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The Determinants of Leverage in Tunisian Listed Companies

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Abstract:

Purpose: *In this article we studied the determinants of leverage in Tunisian context in the period (2016-2023).*
Design/methodology/approach: *We used a sample of 30 companies listed in Tunisian stock exchange.*
Findings: *By applying a method of panel static we found that return on assets, return on equity, size of firm, capital, economic growth, and inflation have a significant impact on firm leverage.*
Practical implications: *The article identifies the determinants of firm leverage for possible use by managers to protect their companies from unforeseen financial disturbances.*
Originality/value: *Leverage is important in the field of finance of firm. It is useful to increase the investment and the growth opportunities of companies.*

Keywords: *Leverage, firm, panel, investment, return on assets.*

JEL codes: *G32, G30, C23, L25, O55.*

Paper type: *Research article.*

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1. Introduction

Leverage is using debt or borrowed capital to undertake an investment or project. It is commonly used to boost an entity‘s equity base. The concept of leverage is used by both investors and companies:

- Investors use leverage to significantly increase the returns that can be provided on an investment. They leverage their investments using various investments including options, futures, and margin accounts.
- Companies can use leverage to finance their assets.

Most of firms used financial leverage as main element of the capital structure which to optimum wealth of shareholders. But they may be increased bankruptcy of the firms if they not concern about leverage in fairly (Johnson and Chukuku, 2022). In this article we try to identified the determinants of firm leverage. We used a methodology of 3 sections. The first section is devoted to literature review, then the second section indicate the empirical study. We conclude by a conclusion.

2. Literature Review

There are many studies about determinants of leverage in companies. Prenaj *et al.* (2021) examined the determinants of the capital structure of Kosovo companies reporting to the Kosovo commercial for financial reporting. The data is collected from the financial statement of 50 non listed companies and cover the period (2013-2018) .

Swarti and Sudiyatno (2022) studied the determinants of leverage in manufacturing companies listed on the Indonesian stock exchange for the period (2019-2021). The results show that liquidity operating costs have a negative impact on leverage while return on assets and firm size have no effect.

Nguyen and Nguyen (2020) investigated the factors affecting for capital structure in the context of Vietnam. The research include 290 non financial listed companies on vitenamese stock market. This study applied generalized method of moments (GMM) to explain the research results. The empirical results show that return on assets, tangible assets, risk and growth have a statistically significant positive effect on firm capital structure. While return on assets has a statistically negative effect on the capital structure.

Khaki and Akin (2020) studied the firm specific determinants of capital structure in the Gulf cooperation counciles countries (GCC). A number of regression modes are employed on the date of 329 non financial firms for the period (2009-2017). The findings indicates that size, tangibility and growth have positive impact on leverage. On the other hand profitability, age, financial constraints, liquidity and government ownership affect the leverage negatively.

Ekadjaja *et al.* (2020) studied the determinants of leverage of firms. Data was collected from financial aspects of manufacturing firms in Indonesia during the period (2010-2017). It can be revealed that institutional ownership, foreign ownership, firm size affect positively a firm decision to use leverage. Meanwhile asset structure had negative and significant effect, managerial ownership had positive and significant effect on such decision.

Using data of Indian manufacturing companies Gulzar and Haque (2022) examined the relationship between corporate governance characteristics and firm specific factors in predicting leverage decision of a firm. The results of this study show that non debt tax revealed positively affects SOA, whereas growth, tangibility and firm size negatively influence SOA.

Karim *et al.* (2021) investigated the relationship between company specific factors and firm leverage of 231 service companies of Bursa Malaysia for the period (2008-2018). Findings reveal that firm size, profitability, and growth opportunities are the determinants of corporate leverage in Malaysia.

Abubakar (2023) analyzed the determinants of leverage of non financial firms in Nigeria applying the 2 stage system generalized metho of moments (GMM) on 73 listed firms over the period (2010-2020). The results show that leverage is positively related to assets tangibility, growth and age are negatively related to profitability, size, and liquidity. Thus, he conclude that high growth of older firms with a higher proportion of tangible assets tend to rely more on debt than larger firms with the capacity of generate internal funds or retained earnings.

Alahdal *et al.* (2022) investigated the impact of corporate characteristics on leverage in the GCC non financial listed firms. A sample comprising a balanced panel for 8 years from (2009-2016) for 4 Gulf countries. In total 85 non financial listed companies have been selected using a non probability sampling technique.

Corporate characteristics are represented by return on assets (ROA), return on equity (ROE), return on capital employed, market value added, Tobin Q, liquidity and firm size. The findings of the study revealed that both ROA and firm size have a significant negative effect on leverage. However, market value added, return on capital employed, and Tobin Q exhibited a statistically significant positive effect on leverage.

Trade off theory could be traced to the debate over the irrelevance propositions which state that in a perfect capital market situation the choice between debt and equity is irrelevant.

The trade-off model of capital structure is a financial theory that suggests that a company should balance the costs and benefits of various sources of financing, such as debt and equity.

The trade-off model assumes that there is an optimal capital structure where the benefits of debt and equity financing are balanced, and that a company should aim to achieve this optimal balance. However, the optimal capital structure may differ for each company depending on factors such as industry, business risk, and tax environment.

Additionally argued that when corporate taxation is introduced to their original irrelevance proposition, firms should be 100% debt financed because of the tax advantage of debt. However introducing bankruptcy costs into their models implies that the optimal capital structure becomes a trade off between the tax advantage of debt and the costs of bankruptcy . The theory also postulates that a firm will borrow up to point where the marginal value of tax shield on additional debts is balanced by increasing the present value of bankruptcy costs.

According to the tradeoff theory higher profitability lowers the expected costs of debtness and firms increase their leverage to take advantage of tax shield benefits.

Based on agency problems arising from the separation of ownership and control recommends the use of debt (leverage as discipline mechanism for managers). The agency cost theory suggests that borrowing could also be forced on firms by shareholders to reduce the free cashflows that is a the disposable of management, thereby reducing agency costs.

Agency theory explains the relationship between agents and principals. A principal relies on an agent to execute certain business transactions and represent the interests of the principal without regard for self-interest. Common principal-agent relationships include shareholders and management, financial planners and clients, and lessees and lessors.

D-Pecking order theory based on information asymmetry postulates that firms would prefere to finance new investments first with retained earnings followed by debt and loan equity.

Myers (1984) contends that there is optimal target capital structure that firms should pursue. The theory assumes asymmetric information , and that the firm's financing decision constitute signal to the market. Under the theory, managers know more about their company's prospects, risks and value than outside investors, see efficient market hypothesis. This asymmetry affects the choice between internal and external financing and between the issue of debt or equity: companies prioritize their sources of financing, first preferring internal financing, and then debt, with equity financing seen as a "last resort".

Here, the issue of debt signals the board’s confidence that an investment is profitable; further, the current stock price is undervalued, mitigating against issuing shares at these levels. The issue of equity, on the other hand, would signal some lack

of confidence, or at least that the share is over-valued. An issue of equity may then lead to a drop in share price. This does not however apply to high-tech industries where the issue of equity is preferable, due to the high cost of debt issue as assets are intangible. Other more practical considerations include the fact that issue costs are least for internal funds, low for debt and highest for equity. Further, issuing shares means 'bringing external ownership' into the company, leading to stock dilution.

Hasefi Pour et al. (2010) argued that pecking order theory suggests that firms have less information asymmetry and replacable of issuing more equity than smaller firms, which makes equity more favorable than debt.

3. Empirical Study

Panel data are multi-dimensional data involving measurements over time. Panel data contain observations of multiple phenomena obtained over multiple time periods for the same firms or individuals. This study is carried out by static panel data analysis under fixed effect model. Static Panel data analysis considers time series data and cross-sectional data simultaneously. There are two type approaches for static panel data models variation such as fixed effects and random effects. In the fixed effects approached, some unobservable variables correlated with the explanatory variables.

3.1 Sample

We used a sample of 30 companies listed in Tunisian stock exchange over the period (2016-2023).

Table 1. *List of companies*

Number	**Name of the company**
1	Air liquid
2	SIAME
3	Ciment Bizerte
4	Carthage ciment
5	SOTIPAPIER
6	Essoukna
7	SOMOCER
8	Magasin General
9	STIP
10	SOTETEL
11	SOTEMAIL
12	SFBT
13	Sovat
14	Tawassol
15	Ennakl
16	Adwya
17	Sotumag
18	STAG

19	SAH
20	Assad
21	Office Plast
22	STEG international services
23	Cellcom
24	SOPAT
25	Sanimed
26	Sotuver
27	Simpar
28	Poulina
29	Delice
30	SNIT

Source: *Authors' evaluation.*

3.2 Model Specification

Levi,t = b0+ b1 ROA i,t +b2 ROEi,t +b3 CAPi,t +b4 CRi,t +b5 Sizei,t +b6 FAi,t +b7 ALAi,t + b8 CEAi,t +b9 TPIBi,t +b10 TINFi,t +Ei,t

B0= constant; i= company; t= time
Lev= total liabilities / total assets
ROA = Net profit / total assets
ROE = Net profit / Equity
CAP= Equity / total assets
CR = currents assets / current liabilities
FA= non current liabilities / Total equity
ALA = liquidity / total assets
CEA = operating costs / total assets
TPIB = Economic growth; TINF = rate of inflation

B1……b10: parameters to be estimated
E= error term; i= firm; t= time

We propose to verify the following hypotheses:

H1: ROA has a negative impact on leverage
H2: ROE has a negative impact on leverage
H3: Liquidity has a negative impact on leverage
H4: Operating costs has a negative impact on leverage
H5: Economic growth has negative impact on leverage
H6: Inflation has a positive impact on leverage.

3.3 Estimation Method

3.3.1 Analysis of Descriptive Statistics

Table 2. *Descriptives statistics*

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Lev	240	0.86	1.15	0.0021	1.943
ROA	240	0.046	0.63	-0.64	0.97
ROE	240	0.129	0.524	-3.004	0.721
ALA	240	0.145	0.632	0.0003	0.681
Size	240	18.73	1.85	11.29	24.65
CAP	240	0.45	0.624	-3.013	4.61
CR	240	2.73	4.35	0.052	34.018
FA	240	0.78	2.73	-12.25	15.9
CEA	240	0.45	0.29	0.0119	1.48
TPIB	240	0.0042	0.053	-0.087	0.039
TINF	240	0.0632	0.017	0.036	0.0735

Source: *Authors' evaluation.*

Lev (mean = 0.86). Total liabilities represent an average 86% of total assets. The standard deviation is high. There is a big difference between firms in term of leverage.
ROA (mean = 0.046). The net return represent 4.6% of total assets. The standard deviation is low. There is a low difference between firm in term of return on assets.
ROE (mean = 0.129). The net return represent 12.9% of total equity. The standard deviation is low.
ALA (mean = 0.145). The liquid assets represent 14.5% of total assets. The standard deivation is low.
Size (mean = 18.73). The standard deviation is high. There is a big difference between banks in term of size.
CAP (mean = 0.45). The equity represent an average 45% of total assets.
CR (mean = 2.73). Current assets represent an average 2.73 of current liabilities.
FA (mean = 0.78). non current liabilities represent 0.78 an average of total equity.
CEA (mean = 0.45). The operating costs represent 45% of total assets an average.
TPIB (mean = 0.0042). The economic growth represent 0.0042 an average in the period (2016-2023).
TINF (mean =0.0632). The rate of inflation represent 6.32% an average in the period (2016-2023).

3.3.2 Multicolinearity Test

Table 3. *Correlation between variables*

	CR	Lev	FA	CEA	TPIB	TINF
CR	1.000					
Lev	-0.1893	1.000				
FA	-0.0674	-0.0226	1.000			
CEA	-0.0563	0.0542	-0.0057	1.000		
TPIB	-0.0491	0.0845	0.0812	0.0145	1.000	
TINF	0.074	-0.0163	-0.0625	-0.0615	0.1205	1.000

Table 4. *Suite of correlation between variables*

	ROA	**ROE**	**ALA**	**Size**	**CAP**
ROA	1.000				
ROE	0.2730	1.000			
ALA	0.038	0.0093	1.000		
Size	0.02724	0.0054	-0.1308	1.000	
CAP	0.1625	0.1294	0.3445	-0.085	1.000
CR	0.0461	0.0195	-0.0408	0.0943	0.1825
Lev	-0.0143	-0.0643	-0.0315	-0.0049	-0.2431
FA	-0.032	0.013	-0.0193	0.1638	-0.06951
CEA	0.0345	0.017	0.1285	-0.0119	-0.0642
TPIB	0.0389	0.0724	-0.0165	-0.0154	-0.01884
TINF	0.0134	0.0025	-0.0234	0.0349	-0.095

Source: *Authors' evaluation.*

All the coefficients are inferior to 80%, there is no problem of multicollinearity.

Table 5. *Test of VIF*

Variable	VIF	1/VIF
Lev	1.59	0.6289
ROA	0.27	3.70
ROE	0.35	2.85
ALA	1.24	0.8064
CEA	1.63	0.6134
CAP	1.47	0.68
CR	1.28	0.7812
Size	1.17	0.85
TPIB	1.25	0.80
TINF	1.53	0.065

Source: *Authors' evaluation.*

A variance inflation factor (VIF) is a measure of the amount of multicollinearity in regression analysis. Multicollinearity exists when there is a correlation between multiple independent variables in a multiple regression model. This can adversely affect the regression results. Thus, the variance inflation factor can estimate how much the variance of a regression coefficient is inflated due to multicollinearity.

$$VIF = \frac{1}{1-R^2}$$

R^2 = unadjusted coefficient of determination for regressing the ith independent variable on the remaining ones.

VIF = 1 variables are not correlated

1< VIF <5 variables are moderately correlated
VIF superior to 5 variables are highly correlated
VIF in our case are inferior to 5, there is no problem of multicollinearity.

3.3.3 Hausman Test

The Hausman test, also known as the Wu-Hausman test or the Durbin-Wu-Hausman test, is a statistical test used in econometrics to compare a convergent estimator under the null hypothesis and the alternative hypothesis and an estimator convergent and efficient under the null hypothesis but not convergent under the alternative hypothesis.

For example, in a linear regression model in which one of the explanatory variables is suspected of endogeneity, we can define the two-stage least squares estimator assumed to converge under the null hypothesis and the alternative hypothesis but not effective under the The null hypothesis and the ordinary least squares estimator converge and are efficient under the null hypothesis but not converge under the alternative hypothesis.

The Hausman test is used to test the hypothesis that the double least squares estimator is significantly different from the ordinary least squares estimator1. And again, this test can be carried out with an auxiliary regression and therefore comparing the relevance of the tested coefficients.

In a linear regression model on panel data, the Hausman test also makes it possible to test the difference between the fixed effects model, assumed to converge under the null hypothesis and the alternative hypothesis, and the random effects model, assumed convergent and efficient under the null hypothesis but not convergent under the alternative hypothesis. In our model PV = 0.63 superior to 0.05 we conclude that our model is random effect.

Table 7. *Estimation results of model*

Lev	**Coefficient**	**Tstat**
ROA	-0.024	2.57**
ROE	-0.032	2.14*
Size	0.185	2.63**
CAP	0.036	2.32**
CR	0.014	1.024
ALA	-0.027	0.94
FA	0.26	0.85
CEA	-0.015	1.173
TPIB	0.034	2.94***
TINF	-0.098	3.16***
Constant	0.145	1.037

Note: *(**) significant at 5%, (*) significant at 10%, (***) significant at 1%*
Source: *Authors' evaluation.*

There is a negative relationship between Leverage and ROA (if ROA increase by 1% leverage decrease by 0.024%). The increase of return on assets has a negative impact on firm leverage. This relationship is statistically significant at 5%.

The tradeoff theory holds that most profitable companies prefer to use more debt to obtain tax benefits suggesting a positive relationship between profitability and debt (Graham, 2000; Fama and French, 2002).

There is a negative relationship between leverage and ROE (if ROE increase by 1% Leverage decrease by 0.032%). The increase of return on equity has a negative impact on firm leverage. This relationship is statisticallay significant at 10%.

Frank and Goyal (2009) suggested that considering the bankruptcy cost and tax benefits, profitable firms are likely to choose debt. Pecking order theory based on information asymmetry advocates the use of internal funds followed by debt and finally the equity.

Berger and De Patti (2006) supported the agency cost hypothesis that is higher leverage or a lower equity capital ratio is associated with high profit efficiency.

There is a positive relationship between size and leverage (if size increase by 1% leverage will increase by 0.185%). This relationship is statistically significant at 5% This result is consistent with tradeoff theory. This result is similar to result found by (Raza *et al.*, 2021; Ahmed and Anis, 2015; Bajagei *et al.*, 2019). While Masor (2017), Rouf (2018) found a significant negative relationship with leverage. Pecking order theory suggests that large firms have less information asymmetry and recapable of issuing more equity than small firms, which makes equity more favorable than debt.

Large companies are more likely to have a credit rating and thus have access to non bank debt financing which is usually unavailable to smaller companies (Bevan and Danbolt, 2002).

Similarly providing additional support in favor of large firms(Titman and Wessel (1988) argued that large firms could have lower costs of borrowing from capital suppliers. This is because the probability of their total failure would be significantly lower than small firms. Besides large firms are considered to be well diversified nationally and internationally and hence process strong coping abilities in term of economic downturn.

Ajmi et al. (2009) reported a positive relationship between the size and leverage of companies in Saudia Arabia. Daskalakis and Thanon (2010) showed a negative relationship between the leverage ratio and the size of companies in Greece and France.

There is a positive relationship between CAP and leverage (if leverage increase by 1% CAP increase by 0.036%). The increase of capital has a positive impact on leverage. This relationship is statistically significant at 5%.

There is a positive relationship between Leverage and CR (if CR increase by 1% leverage will increase 0.014%). The increase of current ratio has a positive impact on leverage.

There is a negative relationship between liquidity and leverage (if liquidity increase by 1% leverage will decrease by 0.027%) . The increase of liquidity has a negative impact on leverage. A company capacity to satisfy short term liabilities increases when its liquidity is larger.

On the other hand high liquidity companies may use it to fund their investments (Viviani, 2008). According to Deesomsak *et al.* (2004) there is a negative relationship between liquidity and the debt ratio.

There is a positive relationship between leverage and FA (if FA increase by 1% leverage will increase by 0.26%).

There is a negative relationship between leverage and CEA (if CEA increase by 1% leverage will decrease by 0.015%). The increase of operating costs have a negative impact on leverage.

There is a positive relationship between leverage and TPIB (if TPIB increase by 1% leverage will increase by 0.034%). The increase of economic growth have a positive effect on firm leverage. This relationship is statistically significant at 1%.

The growth of the level of economic activity of an entire economy, measured by Gross Domestic Product (GDP) growth rate, should lead to greater opportunities for growth, investment optimism, and profitable business entities. Significant expectations regarding future investments may be a reason to maintain creditworthiness (low financial leverage).

If GDP growth leads to profitable growth, then profitability growth reduces the need for borrowing. On the other hand, low leverage combined with significant investment opportunities can lead to the so-called overinvestment problem (Kuc and Kalicanin 2021).

There is a negative relationship between leverage and TINF (if TINF increase by 1% leverage decrease by 0.098%). The increase of inflation has a negative impact on leverage.

This relationship is statistically significant at 1%.

Indeed, higher inflation is linked to higher nominal interest rates. Therefore, firms with higher floating-rate leverage may benefit relatively less from higher inflation (Ippolito *et al.*, 2018).

4. Conclusion

Financial leverage is the degree to which a firm has funded its business operations through outside resourced (MOMI 1958). Leveraged business have additional capital available to finance its operations and expansions compared to solely an unleveraged business dependent on equity (Strebulaev and Yang, 2013).

According to tradeoff theory companies define the optimal capital structure by balancing the benefits and costs of taking on additional debts the benefits of leverage include the tax deductibility of interests and improved cashflow (Jensen, 1986).

The pecking order theory assumes asymmetric information, and that the firm's financing decision constitutes a signal to the market. Under the theory, managers know more about their company's prospects, risks and value than outside investors. This asymmetry affects the choice between internal and external financing and between the issue of debt or equity, companies prioritize their sources of financing, first preferring internal financing, and then debt, with equity financing seen as a "last resort".

On the other hand Agency theory explains the relationship between agents and principals. A principal relies on an agent to execute certain business transactions and represent the interests of the principal without regard for self interest . Common principal-agent relationships include shareholders and management, financial planners and clients, and lessees and lessors.

In this article our objective is to analyze the determinants of firm leverage in Tunisian context. For this propose we used a sample of 30 companies listed in Tunisian stock exchange over the period (2016-2023). We found that return on assets, capital, and size have a significant effect on firm leverage.

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