

Financial development and corporate financing choice: Evidence from Morocco

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Summary

This paper is based on the microeconomic determinants of the capital structure of companies, which have fueled a lot of works. The idea is to mix it up with macroeconomic factors, in particular financial development. We sought to assess the influences that developments in the financial market and financial intermediation in our country actually exert on the behavior of listed companies, in the light of the predictions of the trade-off and the pecking-order theories. Using secondary data from various sources, we proceeded with a time series model over the period 2000-2020. Given the serial autocorrelation of errors, we used the Prais-Winsten method, whose generalized least squares estimator solves also the problem of heteroscedasticity. Our results show that the development of the Moroccan financial market negatively influences the debt ratio of companies, as well as the soundness of the financial system. On the other hand, the rise of financial intermediation leads to an increase in the behavior of indebtedness of these.

Keywords: Financial development; capital structure; Morocco ; trade-off theory; pecking order theory; Prais-Winsten method.

1. Introduction

When we try to delve into the financial literature, we can manage to highlight the main factors that influence the financing decisions of the company, and therefore the determinants of its financial structure and its cost of capital. Since Modigliani and Miller's groundbreaking analysis, other contributions have attempted to extend the study. These notably proceeded by questioning some basic assumptions which appeared unrealistic, and replacing them with others. In the end, we ended up with determinants like taxation, information asymmetry, agency, bankruptcy and transaction costs. In addition, the trade-off theory and the pecking order theory are the two that dominate the theoretical field of the capital structure of the company.

The review of the empirical literature then enabled us to identify the different dependent and independent variables used as well as the corresponding measures retained. In almost all the research work carried out, both in industrialized countries and in emerging countries, the main common variables are of an accounting and financial nature relating to the companies studied and other macroeconomic variables such as the rate of inflation, GDP growth and market capitalization. The results obtained are generally convergent.

We propose to examine the following issue: "How does financial development, taken in its broad sense, actually exert influences on the financing decisions of listed Moroccan non-financial companies, and by extension, on their capital structures?". We start from the assumptions that the development of the capital market would lower the debt ratio while the development of financial intermediation would improve the said ratio. The study covered 55 companies over the period 2000-2020. More specifically, we seek to examine whether these firms make their choices in accordance with the trade-off theory or the pecking order one. Our approach justifies an originality which manifests itself in the integration of the financial stability variable, not taken into consideration in previous studies, and the improvement of the measures of financial development by the composite indicators developed by the IMF.

Accordingly, this article is structured as follows. We begin by presenting theoretical and empirical literature reviews. The second step concerns the definition and documentation of the variables to be used, with their measurements, and the presenting of hypothesis which will be tested. Then comes the description of the data and their sources, with supporting descriptive statistics. Next, we will present the empirical model to be estimated and the technique(s) for estimating the parameters of the model. Finally, we turn to the interpretation of the obtained results.

2. Literature review

2.1 Theoretical literature

Analyses of corporate financing decisions are far from universal. The frames of reference are indeed disparate as we have moved from the neoclassical frame of reference, to that of the agency and then to the frame of reference of transaction costs. Financial thought was at first fundamentally descriptive. Then, in 1958 Modigliani and Miller revolutionized it with their theory of the neutrality of the financing structure in a situation of absence of taxation. The analysis framework retained served as a frame of reference for further study on the existence or not of an optimal financing structure, in connection with relaxations of the basic assumptions, in particular the introduction of relative imperfections. taxation and bankruptcy costs.

In the agency framework of Jensen and Meckling (1976), the firm is perceived as a legal fiction, a node of contracts established between individuals, with conflicting interests, with divergent objectives and whose available stock of information is asymmetrical. . This framework defends the idea according to which the company proceeds by arbitration between, on the one hand, the economic advantages linked to the tax deductibility of the interest charges of the debt and the various costs, implicit or explicit, inevitably associated to bankruptcy.

Faced with these theories, all based on the static vision provided by so-called arbitration theory, Myers and Majluf (1984) proposed a reasoning framework inspired by game theory, while focusing on the problems caused by information asymmetry. It is a scenario diametrically opposed to that proposed by the classic vision of arbitration. Indeed, the financing structure would result from a process of successive optimal decisions, in which the decision-makers take care, each time, to set aside the costs corresponding to the asymmetric information.

Limiting ourselves to this level of detail, we argue that two main theories dominate the theoretical field of the explanation of the structure of corporate financing. These are trade-off theory and the pecking order theory. The first is a theory that believes in the existence of an optimal financial structure and therefore in the possibility of determining an optimal debt ratio by an optimization procedure comparing the advantages and disadvantages of the various sources of financing at the layout of the business. The trade-off theory is actually the result of relaxing or easing taxation and bankruptcy costs. In this respect, the deductibility of the taxable income of the interest on the debt contracted will have the effect of improving the value of the company concerned by the debt, compared to a company without debt. Faced with such opportunities, companies would be tempted to finance themselves by resorting to debt rather

than their own funds. But the introduction of agency and bankruptcy costs associated with indebtedness will put a stop to companies' desire to finance themselves through debt. This is what leads to admitting the existence of an optimal debt ratio.

For the pecking order theory, developed from 1984 by Majluf and Myers, the asymmetry of information, which taints the relationship between the internal actors of the company and the donors, is the basis of the company's financing decision. Consequently, the financial policy pursued by the leaders aims to make this informational asymmetry less costly. This requires the prioritization of funding and the choice of internal funding in preference to external funding. The sequence is as follows: internal equity – non-risky debts – risky debts – capital opening. The expected benefits, by ensuring the strict implementation of this hierarchy are undeniable and refer to the prevention of the fall in the price of the company's equity securities, the limitation of the distribution of dividends (and therefore the stimulation of self-financing) and finally, and this is perhaps the most interesting, the possibility of lowering the company's cost of capital thanks to the control of the financial risk associated with excessive recourse to debt. In this, companies deemed to be profitable, then have more internal financing at their disposal.

2.2 Empirical literature

In light of this theoretical framework, most empirical studies focus on the determinants of capital structure. In this sense, many of the factors correlated with debt ratios have been identified through these two paradigms (trade-off theory and pecking order theory). In this regard, most empirical studies have been conducted in developed countries, mainly the United States (Bradley et al., 1984; Taggart Robert, 1985; Titman & Wessels, 1988).

However, since at least the mid-1990s, there have been a number of studies examining the determinants of leverage in developing countries (e.g., Correa, Fernando and Nakamura, 2005; Christian Espinosa, Carlos Maquieira, João Paulo Vieito and Marcelo González, 2012; Huang & Song, 2006; Köksal and Orman, 2014; Memon et al., 2015; Pandey, 2004; Paredes Gómez et al., 2016; Qureshi, 2009; Wiwattanakantang, 1999). In this context, the pioneering study by Booth et al. (2001) show that the financial factors affecting the choice of financing in developing countries are similar to those in developed countries. However, the difference observed emerges at the level of each country's specific macroeconomic factors.

Furthermore, it was the study by Agarwal and Mohtadi¹ (2004) that was the first rigorous research relating to developing countries. The issues of equity and debt financing have become increasingly important given the rapid growth and development of financial markets in developing countries, particularly during the 1990s. In recent years, the fact remains that stock markets in emerging countries play central roles, compared to what they were a decade earlier, thanks in particular to financial and trade liberalization in these countries. The authors then tried to re-examine the choices of corporate financing by focusing on the determinants of the debt-equity ratios of companies in 21 developing countries during the period 1980-1997, using a dynamic panel model.

The main results of the study show that the development of the financial market, measured by stock market capitalization, is significantly and negatively linked to the levels of indebtedness of companies relative to their capital, while the variables of the banking sector (in particular bank deposits) are significantly and positively associated with the debt-to-equity ratio. Despite these results observed for both the short and the long term, we noted differences, in the short-term vs the long-term, relating to the effects of market and banking sector variables.

With regard to the African context, Wafa Khemiri and Hédi Noubbigh² studied the determinants of the capital structure of non-financial companies in certain countries of sub-Saharan Africa over the period 2006-2016. More precisely, the study reflects two main objectives, namely to study the determinants of capital structure in order to distinguish between the two theories, and to test the non-linearity between performance and leverage of non-financial companies in sub-Saharan Africa. For the measure of indebtedness, the study retained long-term debt in relation to total assets as a measure of leverage. Long-term debt is the measure of how total assets are funded by long-term debt. This ratio has already been used in a number of empirical studies (Chen, 2004; Frank & Goyal, 2009; Köksal and Orman, 2014; Memon et al., 2015).

With regard to the determinants of indebtedness, we first noted profitability, measured by ROA and ROE, growth opportunities, guarantees, company taxation, liquidity, earnings

¹ Agarwal, S and Mohtadi, H. « Financial markets and the financing choice of firms: Evidence from developing countries ». Global Finance Journal 2004. www.sciencedirect.com

² Wafa, Khémiri and Hédi, Noubbigh. « *Determinants of capital structure : Evidence from sub-Saharan African firms* ». The Quarterly Review of Economics and Finance. May 2018.

volatility. Control variables are added, namely the firm's ability to honor these commitments at maturity, to grant guarantees and finally the reputation of the companies (measured by its age). Finally, other variables are introduced that seem to be beneficial for this study. These are macroeconomic variables reflecting the specific characteristics of each country. These are the degree of development of the financial market, the GDP growth rate to control the economic conditions of the country, the inflation rate, the nominal interest rate and the ownership structure of the company.

In addition, the company's ability to honor its short-term commitments, measured by the liquidity ratio, is also significant. Its coefficient shows, in all the regressions, a negative and significant sign at 1%. This is due to the inability of African companies to repay their short-term payable liabilities. This forces them to find other sources of funding. This result is therefore consistent with hierarchical funding theory. The development of the capital market also has a negative effect, and significant at 1%, on the long-term debt ratio of companies. Indeed, this development offers capital financing and leads companies to restrict their recourse to debt.

For the six Gulf monarchies, Ramzi Zeitun, Akram Temimi and Karim Mimouni³ have studied the financial structure of firms in these countries, in light of the 2008 financial crisis. The empirical literature on capital structure has attempted to study these effects to confirm the predictions of the two theories, the trade-off theory and the hierarchical funding theory, when they agree and to distinguish which impact prevails when the predictions of the theories are mixed. The main empirical findings of the study are broken down according to whether they all relate to the study period, the pre-financial crisis phase or the post-global crisis period of the early millennium. Thus, over the entire period 2003-2013, four versions of the model were estimated, with differences from the point of view of the number of variables included in each specification. For the four models, the dummy variable of the crisis reveals a negative and significant influence. This proves that the 2008-2009 financial crisis had a negative impact on corporate debt. This shows that credit demand would be a determining factor in the post-crisis financing structure.

³ Ramzi Zeitun, Akram Temimi and Karim Mimouni. « *Do financial crises alter the dynamics of corporate capital structure? Evidence from GCC countries* ». The Quarterly Review of Economics and Finance 63 (2017) 21 – 33.

For the period before the 2008 crisis, growth opportunities, profitability, liquidity and risk are highly significant in determining indebtedness and their signs are more in line with the trade-off theory. On the other hand, tangibility, GDP growth and financial market development are not significant. Indeed, the financing structure of companies is mainly guided by their growth potential, their profitability and its variability and their working capital needs. It should be emphasized that tangibility and size are not significant in determining their capital structures. This weak influence can be easily explained by the existence of an elastic supply in which lenders easily granted credit to companies without rigorous examination and without taking into account the true value of their fixed assets or their sizes as the risk of bankruptcy was light before the crisis.

3. Description of variables and data

3.1 Variables and assumptions

In the studies having focused on the decisions of choice of the financial structure of the company, the endogenous variables usually used are the financing debts and the treasury-Liabilities ratios (Long-term debts / Equity) and (Debts to short term / Equity). We believe that these choices undoubtedly resulted from the fact that the balance sheets of companies were presented in the patrimonial logic based on the classification of resources according to their degrees of increasing chargeability. The authors themselves specified that this choice is dictated by the offer of the database of this information on the term of the debts.

The functional logic, reflecting the financial cycles of the company, having since taken over, we will retain the data relating to the financing structure of the company as they emerge from the functional balance sheets published by the non-financial companies listed on the Casablanca Stock Exchange. In this register, it is possible to retain the ratios (Financial debts / Equity) and (Cash-liabilities / Equity). These are two variables that can provide information on the distribution of financial debts (represented by Financing debts and Cash-Liabilities) and equity, decided by the companies studied. It would perhaps be interesting to combine the two debts, to retain the overall financial debt. The latter could be related to equity, as Ziane (2004), Dufour and Molay (2010) and Adair and Adaskou (2014) did. However, this separation makes it possible to verify whether companies have preferences for one or the other source of financing to cover their short- and long-term needs. In this paper, we have retained only the financial debts ratio, as a dependent variable.

In the rank of explanatory variables, we have tried to distinguish, among the variables of the financial system, variables relating to the capital market and others relating to financial intermediation. Control variables will be introduced into the model to be tested. With regard to the variables associated with the capital market, we had to use the variables already widely adopted in the corpus of previous empirical studies. It has always been about market capitalization ratios, value of shares traded and turnover ratio. Alongside these indicators already used, we are going to introduce other variables, namely those designed and proposed by the IMF, in order to better capture the influence of the development of the capital market, as well as the variable accounting for the financial system stability.

The first variable is represented by the market capitalization ratio (MCR / GDP). By relating the total value of equity securities listed on the stock market, this value is an indicator conveying information relating to the size of the financial market. The use of this variable is based on the admission of the idea that there is a direct and positive relationship between the overall size of the market and the ability of companies to raise funds and diversify their risks, thanks to their control transaction costs and their economy-wide impact. Hypothesis H 1 then seeks to test the explanation of the capital structure of Moroccan companies, in accordance with the trade-off theory. It can be formulated as follows: the size of the financial market has a positive impact on the level of equity and negatively on the debt ratio.

The second variable corresponds to the value of shares traded ratio (STR/GDP). The share of the value of shares traded on the financial stock exchange in the GDP is considered as an index all the higher as the liquidity on the scale of the economy as a whole is great. This indicator, which translates the organized exchange of a fraction of the production carried out within the national economy, must be perceived as being a variable which completes the previous one. In this respect, it cannot be ruled out that although the market is large enough, the fact remains that it is in a sluggish situation, due to a lack of animation and securities trading. The variable in question represents, when supplemented by the share turnover rate, an indicator of the liquidity of the financial market. Market liquidity is supposed to reduce information costs and favors, according to the trade-off theory, equity financing. Hypothesis H 2 to be tested can be formulated as follows: market liquidity has a negative influence on the debt ratio.

The turnover ratio (TR) is calculated by relating the value of domestic shares in domestic transactions to the total value of all shares listed on the market. It is used to inquire about the level and weight of transaction costs. We are still dealing with information that completes the two previous ratios. It is accepted that a thin but liquid market will justify a high turnover rate

and a low ratio of securities traded. Thus, the turnover ratio would be low if we are in the presence of a sufficiently large market, but characterized by weak animation. Furthermore, this ratio informs about the organized trade of equity securities relative to the size of the capital market while the ratio of traded shares measures with reference to the economic size of the country. Under the trade-off theory, hypothesis H 3 to be verified is: debt is negatively linked to rapid turnover.

The variables developed by the IMF concern both the depth⁴ of the capital market, access to this market and its efficiency. These three characteristics are synthesized by three corresponding specific indices. In this, we obtain a composite index (IMF Index) reflecting the average of the three specific indices and which is retained as an index of the financial markets. Given its construction, centered on equity securities, the index would reveal the driving role of the market in financing the economy and the ease that companies experience in raising funds there and therefore in financing themselves through equity. This ratio should have a negative impact on the debt ratio. Hypothesis H 4 to be validated, in the spirit of the trade-off theory, is: the stock market development index is negatively related to the debt ratio.

Furthermore, we decided to introduce other variables that are not, to our knowledge, adopted in previous empirical studies. Thus, we estimated that the choices of companies, in terms of financing structure, would be influenced by the development of the TCN market and the financial system stability.

On the one hand, in fact, the development of the negotiable debt securities (NDS) market in Morocco has opened up new opportunities for financing the cash flow of companies, through recourse to the money market. The measure adopted here is NDS ratio (NDS traded on the market / GDP). We have, in doing so, retained behind this measure the assumption that the dynamism of the NDS market would be positively correlated with the propensity of companies to mobilize cash loans, which will stimulate financing by financial debt given the drop in

⁴ Market depth is an interesting indicator for understanding market liquidity. As a measure of the overall level and magnitude of open buy and sell orders for a financial asset, a particular stock, market depth provides information on a market's ability to absorb market orders. of sufficient importance without causing a significant effect on the price of the asset concerned. In this respect, the liquidity of the market is all the greater as the list of trading orders is longer.

associated transaction costs. Here is hypothesis H 5 to be tested, in the spirit of the trade-off theory: the NDS ratio should have a positive impact on the debt ratio.

On the other hand, the financial system solidity, reflecting its resilience to shocks and its ability to play its proper roles, is a characteristic that is supposed to intervene positively in the financing choices of companies. Indeed, the work of King and Levine has shown that financial development positively affects the volume and efficiency of investment. Conversely, the authors note that financial instability, inherent in financial development, negatively affects investment. We can therefore infer, by virtue of the foregoing, that the stability of the financial system would be favorably linked to the choices of corporate financing structures. We have chosen the measure represented by the aggregate financial stability index (FS Index), designed and developed by Moroccan Central Bank (MCB)⁵. The component relating to the evolution of the financial markets was assigned a weighting of approximately 13%, against 33% for financial institutions. This let us to believe that financial stability leads to stimulating companies' recourse to equity and debt. Hypothesis H 6 to be examined is: financial stability seems to positively or negatively influence the corporate debt ratio.

Finally, it is a truism to suggest that interest rates are indubitable vectors of choice. More precisely, the interest rate would be negatively correlated with the use of financial debt. In our study, we will retain two indicators to try to capture the presumed influences of the interest rate, the long-term interest rates on the financial market (LTIR) and the short-term interest rates on money markets (STIR). The variables are documented from successive MCB annual reports. These are the published annual rates for equipment loans for companies, and the average annual rates for cash loans, calculated on the basis of weighted average rates.

Interest rates are two variables that act on the choice of debt financing in the opposite direction to that of their evolution. If interest rates are low, companies will be inclined to resort to debt as this will reduce their cost of financing, and vice versa. In this way, the dilution of powers, in favor of new financing partners, would be avoided and control of the company would always be safeguarded. In accordance with the pecking order theory, hypothesis H 7 to be tested can be formulated as follows: interest rates should be negatively linked to corporate debt.

⁵ It is built, with the assistance of the IMF, and starting from the benchmark of certain countries that have already calculated this type of composite index. The index is calculated from 2007.

Turning now to the variables relating to banking financial institutions, the first variables are the indicator of bank's commitment to economic agents and that of domestic bank deposits. The measures used are respectively the economy general liquidity ratio and domestic bank deposits ratio. The first ratio is ($M3 / GDP$) which, by relating fiduciary circulation, monetary deposits⁶ of individuals, private non-financial companies and public companies as well as securities of monetary UCITS (undertakings for collective investment in transferable securities), to the total wealth produced in the economy, captures the financial depth and size of the banking sector in its relationship to overall domestic economic activity. Used following Levine and King (1993)⁷, this variable reflects, to a large extent, the behavior of banks in the channeling of deposits, attributable to the evolution of the situation during the different phases of the economic cycle. Hypothesis H 8 which must be tested is: the general liquidity of the economy acts positively on the debt ratio of companies.

The second ratio (Domestic bank deposits / GDP) completes the previous one, in terms of information on the size of the banking sector, in its capacity to drain domestic savings. With regard to domestic bank deposits, the calculations are made from the various annual reports of MCB. These are credit accounts at sight, savings accounts on passbooks and term deposits with banks, excluding deposits of Moroccans residing abroad. Hypothesis H 9 to be assessed can be stated as follows: the drainage of domestic deposits by banks should have a positive impact on the debt ratio.

As part of our work, we have considered improving the research model by adding the two variables relating to bank loans to the private sector and the index of financial institutions. In this respect, bank credit oriented towards private productive investment ratio, would be a good additional indicator to better appreciate the importance of financial intermediation. The measurement used for this variable being (Private bank loans / GDP), the indicator illustrates the ability of the banking sector to channel savings and its foresight in identifying and selecting projects to be financed and to manage the corresponding risks. This variable completes the money supply ratio since this one does not provide information on the allocation of credit between the different parts of the economy. Under the pecking order theory, hypothesis H 10,

⁶ These are demand deposits, term deposits and savings accounts of non-financial depositors, including Moroccans residing abroad.

⁷ In their studies on the relationship between the degree of financial development and growth, investment and capital efficiency.

to be assessed, is formulated as follows: corporate debt would be positively impacted by credit to the private sector.

In addition, the financial institutions index (FI index) corresponds to a variable that synthesizes the characteristics of depth⁸, access and efficiency of financial institutions. It is an index obtained by a weighted average of the indices associated with these three components. It reflects the dynamic role played by financial intermediation in meeting the financing needs of businesses. This active role of financial institutions should reduce information asymmetry and therefore encourage companies to seek debt with them. In the spirit of the trade-off theory, hypothesis H 11 is: the index of financial intermediation development should be positively linked to the debt ratio.

The control variables will be those which could intervene in the explanation of the decisions of the companies, in terms of choice of the capital structure, alongside the explanatory variables whose contributions we seek to capture and isolate. Without taking any prior position on these variables, we have decided, in order not to burden our model further, to focus on macroeconomic variables such as GDP, real investment and foreign direct investments (FDI).

With regard to GDP, it is the measure universally adopted to account for the wealth, material and immaterial, produced in an economy. It is therefore an indicator of the size of the economy, which provides information on the financing needs of resident economic agents, including companies, and, consequently, on the decisions of their capital structure. On the one hand, GDP growth would lead to recourse to debt given the insufficiency of internal equity (pecking order theory). On the other hand, this growth would lead to an increase in the risk of moral hazard in corporate behavior. This induces reluctance from lenders and reduces indebtedness. In the spirit of the pecking order theory, hypothesis H 12 is: the GDP should have a positive effect on the indebtedness of the company.

Second, real investment encompasses all expenditures incurred, for the purpose of improving production and income, in material and productive technical capital rather than in financial securities of capital and debt. It is clear that this variable impacts the choices of corporate financing, in equity and/or in loans. In this regard, financing decisions follow the

⁸ The depth of financial intermediation refers to the level of development of financial institutions, in qualitative terms. The best measure of this is any indicator that informs about the development of credit intermediation.

choice of productive investments to be made. The measurement used is the ratio (GFCF/GDP). It provides information on the investment effort made, at the level of the economy as a whole. As for the GDP, the hypothesis H 13 to be tested, according to the pecking order theory, is: the indebtedness of the company would be an increasing function of the investment.

Finally, come the FDI whose inclusion as a control variable is based on the hypothesis put forward by Razin and al. (1998), according to which more open economies tend to substitute capital for debt. From this perspective, as investments made by non-resident economic agents in Moroccan companies, FDI provides information on the degree of financial integration of the Moroccan market in its links with international financial markets. These flows involve capital inflows that are available to companies for their financing in the form of equity participation, reinvested earnings and debt securities. As for the GDP, we used, in our model, the measure (log FDI). Hypothesis H 14, which seeks to test the trade-off theory, is: FDI has a negative impact on corporate debt.

3.2 Data sources

The sample we worked on actually includes 55 non-financial companies listed on the Casablanca stock exchange market. These are companies for which we have data available over the entire study period. This is spread over a period of 21 years, between 2000 and 2020. There are one or two companies whose IPO was done only very late⁹. Consequently, they are eliminated from the scope of the retained study. In this, we are dealing with a population comprising companies from the official economy. They are therefore organized, assume their legal and social obligations and produce honest financial communications for their various partners.

Regarding the sources of data used in our study, we must emphasize that they are varied. The first source used is the stock exchange site, for statistics on the financial structure of companies, their turnover and data relating to the dates of creation of companies, and therefore their ages. For these, we used data from the balance sheets of listed non-financial companies as published by said companies as part of their legal obligation of financial communication to their external partners. It should be noted that for some companies, we could not find corporate accounts, but consolidated balance sheets. We then had recourse to the Moroccan industrial property office to recover the missing summary accounting documents.

⁹ This is the case of Mutandis SCA, which went public in 2018.

In addition, we used the statistical databases of the HCP to draw from them a set of varied data. These include market data relating to the market capitalization of Moroccan shares and the values of shares traded on this market, certain figures relating to the gross domestic product, the monetary aggregate M3 and the investment aggregate real, gross fixed capital formation. In addition, the data concerning FDI in Morocco come from the database of the exchange office while the statistics concerning the development indices of the financial market and financial institutions are extracted from the IMF database.

Finally, the successive annual reports of the Moroccan Central Bank allowed us to complete the GDP, M3 and GFCF data that we did not find in the HCP database. In addition, we used them to collect data relating to the financial stability index, domestic deposits drained by the banking system as well as loans distributed by the private sector and the volumes of negotiable debt securities traded on the Money Market. In addition, thanks to quarterly data relating to interest rates on debits, accounts receivable and cash loans and equipment loans, extracted from these reports, we were able to proceed to the calculations of the average annual short-term interest rates term and medium and long term, respectively.

4. Model and statistics

The general expression of the basic model relates two individual processes X and Y observed during a period of duration T. If we set aside the matrix form of the model to retain the vector expression, the linear connection between the two process is written as follows:

$$y_t = \alpha + \beta_t * X_t + \varepsilon_t \text{ where:}$$

Y_t : Dependent variable. In our study, it is the average financing debt ratio of listed Moroccan companies;

X_t : Vector of the explanatory variables used in our model;

β_t : Vector of the coefficients of endogenous variables;

α : constant of the linear model studied;

ε_t : error term of the specified model. It is supposed to capture the influences of all other variables not explicitly integrated into the model.

We have here 21 observations and 15 explanatory variables. In addition, in this model, the error terms ε_t have two accepted characteristics, namely that their means are zero, have

finite, known and equal variances for all individuals (equal to $\sigma^2 \forall i \in [1, N]$) and are i.i.d¹⁰. And finally, the parameters α and β_t are considered to be invariable in their time dimension.

4.1 Descriptive statistics

It is usual to start by presenting some descriptive statistics of the time series of the different variables of the model. In this regard, examination of the table below reveals the following main facts. First, the debt ratio, market variables are characterized by high variability over time. In addition, the average ratio of financing debt to equity, over the period 2000 – 2020, was 39%. This shows that, on average, equity, higher than financial debt, has always been the main source of financing for listed Moroccan companies.

Moreover, on average 61% of the domestic wealth produced was exchanged on the capital market. Financial intermediation is very active insofar as the ratios of domestic bank deposits and loans distributed to the private sector represented, on average and respectively, 78% and 69% of GDP over the period studied. For their part, the average interest rates around 5.7%, experienced a moderate dispersion of around 21%. Finally, the average indices of capital market, financial intermediaries and financial stability amounted to 25%, 40% and 46%, respectively. Their temporal variabilities were very low, with respective standard deviations of 4%, 1% and 1.6%.

Variables	Mean	Std. Deviation
Financial debts/equity	0,37	0,94
Liability cash/equity	0,56	0,89
MCR/GDP	0,53	0,18
STR/GDP	6,91	6,43
Turnover ratio	18,5	15,7
Liability/GDP	1,08	15,9
FMI Index	0,25	0,18
NDS/GDP	0,07	0,10
Bank Deposit/GDP	0,71	0,11
BLPS/GDP	0,62	0,12
FI Index	0,56	0,39
LTIR	6,85	1,93

¹⁰ Independently and identically distributed in the time dimension.

FSI	0,47	0,54
Log (GDB)	11,96	0,15
Log (FDI)	10,44	0,19
Inv Rate	0,28	0,31
STIR	5,87	0,94

Table of descriptive statistics of variables

Source: output from our study (STATA 14).

4.2 Corrélations

	FD/Equity	LC/Equity	MCR/GDP	STR/GDP	Turnover ratio	Liability/GDP	IMF Index	NDS/GDP	BD/GDP	BLPS/GDP	Flin dex	LTIR	FSI	Log (GDP)	Log FDI	Inv rate	STIR
Financial debt	1.0000																
Liability cash	0.834	1.0000															
MCR/GDP	-0.297	-0.060	1.0000														
STR/GDP	-0.534	-0.196	0.6311	1.0000													
Turnover ratio	-0.459	-0.275	-0.0681	0.6919	1.0000												
Liability/GDP	0.146	0.321	0.6317	0.0742	-0.6976	1.0000											
FMI Index	0.013	-0.102	0.1358	0.2674	-0.3627	0.2858	1.0000										
NDS/GDP	0.032	-0.002	0.0448	0.2236	-0.3636	0.3043	0.0309	1.0000									
Bank Deposit	0.131	0.292	0.5168	0.1766	-0.7414	0.9642	0.3647	0.3331	1.000								
BLPS/GDP	0.029	0.058	0.5378	0.1138	-0.6556	0.7434	0.3945	0.5615	0.748	1.0000							
FI Index	0.229	0.262	0.4269	0.3358	-0.8135	0.8994	0.3725	0.3552	0.929	0.6817	1.00						
LTIR	-0.172	-0.276	-0.6037	0.0646	0.6395	-0.8959	-0.2562	-0.2669	-0.883	-0.6013	-0.93	1.00					
FSI	-0.265	-0.226	0.1451	0.1849	0.1834	-0.1587	-0.2599	0.2686	-0.187	0.2651	-0.23	0.28	1.00				
Log (GDB)	0.255	0.301	0.4367	0.3027	-0.7554	0.8907	0.3626	0.2885	0.908	0.5829	0.97	-0.93	-0.28	1.00			
Log (FDI)	0.069	0.146	0.5444	0.1017	-0.3611	0.6251	0.2158	0.1737	0.622	0.4005	0.66	-0.72	-0.17	0.67	1.00		
Inv Rate	-0.124	-0.072	0.7942	0.2674	-0.3531	0.6725	0.3113	0.4111	0.650	0.7670	0.61	-0.68	0.13	0.59	0.59	1.00	
STIR	-0.134	-0.180	0.1479	0.3373	0.1837	-0.1680	-0.2031	0.0476	-0.209	0.1779	-0.31	0.27	0.34	-0.44	0.06	0.11	1.00

Correlations matrix

Source: output from our study (STATA 14).

For the variables related to liquidity and market size and stock turnover, we found a very strong negative correlation between these variables and the equity ratio relative to the balance sheet. On the other hand, the links between these same variables and the ratio of cash-liabilities to equity are certainly negative, but moderate to weak. Finally, the two variables concerning the capital markets index and the ratio of TCNs traded on the market are weakly correlated positively with the ratio of financing debts, and negatively with that of cash-liabilities.

In the section of financial intermediation variables, it should be noted on the one hand the positive correlation, the degree of which varies between low and medium, between the ratios of domestic bank deposits and the liquid liabilities of banks as well as the index of financial institutions and corporate debt ratios, both for financing debts and for financing by cash-liabilities. On the other hand, the variables relating to bank loans to the private sector and the

debit interest rates practiced by the banks, are also correlated, certainly of similar degree, but negative with the two debt ratios.

With regard to the other variables, it is important to note that the correlations are disparate both in terms of their direction and their degree. In this respect, the financial sector stability index and the real investment ratio are negatively correlated with the ratios of financing debts and bank financing of the company's operations and cash. On the other hand, while the correlation between domestic wealth produced and debt ratios is positive and medium, FDI is positively and moderately correlated with the ratio of financing debts.

Returning to the control variables, we note that the real investment rate is positively correlated with the variables of the equity market and the banking sector. In addition, FDI as a percentage of GDP is positively correlated with stock market variables, and negatively correlated with financial intermediation variables. Furthermore, we note that GDP, as a measure of the size of the economy, is curiously negatively correlated with stock market indicators. The correlation with the variables of the financial intermediaries is ambiguous since sometimes it is positive and sometimes it becomes negative.

5. Results and discussions

5.1 Regression results

After stationarization of the variables, we raised the problem of autocorrelation of errors. We solved it using the Praise-Winsten method. The following table summarizes the main indicators of the regression carried out on the exogenous variables on the financing debt ratio.

Source	SS	df	MS	Number of obs	=	20
				F(15, 4)	=	9.89
Model	41.8650293	15	2.79100195	Prob > F	=	0.0196
Residual	1.12927708	4	.282319269	R-squared	=	0.9737
				Adj R-squared	=	0.8752
Total	42.9943064	19	2.26285823	Root MSE	=	.53134

Financial debts/equity	Coef	Std. Err.	t	P> t
MCR/GDP	-4.57833	5.902942	-0.78	0.481
STR/GDP	.109340	.177829	0.61	0.572
Turnover ratio	-.050885	.0431597	-1.18	0.304
Liability/GDP	9.71720	5.17315	1.88	0.134
FMI Index	-17.1239	13.83306	-1.24	0.283
NDS/GDP	1.8733	1.628925	1.15	0.314
Bank Deposit/GDP	-6.11195	8.224855	-0.74	0.499
BLPS/GDP	18.3266	4.764109	3.85	0.018
FI Index	-77.2392	17.37676	-4.44	0.011
LTIR	-.927478	.274071	-3.38	0.028
FSI	-13.3329	5.083255	-2.62	0.059
Log (GDB)	2.66059	1.15167	2.31	0.082
Log (FDI)	-119.073	21.43144	-5.56	0.005
Inv Rate	-.841809	.3467155	-2.43	0.072
STIR	38.3522	8.083641	4.74	0.009
_cons	-407.917	84.63727	-4.82	0.009
rho	1.141402			

Table of the results of the regressions on the financing debt ratio

Source: output from our study (STATA 14).

5.2 Analysis of results

The first variable relating to the size of the capital market, measured by the ratio (Market capitalization/GDP), has a negative but insignificant coefficient. This means that the size of the market exerts a negative influence, but not a strong one, on the indebtedness of Moroccan companies for the financing of investment. This finding is consistent with the conclusions of the trade-off theory. Indeed, a market of sufficient size would allow the company to raise the capital funds necessary to finance its top of the balance sheet and to improve its working capital.

The theory of transaction costs (Williamson, 1988) can be used here in an attempt to seek to justify this result. Taking advantage of low transaction costs leads to choosing, in these circumstances, equity financing, which would reduce the debt ratio. Our hypothesis H1 is

therefore confirmed, a strong financial capitalization reduces the indebtedness of listed companies. This result is in agreement with those of the work carried out by Booth et al. (2001), Agarwal and Mohtadi (2003), Zeitun et al. (2017) and Khemiri and Noubigh (2018). This result also seems to refute the statements of the theory of hierarchical financing, in its second sequence, in the sense that the recourse to the increase in capital precedes indebtedness.

The second variable corresponds to the liquidity of the capital market, measured by the ratio (shares traded/GDP). The results show that this variable exerts a positive influence certainly, but not significant on the ratio of the financing debts of the listed Moroccan company. Market liquidity therefore increases the indebtedness of listed companies. This attests that the second hypothesis has not been validated, thus calling into question the claims of the trade-off theory. This result contradicts that found in the study by Agarwal and Mohtadi (2003).

With regard to the turnover of equity securities traded on the market, we find that this variable exerts an influence that is both negative and insignificant on the indebtedness of listed companies. Our third hypothesis H 3, which provides information on the proportion of listed shares that change owners, is therefore, in accordance with the trade-off theory, verified in our model. But it should be emphasized that the negative influence that this variable exerts on the debt ratio is not significant enough. This result is consistent with those established by Agarwal and Mohtadi (2003) and Zeitun et al. (2017).

The fourth explanatory variable, which refers to the financial market development index as defined by the IMF, was in turn found to be able to exert a negative and insignificant impact on corporate term debt. . In this register, thanks to the depth of the financial market, access is becoming more and more open and a growing number of companies are accessing it to be financed by capital increase. This broad financial inclusion is accompanied by improved allocational efficiency thanks to lower transaction costs. This result is consistent with that of Book et al. (2001) who maintained that the development of the equity market pushes companies to limit their recourse to credit. Hypothesis H 4 tested in the spirit of the trade-off theory is therefore validated in our model. It refers to the fact that the development of the capital market has a lowering effect on the debt ratio of listed companies.

As for the last variable relating to the capital market, it is the development of the money market and its openness to businesses. We find that this variable exerts a positive but insignificant influence on the debt behavior of the Moroccan companies studied. The weakness of the impact may be motivated much more by the discouragement associated with the

conditions for issuing commercial paper on the money market, in particular those relating to the nominal amount. Hypothesis H5 is therefore confirmed. According to the theory of compromise, the development of exchanges of negotiable debt securities on the money market allows companies to obtain funding for cash and their current expenses. The corresponding reduction in transaction costs must have played some role in this reality (Williamson, 1988).

Moreover, financial stability exerts a negative influence on the indebtedness of Moroccan companies. This influence is on the verge of significance. It seems to us that the resilience of the financial sector has been made much more in favor of strengthening the financing of Moroccan companies by directly appealing to surplus agents on the capital market, and to turn away from recourse to debt. Hypothesis H 6, which expected influence in one direction or the other, is verified and this in accordance with the teachings of the trade-off theory. It cannot be ruled out that the benefit of largely standardized financing contracts with controllable transaction costs (Williamson, 1988) reinforces this propensity of Moroccan companies to take advantage of the robustness of the Moroccan financial system to obtain financing from the capital market.

For interest rates, the regression results show that the financing debt ratio is negatively impacted by these rates. This is expected as the increase in the cost of credit will tend to modify the behavior of companies in their choice to finance themselves through debt, in accordance with the lessons of the agency theory of Jensen and Meckling (1976). However, it is the influence of medium and long-term interest rates that is significant. Indeed, a 1% increase in these rates will cause a decrease in term debt of 0.92%. In accordance with the theory of hierarchical financing, hypothesis H 7 is validated, debt is a decreasing function of interest rates. This result confirms that found by Handoo and Sharma (2014). However, it is not consistent with that found by Khemiri and Noubigh (2018), for whom the relationship would be positive.

For the general liquidity of the economy, measured by the ratio (M3/GDP), the impact it has on the term debt of companies is certainly positive but not significant. This positive influence stems from the fact that any increase in the commitments of the banking system, with regard to non-banking economic agents, is synonymous with a system whose efforts to fight against hoarding are crowned with success. The speed of circulation of means of payment is improving, making the supply of credit even more stimulating for demand. The combined effects of these factors encourage companies to take on more debt with banks. Hypothesis H8 is therefore verified. This fits with the provisions of the trade-off theory, with companies

seeking to take advantage of the resulting cost savings. Our result is in line with that established by King and Levine (1993), Agarwal and Mohtadi (2003), for whom the impact is significant in the long term only, Zeitun et al. (2017).

Domestic bank deposits with banks have contrasting effects on the behavior of listed companies with regard to their recourse to debt to finance themselves. In this regard, the drainage of savings from resident economic agents has a negative impact on the ratio of their financing debts. Perhaps this should be seen as a diversion of funds into unproductive jobs. Our result therefore defeats, at least in part, the teachings of the trade-off theory. Moreover, we can argue that it also fits into the spirit of the theory of hierarchical financing. Companies may be using internal funds to finance their investments. Hypothesis H 9 is therefore only partially validated. Our result is thus partially consistent with that found by Agarwal and Mohtadi (2003).

The variable relating to loans distributed by the banking system to the private sector has both positive and significant impacts on the financing debt ratios of listed Moroccan companies. The ability of the banking system to mobilize and distribute these domestic savings allows it to increase the supply of funds for businesses. This result testifies to the success of financial institutions in directing savings towards deserving jobs. We can invoke here the argument of Stiglitz and Weiss (1984) concerning the exploits of financial intermediaries in the financing of the economy at a time when the financial markets suffer from various imperfections. Our result confirms the stipulations of the theory of hierarchical financing. Hypothesis H 10 is therefore confirmed in our study.

The financial intermediation development index exerts negative and very significant impacts on the debt ratio of companies. While the deepening of the banking system, the increase in rates and the pace of bankarization of the economy and the improvement of the performance of banks in terms of cost control and customer satisfaction, should combine to encourage companies to ask for more loans and the banks to respond with suitable offers, the opposite has been observed. This can perhaps be explained by the tendency of banks to prefer taking stakes in the capital of companies, rather than behaving as creditor financiers. Hypothesis H 11 has not been validated, in the spirit of the trade-off theory.

The size of GDP plays a positive and significant role in determining corporate debt. The latter are thus encouraged to increase their requests for loans both for investment and for their day-to-day operations. It is very likely that it is the insufficiency of own funds compared to the financing needs in a phase of economic growth, which leads companies to adopt these behaviors

of indebtedness all over the place. Hypothesis H 12 is confirmed, a positive and significant relationship links the volume of wealth produced within the country and corporate debt. This link reinforces the stipulations of the theory of hierarchical financing. This result is consistent with that observed by Zeitun et al. (2017). Nevertheless, it does not overlap with those found by Agarwal and Mohtadi (2003) and Khémiri and Noubigh (2018). The importance of the GDP can reduce the ratio of the indebtedness of the companies as that is accompanied by the growth of the financial performances of these. The improvement of internal funds will lead companies to take on less debt (Myers, 1984), Constantinides and Grundy (1988).

For real investment, the coefficient is negative and significant at the 5% level. It is reasonable to believe that Moroccan companies prefer to choose to finance real investment by using their own funds rather than resorting to debt. This negative link therefore runs counter to the predictions of hierarchical funding theory. Thus, hypothesis H 13, under which real investment would increase the indebtedness of Moroccan companies, could not then be verified here. This result is consistent with that found by Zeitun et al. (2017), but it is not consistent with those established by Agarwal and Mohtadi (2003), Khemiri and Noubigh (2018).

Finally, with regard to foreign direct investment, we note that the associated coefficient is positive and almost significant at the 5% threshold. This somewhat unexpected result, by virtue of the predictions of financial economics, can lead, on the grounds of understanding it, to suspicions around the speculative nature, and/or often on a short-term horizon, of these direct investments. This means that the influx of foreign direct investment in our country is pushing companies to adopt behaviors that tend to increase their debt to finance their investments. This decreasing relationship is a result consistent with that noted by Glen and Pinto (1994), Schmukler and Vesperoni (2000), Agarwal and Mohtadi (2003). Hypothesis H 14, according to which foreign direct investment improves the capital ratio and therefore reduces the debt ratio of companies, could not be confirmed here.

6. Summary

6.1 Main lessons of the study

This paper has tried, through time series modeling, to shed light on the roles of financial development variables in Morocco in explaining the choices of financing structures of Moroccan companies, in the spirit of the theories of compromise and hierarchical funding. In this respect, the two theories are indeed able to help us to understand to a large extent these behaviors of indebtedness in Morocco.

Regarding the variables related to the capital market, the size of the stock market has a negative influence on the financial structure of Moroccan companies. This is in line with what the trade-off theory predicts. Second, increasing market liquidity increases corporate debt ratios. This constitutes a departure from the previous theory, which defends that a lively market would lead to lower indebtedness. In addition, rapid turnover tends to reduce the debt-to-finance ratio of companies. This result validates the hypothesis according to the trade-off theory. In addition, the financial market development index intervenes in the reduction of corporate debt, thanks to its depth. This supports the claims of the trade-off theory and challenges that of hierarchical funding. Finally, the TCN ratio has a positive effect on corporate debt. The increase in exchanges on the money market reinforces, in confirmation of the theory of compromise, recourse to indebtedness.

Turning now to the financial soundness index, it is a variable that produces negative effects on the medium and long-term indebtedness of companies. Our corresponding hypothesis has been verified in full compliance with the teachings of the trade-off theory. The same negative influence is also exerted by interest rates. It should be noted that it is the effect of the medium and long-term rate that is more significant in terms of long-term debt behavior. The hypothesis that we wanted to test is confirmed, the increase in the cost of credit is indeed likely to compress the indebtedness, by virtue of the theory of hierarchical financing.

Among the variables that directly concern financial intermediation, we were able to verify, in the spirit of the theory of compromise, the hypothesis according to which the general liquidity of the economy increases the propensity of companies to go into debt. In addition, domestic bank deposits are curiously pushing down medium and long-term debt. The corresponding hypothesis is therefore only partially validated with respect to the trade-off theory. For their part, bank loans to the private sector positively and significantly influence the debt behavior of Moroccan companies. Our hypothesis is validated, in accordance with the theory of hierarchical financing. In last place, the development index of financial institutions, and against all expectations, has a negative impact on the debt ratio. The hypothesis we tested was invalidated by the facts.

In the light of all the previous analyses, concerning the various operational hypotheses, we consider ourselves in a position to attempt to give some elements of an answer to our problem. We noted that the restructuring experienced by the capital market in Morocco, in the direction of its development and its modernization, exerted negative influences on the debt behavior of Moroccan companies. They prefer to resort more and more to equity financing.

Moreover, banking sector reforms, in conjunction with the continued growth of the market economy, are pushing companies more to improve their debt ratio. Finally, the improvement in the stability of the Moroccan financial sector and its resilience is influencing the indebtedness of Moroccan companies downwards.

6.2 Limits of the study

We can point out various limitations affecting certain aspects of our study. These include limitations in our methodology, data quality, and model specification. First, since our choice of the quantitative approach meant that we could not escape the halo around the experimentation, the questioning biases and doubts tainting the causality and the relationships tested. Consequently, it is the internal validity of the study that is artificially promoted (without however destroying all the biases), to the detriment of the ability to generalize the results (external validity). Second, it must be recognized that secondary data suffer from certain shortcomings, which are to their credit, namely the lack of democratization, obsolescence, incompleteness and unsuitability of their original format.

Furthermore, specification errors cannot be ruled out. Since we adopted a linear model, we limited ourselves to testing linear relationships. However, in the social sciences in general, and in management sciences in particular, there are many situations where non-linear, U-type, inverted-U, or even increasing or decreasing curvilinear type relationships are proven. In addition, it should be noted about the Prais-Winsten method, used to correct the serial autocorrelations of the errors, that the estimates obtained are conditioned by the estimated value of rho. In this register, the variance estimates are only robust to heteroscedasticity. On the other hand, the robustness to omitted variables and to errors of specification of the functional form of the relation is lacking.

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