of the company's stock. Following the panel results (y_1x_2), we can say that the relationship between the βeta and the earnings growth is company specific. The generalization of this relationship remains invalidated.

From this, we note that hypotheses H_1 *and* H_2 remain invalidated, in the absence of a direct confirmation, the company's financial risk is not directly impacted by the level of debt to equity or the volatility of the earnings growth rate.

CONCLUSION

As a result of these findings, the financial risk measured by βeta among the companies in our study did not reflect any sensitivity to the choice of the financial structure and earnings growth rate. In corporate finance, the βeta is normally a function of these two components, as mentioned earlier. The case concerning us, was far from directly endorsing this direction of linkage, it remains unconfirmed for the panel (y_1x_2; βeta - earnings growth rate).

Regarding our first hypothesis, where it was assumed that the debt financing decision impacts the company's financial risk, we received results that broadly invalidated this hypothesis. In a very broad sense, βeta measures the financial risk of a firm. By detailing it to the various types of financial risks which can affect the volatility of a share price, we can say in this regard, that the absence of a confirmed relationship between the βeta and the gearing of a company on the one hand, and then the βeta and the volatility of the earnings or their variations on the other hand, can only be explained by the share of the debt risk compared to the other risks, which preponderantly influence the volatility of the share price of the companies in our sample. This share is **surely insignificant** to stand out from risks other than those of debt.

After the invalidation of the hypotheses of this study, it is clear that debt financing decisions do not have a primary influence on the βeta of the companies studied. Following the second comparison between the βeta and the earnings growth rate, where the contribution was negative, the income flows determine, over time, the value of the company following a valuation approach by the flows, something which has not been confirmed. Thus, we return in this case, to a neutrality of the financial structure on the βeta displayed by these companies.

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ENDNOTES

1. It is assumed in this case that the specific risk is purely a financial risk for companies of the same activity.
2. $\frac{D}{CP+D} = \frac{1}{\frac{CP}{D}+1} = \frac{1}{\frac{1}{gearing}+1}$

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APPENDIX 1

The Distribution of the Companies in the Sample by Sectoral Capitalisation

Business Sector	Facility	Market capitalization	Sectorial Capitalization	Share in %
Agri-food Processing	CARTIER SAADA	168 480 000	34 902 774 993	10,79%
	CENTRALE DANONE	5 925 180 000		
	COSUMAR	20 683 235 603		
	DARI COUSPATE	1 234 675 750		
	LESIEUR CRISTAL	4 973 671 800		
	UNIMER	1 917 531 840		
Building and Construction Materials	ALUMINIUM DU MAROC	783 268 674	69 745 560 141	21,56%
	CIMENTS DU MAROC	23 963 766 640		
	COLORADO	675 730 827		
	LAFARGEHOLCIM MAR	43 347 794 000		
	SONASID	975 000 000		
Beverage	SOCIETE DES BOISSONS DU MAROC	8 064 511 050	10 996 891 050	3,40%
	OULMES	2 932 380 000		
Chemicals	MAGHREB OXYGENE	156 731 250	1 301 531 250	0,40%
	SNEP	1 144 800 000		
Distributors	AUTO HALL	4 023 562 240	14 162 031 643	4,37%
	AUTO NEJMA	2 251 180 800		
	FENNIE BROSSETTE	111 593 209		
	LABEL VIE	7 616 935 046		
	REALISATIONS MECANIQUE	60 832 000		
	STOKVIS NORD AFRIQUE	97 928 348		
Electronic and electrical equipment	NEXANS MAROC	301 977 792	301 977 792	0,09%
Pharmaceutical Industry	PROMOPHARM S.A	856 000 000	3 773 800 000	1,16%
	SOTHEMA	2 917 800 000		
Engineering and industrial equipment	DELATTRE LEVIVIER MAROC	65 000 000	65 000 000	0,02%
Leisure and Hotels	RISMA	2 435 580 990	2 435 580 990	0,75%
Hardware, software, and computer services	HPS	2 638 496 250	3 895 016 567	1,20%
	IB MAROC.COM	18 315 111		
	INVOLYS	61 234 560		
	M2M GROUP	387 370 646		
	MICRODATA	789 600 000		

Business Sector	Facility	Market capitalization	Sectorial Capitalization	Share in %
Mining	MANAGEM	8 492 611 800	11 072 112 920	3,42%
	SMI	2 579 501 120		
Real estate investmant and promotion	ALLIANCES	1 236 400 928	4 894 198 646	1,51%
	DOUJA PROM ADDOHA	3 657 797 718		
Oil & Gas	AFRIQUIA GAZ	13 065 937 500	23 522 257 500	7,27%
	TOTAL MAROC	10 456 320 000		
Coporate services	LYDEC	3 567 200 000	3 567 200 000	1,10%
Real estate investmant trusts	BALIMA	150 681 600	150 681 600	0,04%
Holding companies	DELTA HOLDING	2 995 920 000	2 995 920 000	0,92%
Forestry and Paper	MED PAPER	51 651 100	51 651 100	0,01%
Telecommunications	ITISSALAT AL-MAGHREB	134 501 587 020	134 501 587 020	41,58%
Transport	CTM	1 054 341 080	1 104 624 780	0,34%
	TIMAR	50 283 700		
TOTALS	**44**	**323 440 397 992**	**323 440 397 992**	**100%**

APPENDIX 2

Specification of the Panel (Y1 X1): The Beta # The Gearing

Dependent Variable: Y1?
Method: Pooled Least Squares
Sample: 2012 2019
Included observations: 8
Cross-sections included: 44
Total pool (balanced) observations: 352

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.560042	0.010274	54.50884	0.0000
X1?	-0.000611	0.000548	-1.114491	0.2659
Fixed Effects (Cross)				
_1--C	0.594281		_23--C	0.254506
_2--C	0.400566		_24--C	-0.097656
_3--C	-0.141845		_25--C	1.384175
_4--C	0.061372		_26--C	0.105924
_5--C	0.385011		_27--C	0.372265
_6--C	-0.342361		_28--C	-0.347024
_7--C	-0.562761		_29--C	-0.281843
_8--C	-0.187285		_30--C	0.615188
_9--C	-0.270575		_31--C	-0.037783
_10--C	-0.325068		_32--C	-0.037649
_11--C	0.763259		_33--C	-0.530245
_12--C	-0.082901		_34--C	-0.256903
_13--C	0.277587		_35--C	-0.445707
_14--C	0.188225		_36--C	0.033975
_15--C	-0.402759		_37--C	0.337559
_16--C	-0.226545		_38--C	-0.278225
_17--C	-0.235859		_39--C	-0.223031
_18--C	0.591715		_40--C	0.542172
_19--C	-0.042532		_41--C	-0.375826
_20--C	0.168665		_42--C	-0.149653
_21--C	-0.070404		_43--C	-0.460566
_22--C	-0.133513		_44--C	-0.529923

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.835094	Mean dependent var	0.559150
Adjusted R-squared	0.811460	S.D. dependent var	0.442589
S.E. of regression	0.192178	Akaike info criterion	-0.341894
Sum squared resid	11.33821	Schwarz criterion	0.152036
Log likelihood	105.1734	Hannan-Quinn criter.	-0.145334
F-statistic	35.33342	Durbin-Watson stat	0.628697
Prob(F-statistic)	0.000000		

APPENDIX 3

Specification of the Panel (Y1 X2): The Beta # The Earnings Growth Rate

Dependent Variable: Y1?
Method: Pooled Least Squares
Sample: 2012 2019
Included observations: 8
Cross-sections included: 44
Total pool (balanced) observations: 352

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.561633	0.010343	54.30175	0.0000
X2?	0.005624	0.003564	1.578054	0.1156
Fixed Effects (Cross)				
_1--C	0.593264		_23--C	0.253030
_2--C	0.398360		_24--C	-0.101550
_3--C	-0.141848		_25--C	1.382245
_4--C	0.058475		_26--C	0.101846
_5--C	0.383461		_27--C	0.370249
_6--C	-0.344401		_28--C	-0.349497
_7--C	-0.564541		_29--C	-0.284217
_8--C	-0.189026		_30--C	0.619169
_9--C	-0.272422		_31--C	-0.064655
_10--C	-0.323567		_32--C	-0.040225
_11--C	0.765331		_33--C	-0.535567
_12--C	-0.084320		_34--C	-0.260568
_13--C	0.276204		_35--C	-0.447289
_14--C	0.186158		_36--C	0.083988
_15--C	-0.405278		_37--C	0.338302
_16--C	-0.229491		_38--C	-0.267932
_17--C	-0.226302		_39--C	-0.219966
_18--C	0.589763		_40--C	0.547896
_19--C	-0.041743		_41--C	-0.378533
_20--C	0.167043		_42--C	-0.150596
_21--C	-0.063756		_43--C	-0.455486
_22--C	-0.139729		_44--C	-0.532277

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.835759	Mean dependent var	0.559150
Adjusted R-squared	0.812220	S.D. dependent var	0.442589
S.E. of regression	0.191790	Akaike info criterion	-0.345935
Sum squared resid	11.29248	Schwarz criterion	0.147995
Log likelihood	105.8846	Hannan-Quinn criter.	-0.149375
F-statistic	35.50475	Durbin-Watson stat	0.644041
Prob(F-statistic)	0.000000		