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Theme:

Financing of small and medium sized enterprises (SMEs) and the determinants of their capital structure

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Dedication:

I would like to dedicate this humble work

To my mother who I miss everyday and who supported me till the last day.

To my father for earning an honest living and for supporting me throughout my life journey.

To my lovely sister and my two brothers.

Acknowledgement

My full gratitude and appreciation goes to my supervisor Dr.Benzazoua bouazza Asma, whose support, guidance, and advices have been particularly instrumental to the successful completion of this work

I would like to thank my father for supporting me throughout my years of study.

My gratitude goes as well to my mother, may god have mercy on her, for encouraging to take this major.

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Abreviations list

SMEs	Small and medium sized enterprises
MIPMEPI	Ministry of Industry, Small and Medium Enterprises and Investment Promotion
ONS	national office of statistics
GDP	Gross domestic product
IFC	International Finance Corporation
CF	Cash-flow
ANSEJ	National Agency for Support to Youth Employment
ANGEM	the National Agency for Administration of micro-credits
CNAC	National Fund for unemployment insurance (CNAC)
WACC	Weighted Average Cost Of Capital (WACC)
TOT	the trade-off theory (TOT)
POT	the pecking order theory (POT)
M&M	Modigliani and Miller
NDTS	Non-debt tax-shield
TD	Total debt
STD	short term debt
LTD	Long term debt
BE	Book value of equity
LLC	limited liability companies
PLS	Common Effect Model or Pooled Least Square

Summary:

Abstract

In our study we investigate the determinants of capital structure of the Algerian SMEs using a sample of 50 SME, observed during the period between 2016 and 2019. In order to explain the total-debt ratio (TD) and the short-term debt ratio (STD), we used the Tobit model under panel data as an estimation method for the two models, the results show a significant relationship between profitability, liquidity ,tangibility of assets, size, non-debt tax shield ,age and the SMEs level of leverage (TD and STD). These results confirm the predictions of the pecking-order theory.

Key words: SMEs, capital structure, leverage, debt ratio, pecking order theory, funding

Résumé

Dans notre étude nous étudions les déterminants de la structure du capital des PME algériennes à l'aide d'un échantillon de 50 PME, observé au cours de la période entre 2016 et 2019. Afin d'expliquer le ratio d'endettement total (TD) et le ratio d'endettement à court terme (STD), nous avons utilisé le modèle Tobit sous données de panel comme méthode d'estimation pour les deux modèles, les résultats montrent l'existence d'une relation significative entre la rentabilité, la liquidité, la tangibilité des actifs, la taille, les économies d'impôt non liée à la dette, l'âge et le niveau d'endettement des PME (DT et DCT). Ces résultats confirment les prédictions de la théorie de l'ordre hiérarchique.

Mots clés : PME, la structure de capitale, l'endettement, le financement, ratio de dette, la théorie de l'ordre hiérarchique.

ملخص

تهدف هذه الدراسة الى شرح مستوى المديونية لدى المؤسسات الصغيرة والمتوسطة في الجزائر. وذلك من خلال دراسة عينة ل 50 مؤسسة صغيرة ومتوسطة خلال الفترة من 2016 الى 2019 حيث تم استعمال نموذج توبيت في ظل معطيات بانل من اجل تقدير معالم نموذج المديونية الكلية ونموذج المديونية قصيرة الاجل. تشير النتائج المتحصل عليها الى وجود علاقة ذات دلالة إحصائية بين متغير الضمانات، المردودية،السيولة،الحجم، الاقتصاد الضريبي غير المتعلق بالمديونية، العمر مع متغيري المديونية الكلية والمديونية قصيرة الاجل.

الكلمات المفتاحية المؤسسات الصغيرة والمتوسطة، الهيكل المالي،المديونية، التمويل، نظرية ترتيب افضلية مصادر التمويل.

Introduction

General introduction

The current economic situation is marked by a crisis and a financial instability, which has created a damage into the economic tissue, threatening the attempt to support the economic revolution of SMEs.

Small and medium-sized enterprises (SMEs) appeared during the economic crises; for this reason, they are the most resistant type of firms to market fluctuations and exogenous pressures; in fact, an SME is an indispensable element for integration and regional and social balance, and an essential factor in the promotion of the industry

Indeed, the Algerian SMEs face several issues when it comes to finding a funding source for their activity, or choosing their financial structure, which means the debt to equity ratio

For years, the problem of capital structure for firms has been of great interest to the world of finance and has given rise to several theories and studies. If this interest is still so important today, it is because there are questions that remain unanswered. This problem is of a great importance, particularly because of its direct impact on the value of the firm. Indeed, if the choice of the capital structure for a firm determines its value, then it also influences its capacity to finance possible projects and thus its future growth.

A suitable capital structure is essential to ensure stability and a good financial situation within an SME.The debate on capital structure began in 1958 when Modigliani and Miller demonstrated the independence between capital structure and the firm’s value, under the hypothesis of a perfect financial market, This assumption is too restrictive and unrealistic, since we interact in a world where information asymmetry and agency costs are largely present. In 1963, Modigliani and Miller consider the corporate taxation, so another conclusion emerged is that the value of the firm is an increasing function of its debt level, and a maximum debt is therefore recommended.

Later on, with the emergence of new theories such as the pecking order theory, the agency cost theory, and the signal theory, which have shown that an increase in the level of debt also allows for an increase in the probability of financial distress and agency costs. so the optimal solution is obtained when the marginal benefit of debt (tax savings) is equals to the marginal cost (bankruptcy and agency costs).

Subsequently, various empirical studies on the capital structure of firms highlighted the importance of the characteristics of firms in determining their financial structure. Thus, the studies of Titman & Wessels (1988), Harris and Raviv (1991), Rajan and Zingales (1995), Booth et al. (2001) show the importance of several factors such as size, profitability, guarantees, to determine the financial structure.

The studies done on the capital structure are based on samples of firms of different legal forms, different sizes and different sectors of activity. In our study, we are particularly focusing on the capital structure of the Algerian small and medium sized enterprises SMEs.

The problem

Our problem can be summarized through the following main research question:

- **What are the determinants of the capital structure of the Algerian small and medium sized enterprises (SMEs)?**

The main question can be divided into a set of sub-questions, as follows:

- What are the main funding sources available for SMEs?
- What are the factors that affect positively the level of leverage of SMEs?
- What are the factors that affect negatively the level of leverage of SMEs?

The hypotheses

H1: there are several funding sources, internal and external, available for SMEs.

H2: the level of leverage of the Algerian SMEs is affected positively by their profitability, Age, and tangibility of assets.

H3: the level of leverage of the Algerian SMEs is affected negatively by their liquidity, and the non-debt tax shield.

Research motivations

Personal motivations:

- The good correlation that exist between this field and the student's major.
- The personal desire to create a similar firm, therefore in the measure of having a deep knowledge about this kind of firms.

General introduction

Objective motivations

- An attempt to determine whether the theories of capital structure applied to developed countries are suitable with the reality of the Algerian SMEs.
- The lack of researches on this subject, especially studies on the financial behavior of Algerian SMEs.

Structure of thesis

In our study, we focused about a sample of 50 Algerian SMEs observed over the period of 2016 to 2019 , and obtained from the national center of commerce register (CNRC) , using a Tobit model under panel data , in order to explain le level of leverage of these firms.

This work is composed of two parts: a theoretical part and an empirical part .In the theoretical part, we will define the SMEs and present some important statistics that reflects their evolution during last years. Also, we will see the funding sources of SMEs and the difficulties faced by these firms in order to get access to financing; also, we will take a brief overview on the capital structure theories and its main determinants, in addition to the previous empirical studies conducted about capital structure.

In the empirical part, we will study the influence of the different capital structure determinants on the short-term debt level and the long-term debt level of the firms composing our sample.

Chapter 01: small and medium sized enterprises and their financing

Chapter 01: small and medium sized enterprises and their financing

Introduction

The SME is a vital component in the economy of all countries. The flexibility of its structure, its reactivity and its capacity to adapt to the multiple pressures of environment, especially the economic environment, and its ability to ensure economic integration and local development, show that its place in the economy is becoming increasingly important.

However, the SMEs face many obstacles when it comes to finding the financing sources to meet their needs, and this is because of their specific characteristics that make them riskier than any other type of firms.

Therefore, the objective of this chapter is to try in the first part to give a definition of the SMEs and some related statistics. than in the second part we will talk about the funding sources available for SMEs, and by the third part we will discuss about the difficulties and the opportunities for the Algerian SMEs. The structure of this chapter is as follows:

- Part 01: generalities about the Algerian SMEs
- Part 02: the SMEs funding sources
- Part 03: difficulties and opportunities for the Algerian SMEs

Part 01: Generalities about the Algerian SMEs

Through this part, we will try to give a definition for SMEs and see some important statistics about their reality.

1 The difficulty of defining SMEs

One of the first difficulties of a work about SMEs is to define the object of the study; the SME is an expression that has more value than meaning, the term S.M.E. is used to refer to the reality of small and medium-sized enterprises. However, this concept is often not very well defined and covers different definitions.

There is no universal and official definition for SMEs. Each country adopts its own definition relating to its level of economic growth. Faced with this economic diversity, it is not surprising that the problem of defining an SME has caused a lot of debates. In our study, we will give a definition for SMEs according to the Algerian context.

2 Definition of SME in Algeria

The Algerian definition of SMEs follows the application of the definition of SMEs adopted by the European Union in 1996 and which was the subject of a recommendation to all the member countries, it should be mentioned that Algeria Adopted the Bologna Charter in June 20003 on the European definition of SMEs.

Indeed, this definition is based on three criteria: the workforce, the turnover and the independence of the company. By giving a clear configuration of the Algerian SME, the law N ° 01-18 of December 12, 2001 laying down the law of orientation on the promotion of Small and Medium Enterprise stipulates that: "The SME is defined, whatever its legal status , As a goods and / or services production enterprise that is characterized by:

- Employing one (1) to (250);
- Of which the annual turnover does not exceed 2 billion Dinars or whose total annual balance does not exceed 500 million Dinars,
- And that meets the criteria of independence.

According to Articles 5, 6 and 7 of Chapter II, the Official Journal introduced precision elements of a practical nature by subdividing it into three categories:

- The average enterprise is defined as an enterprise employing 50 to 250 people and whose turnover is between 200 million and 2 billion Dinars or whose total annual balance is between 100 and 500 million Dinars.
- Small business is defined as an enterprise employing between 10 and 49 persons, whose annual turnover does not exceed 200 million Dinars or whose annual balance sheet total does not exceed 100 million Dinars 6).
- The very small company, or micro-enterprise, is a company employing 1 to 9 employees and generating a turnover of less than 20 million Dinars or whose annual balance total does not exceed 10 million Dinars .[1]

Table 1-1 : Types of SMEs

type of SME	Number of SMEs	%
Micro-Enterprise	1 157 539	97
Small Enterprise	31 027	2,6
Medium Enterprise	4 773	0,4
Total	1 193 339	100

Source: MIPMEPI Statistical Information BulletinN°36

3 Classification of SMEs by sector

3.1 Public sector

Public SMEs represent only a small part of the Algerian SMEs tissue. In 2019, their number decreased by 7% compared to the previous year2018. It goes from 261 to 243 SMEs.

These SMEs operate in all sectors of the national economy, mainly in Agriculture 94, industry sector with 72 SME and 60 SME in the services sector. The coming table shows the distribution of the public SMEs according to the activity sector.

[1]The Official Journal of the Republic of Algeria No. 77 of 15 December 2001, Chapter II, Article 4.

Table 1-2: Distribution of public SMEs by sector

Sector	Global number of SMEs		Evolution
Year	2018	2019	
Industry	73	72	-1%
Services	68	60	-12%
Agriculture	100	94	-6%
construction	16	15	-6%
Energy	4	2	50%
Total	261	243	100

Source: MIPMEPI Statistical Information Bulletin N°36

3.2 Privet sector

At the end of 2019 the number of private SMEs was 1 193 096 SME distributed by sector as follows:

- Agriculture : 7387 privet SMEs
- Energy, Mines and services : 83 privet SMEs.
- BTPH: 190155 privet SMEs.
- Manufactures:103621privet SMEs.
- Liberal profession :614315 privet SMEs.
- Handicraft :274554privet SMEs.

Compared to 2018, private SMEs have increased by 4,51% with an increase of 51 494 new SME in different sectors this increase was divided as follows :

- Agriculture : 319 privet SMEs .
- Energy, Mines and services : 83 privet SMEs.
- BTPH: 5034 privet SMEs.
- Manufactures:3756privet SMEs.
- Liberal profession : 28400privet SMEs.
- Handicraft :13902 privet SMEs.

The coming table summarize the previous statistics.

Table 1-3 :Evolution of privet SMEs by sector

Sector	Number of SMES		Evolution
Year	2018	2019	%
Agriculture	7068	7387	4,51%
Energy	2981	3064	2,78%
constructiion	185121	190155	2,72%
manufacturies	99865	103621	3,76%
Services	585915	614315	4,85%
Artisanat	260652	274554	5,33%
Total	1141602	1 193 096	4,51%

Source: MIPMEPI Statistical Information Bulletin N°36

4 Evolution of Algerian SMEs in the period 2004-2009

The study of SMEs by activity sector allows us to define the favorite sectors of private investors.

The structure of the main sectors of economic activity represented in the table below shows a stable distribution of SMEs.

The services sector, still in the lead, clearly reflects the constant choices of private investors, who in light of the difficulties of investing in the industrial sector and to protect themselves from external competition, prefer to turn to the tertiary sector.

The evolution of the number of private firms, for the period from 2004 to 2009, shows a significant gap between, on the one hand, the service sector (45.93%) and the construction sector (35.25%), and on the other hand, manufacturing firms, whose number continues to decline, representing only 17.84% of the total number of companies in 2009. These data are summarized in the table below.

Table 1-4: Evolution of SMEs in Algeria between 2004-2009

	2004	2005	2006	2007	2008	2009
Services	45,62	45,82	45,88	45,98	45,92	45,93
constructio n	32,32	32,83	33,62	34,1	34,84	35,25
Industry	20,53	19,84	19,03	18,48	17,84	17,48
agriculture	1,22	1,2	1,18	1,16	1,12	1,07
idustry services	0,31	0,31	0,29	0,29	0,27	0,27
total	100	100	100	100	100	100

Source: MIPMEPI Statistical Information Bulletin of years from 2004 to 2009

In 2009, service and construction companies together accounted for 81.18% of private SMEs. Calculations based on the following table show that the construction sector grew by 62.3% between 2004 and 2009. It is followed by commercial activities, which grew by 50.6% over the same period. The industrial sector, on the other hand, had the lowest growth rate of 24.8%.

Among the firms of the industrial sector, only the food-processing industries are cited in the group of dominant activities, they represent on average only 5% of the total number of private firms. The textile, garment, leather and footwear, wood and paper industries have been hit hard by competition from imported products.

Table 1-5: Evolution of SMEs number in Algeria between 2004-2009

Secteurs	2004	2005	2006	2007	2008	2009	evolution rate
Agriculture	2.748	3.011	3.186	3.401	3.599	3.592	30%
industry	46.991	49.307	51.343	54.301	57.352	58.648	24,80%
Constructio n	72.869	80.716	90.702	100.250	119.978	118.26 8	62,30%
Services	102.841	112.808	123.782	135.151	148.854	154.98 0	50,60%

Total	225.449	245.842	289.930	293.103	329.783	335.44	48,80%

Source: MIPMEPI Statistical Information Bulletin of years from 2004 to 2009

5 Characteristics of Algerian SMEs

Algerian SMEs exhibit the following specific characteristics that distinguish them from large firms.

- **Algerian SMEs are dominated by private enterprises:** The Algerian SME sector is dominated by private enterprises. According to the Algerian Ministry of Industry, SME and Investment Promotion. By the end of 2019, 99.98% of all SMEs were private and the remaining 0.04% were public. These percentages indicate that job and wealth creation in the Algerian SME sector are based on private SMEs.

- **Algerian SMEs are dominated by micro-enterprise types**: The SME sector in Algeria is dominated by micro-sized enterprises. According to the Algerian national office of statistics (ONS), at the end of 2019, 97% of all SMEs were micro enterprises that employ nine or fewer individuals. The remaining 3% were small and medium enterprises. These statistics indicate that the Algerian economy is based on the fabric of micro enterprises in terms of number and relies on such enterprises to absorb unemployment on the one hand and to create wealth on the other hand

- **Algerian SMEs are concentrated in north Algeria:** In Algeria, a disparity exists in the spatial distribution of SMEs, with a higher concentration recorded in the north, followed by the highlands, and finally the greater south.

- **Algerian SMEs are concentrated in the service and construction sectors**: Algerian SMEs have a strong presence in the service sector (particularly transport) and account

for nearly half of all SMEs, followed by the building, construction, and hydraulic sector[1].

6 Contribution of SMEs to the Algerian economy

SMEs are considered as an engine of growth, innovation, and job creation in both developed and developing economies. Almost all large companies began as an SME. Microsoft began with two individuals in a small garage in North America. Google was started by two young men who had a good idea.

SMEs are a source of development for talent and creation, and are considered an ideal place to develop, create, and innovate. Several studies sated that the number of inventions created by SMEs were more than double those created by large organizations. This fact emphasizes the important role played by this effective sector. The following points identify the key contributions of SMEs to the Algerian economy[2].

6.1 Contribution of SMEs to the country's total employment

SMEs play a leading role in the job creation process and absorb a large proportion of the workforce at several levels, thus contributing to the alleviation of unemployment and ensuring the sustainability of the economic development process.

The evolution of the unemployment rate in Algeria is still on a decreasing trend in recent years, due to the contribution of the SME/SMI sector to the creation of employment, especially by the private sector. Thus, the data of unemployment rates in Algeria have known a decline during the two successive years 2005/2006 from 15.3% to 12.3%, on the other hand this rate has recorded a slight increase of 1.5% in 2007

6.2 Contribution of SMEs to the country's GDP

SMEs are sources of wealth creation, contribute to social stability, and generate tax revenues. According to the International Finance Corporation (IFC), a positive relationship exists betweena country's overall level of income and the number of SMEs per 1,000 individuals.

[1]Benzazoua Bouazza.A, **" Small and medium sized enterprises as an effective sector for economic development and employment creation in Algeria** ", International Journal of Economics, Commerce and Management, Feb 2015, p.8-9.
[2]Benzazoua Bouazza .A. Op.cit,p.11-12

Additionally, because SMEs are able to efficiently resettle activities in remote areas, they are effective tools for the significant enhancement of local wealth and act as instruments in the merging and integration of domestic regions[1].

6.3 Contribution of SMEs to the value added

The value added is measured by the difference between the goods it sells and what it had to buy to produce these sales. In 1994, the value added of the public sector was 617.4 billion dinars, representing 53.5% of the national total, while the value generated by the private sector was 1,178 billion dinars, nearly 46.5% of the national total.

Since 1998, the respective shares have been reversed, putting the private sector in the lead with 1,178 billion dinars or 53.6% and 1,019.8 billion dinars or 46.4% for the public sector. In addition, it should be noted that more than 65% of the value added and employment in developed countries comes from SMEs. An economic policy for the establishment and promotion of SMEs is essential when we aim at development.

6.4 Contribution of SMEs to the revenue distribution

The added value created by each SME covers all the earnings of the firm. The added value will be used to:

- Pay the services, labor force, capital, financial means (it will be then salaries, dividends or interests).
- Contribute to the functioning of the administrations in particular by paying taxes

[1] Idem.

Part 02: the SMEs funding sources

For any new or already existing SME, different forms of internal or external funding exist in order to satisfy the need for expansion, creation, asset renewal, acquisition or enlargement,

Funding is one of the most important requirements for new SMEs; sources of finance must be available during the establishment of a project. The literature shows that lack of funding is one of the biggest and most significant challenges when starting-up and operating an SME

There is no doubt that SMEs are of different levels and sizes, and that both new and existing ones need adequate funding, therefore research into policy and its implications are a serious and important issue. It is widely believed that the characteristics of SMEs, such as age and size, make the sources of finance available to them more limited. It is therefore; often recommended that there should be subsidized institutional finance for such a firms

There are several sources of finance available to SMEs. However, despite various breakdowns in the names of these sources, they fall into the groups of either debt or equity financing. In this part, we will divide the funding sources into internal and external sources and discuss each one of them.

1 Internal sources

Compared to large enterprises, SMEs experience considerable difficulty in obtaining external finance from banks and financial institutions. Thus, the first stage of starting a business involves internal sources of finance. Many firms in the early stages use internal funds, to support the business. The use of external finance is delayed until internal sources of finance are exhausted.

1.1 Owner's Equity

Most businesses, including some of the most successful companies of our time, such as Microsoft and Wal-Mart, started off as small businesses with one or a few individuals providing the seed money and plowing back the earnings of the firm into the businesses.

These funds, brought in by the owners of the company, are referred to as the owner's equity and provide the basis for the growth and eventual success of the business. Although owner's equity cannot be traded like common stock, its counterpart in publicly traded firms, these two sources of funds share several characteristics. First, both entitle the holder to the residual cash flows of the business. The difference between the two is that these cash flows are often funneled through a man-ager as dividends in publicly traded firms, whereas the claim is much more direct for privately owned firms. Second, the cash flows to equity investors are not tax deductible for either private or publicly traded firms. Third, in both cases lenders to the firm have prior claims on the firm's operating cash flows and assets. Finally, in both cases, the holders of the equity maintain management control of the firm, though the control may be more indirect for publicly traded firms[1]

1.2 Friends and family

Also known as, love capital, Friends and family are the second most common source of early financing; this capital comes from the parents or close friends of the entrepreneur, or from any other person having close relations with him, it is often used at the creation of the business.

It should also be mentioned that the possibility of counting on this capital in case of financial difficulties becomes an important survival factor for many SMEs.

1.3 Self-financing

In a firm, earnings after tax and interest are used in two ways: part of these earnings are distributed to shareholders in the form of dividends, the other part is retained by the firm for a reinvestment; self-financing represents the wealth created by the firm. It is an essential internal resource intended to finance all or part of the investments, the increase in working capital requirements and to increase liquidity[2].

In other words, self-financing is represented by the difference between cash flow (CF) and the distribution of dividends paid during the year (one of the three destinations of CF: refunding, investment, dividends); self-financing can discourage associates (who do not receive

[1]Aswath .D," **Corporate Finance Theory and Practice"**, edition second, New York, 2001,p.482.

[2]J.Delahaye et F.Delahaye, **Finance d'entreprise**, édition Dunod, Paris, 2007, p.346.

dividends during a period) from continuing their participation as associates, and can turn away from the firm.

1.4 Disposal of assets

For the SME, disposal of assets is an investment and financing choice; it can be preferred as a non-risky and non-expensive resource option. The choice of disposal of assets is generally taken during the realization of large projects in the presence of unused resources, in other words, reduce or cancel previous investments by selling assets (tangible or financial), or -simply- it is to stop investing money or supporting a project and turning into a sector which is likely to increase its future income or interest. In a more defined sense in the Finance-Banking field: disposal of assets is the sale of assets, (any form of fixed asset) that do not contribute to the company's main activity.

2 External sources

External sources of finance are considered as the last source of fund for SMEs to be used only when internal funds are insufficient[1]. However, SMEs in the early stages of their development face more difficulties than larger companies with regard to obtaining external funding. Credit history, asymmetrical information, potential agency problems, lack of assets and other obstacles limit the access of SMEs to external finance

Most capital providers specialize in either debt or equity financing. Numerous studies have argued that SME will prefer debt to new equity mainly because debt brings a lower level of intrusion and, more importantly, a reduced risk of losing control and decision-making power than equity.

2.1 Equity finance

SMEs are usually deeply reliant upon internal funds, have lower levels of debt, and avoid external equity finance, so that they can control the business without outside intervention. However, when internal funds are insufficient, they will select debt funds rather than new equity because debt reduces the risk of losing control over management of the SME.

[1]Myers S.C. and Majluf N. (1984**), "Corporate financing and investment decisions when firms have information that investors do not have"**, Journal of Financial Economics, 13, 187-221

However, the most important sources of Equity finance for SMEs are the: ownership ,common stock and venture capital.

2.1.1 Ownership

Equity financing involves selling a percentage of ownership in the company to an investor. The main advantage of ownership is that the firm does not incur a debt obligation that must be repaid. The investor may be paid a dividend when the company makes a profit. The biggest disadvantage of equity finance is that every time the owner sells shares, the percentage of the company owned by the owner is diluted or falls.

2.1.2 Common stock

Common stocks are one of efficient ways of equity funding, which is available only for publicly traded firms ,These firms try to raise equity capital by issuing common stock at a price the market is willing to pay. For a firm that is being publicly traded for the first time, this price is estimated by an investment banker and is called the offering price[1].

2.1.3 Venture capital

As small businesses succeed and grow, they typically find that their funds are insufficient to cover their investment and growth needs. One of the ways to face this is to use the venture capital.

A venture capitalist is an entity that provides equity financing to small and often risky businesses in return for a share in ownership of the firm. The act of seeking and receiving venture capital is voluntary, and both sides enter into the relationship with the hope of gaining from it. The business gains access to funds that would not have been available otherwise; these funds in turn might enable the firm to bridge the gap until it can become a publicly traded firm. The venture capitalist might contribute management and organizational skills to the venture and provide the credibility needed for the business to raise more financing. The venture capitalist also might provide the know-how needed for the firm to eventually make a public offering of its equity[2].

2.2 Debt financing

[1]Aswath .D, Op.cit, p485
[2] Idem

The alternative to using equity, which is a residual claim, is to borrow money. Debt creates a fixed obligation to make cash flow payments and provides the lender with prior claims if the firm is in financial trouble

2.2.1 Bank Debt

Historically, the primary source of borrowed money for all private firms and many publicly traded firms has been a bank, with the interest rates charged by the bank based on the perceived risk of the borrower. Bank debt provides the borrower with several advantages. First, it can be used for borrowing relatively small amounts of money; Second, if the company is neither well known nor widely followed by analysts, firm can convey proprietary information to the lending bank that will help in both pricing and evaluating the loan, without worrying about the information get-ting out to its competitors[1].

2.2.2 Bonds

For larger publicly traded firms, an alternative to bank debt is to issue bonds. Corporate bond issues have several advantages over bank debt for some firms. The first is that bonds usually carry more favorable financing terms than equivalent bank debt, largely because risk is shared by a larger number of financial market investors. The second is that bond issues might provide a chance for the issuer to add on special features that could not be added on to bank debt. For instance, bonds can be convertible into common stock or have other options attached to them. In this section, we examine a variety of choices the firm has to make, when it decides to issue bonds[2].

2.2.3 Leasing

A firm often borrows money to finance the acquisition of an asset it needs for its operations. An alternative approach that might accomplish the same goal is to lease the asset. In a lease, the firm commits itself to making fixed payments to the owner of the asset for the rights to use the asset. These fixed payments are either fully or partially tax deductible, depending on how the lease is categorized for accounting purposes .A lease has two parties , the owner of the asset, who buys the asset and leases it out, and the user, who uses the asset during the life of the lease. The first party, the lessor, charges the second party, the lessee, an agreed-upon

[1]Aswath .D, Op.cit,p500
[2] Idem.

charge a lease payment in every period (usually monthly or semiannual). Although this is the typical structure, we should mention that leases take a number of different forms, with different implications for ownership and tax benefits to both parties[1].

[1] Idem.

Part 03: difficulties and opportunities for the Algerian SMEs

1 The difficulties faced by the Algerian SMEs

1.1 The problem of financing

The problem of financing SMEs is one of the main obstacles that stand in the way of their growth and development, owners of SMEs face difficulty in obtaining the necessary funds to conduct different activities of their firms.

The problem of financing SMES is due to the fact that in most cases the firm has a very limited ability to obtain capital and financial services to meet its needs of working or fixed capital on an ongoing basis, and this is due to the weak personal funds of the owners, and the refusal of financing institutions to provide necessary funds for SMEs.

The financial institutions, whether commercial banks or specialized banks, are the main external source of financing for small and medium-sized enterprises. The reluctance of these financing institutions to provide the necessary credit to small enterprises to carry out their various activities is due to a number of reasons that can be highlighted as follows:

1.1.1 The high interest rates

The costs of service or banking transactions related to the financing of SMES are high due to the small amount of the loan; the banks bear a high cost for their financing to SMEs, because small credits require long administrative procedures.

These procedures are related to the documents and data that should be collected in order to make the decision of financing. Also the credit monitoring is higher in this case, because of the big volume of documents and the small amount of loan.

1.1.2 The High risk of lending to SMEs

In most cases, small and medium-sized enterprises are seen as not worthy of credit, in most cases the owners of SMEs do not have the ability to provide a feasible study or a business plans as the owners of large enterprises do.

In addition, a high percentage of these firms, especially small ones, operate in the informal sector and do not have tax neither interested in recording their operations and recording their accounts in financial statements that can be taken into consideration by banks, all of this increases the risks of dealing with them .

1.1.3 Lack of required guarantees:

Granting loans require different guarantees, depending on the nature of the loan and the borrowing client, and this is in order to cover the risks of non-payment of the loan by the borrowing client. Often the owners of small SMEs are unable to provide sufficient guarantees to cover their financing need. Rare are institutions that provides funds for such a small firms and if exist, their funding will be limited.

In addition to the financing obstacles, SMEs face several problems that can be summarized in the following part

1.2 Lack of qualified labor

Small SMEs cannot attract qualified labor, because this type of employment often resorts to working in large firms, and this is due to several reasons, the most important of which is that the Small enterprises cannot pay high wages like large firms, as well as the number of The working hours required daily are more than the large firms also , and therefore the degree of saturation and satisfaction that will be achieved as a result of working in a small firm is limited, unlike the case of working in large institutions.

1.3 Management and access to information obstacles

One of the major obstacles facing SMEs is the difficulty of obtaining information and the lack of organizational experience that would enable the owners of SMEs to face their problems or help them expand their work.

Usually, the owners of SMEs in developing countries have a narrow horizon and does not extend to more than their industry or craft. Therefore, the owners of SMES may not know anything at all about price trends in their country, they are surprised by it, rising or falling for no known reason. They may also be exposed to a severe shortage of raw materials that they use in their activities, so they are exposed to the monopoly of sellers in the local markets, and they are not aware of the existence of alternative sources.

1.4 High production costs

Small-sized enterprises cannot benefit from the advantages of economies of scale and the advantages of different economies of large production. Large-scale production enterprises can

buy raw materials in large quantities and therefore at low prices, and also use advanced technology, which also contributes to reducing the costs of production per unit.

1.5 Infrastructure unavailability

This problem is considered as one of the most complex obstacles that bloke the process of establishing and growing micro-enterprises, as they face the problem of obtaining land, real estate, or the right place to engage in activity and production.

1.6 Marketing obstacles

The market to which the product is directed is considered as one of the biggest problems that lead to the demise of many firms that cannot compete with the large enterprises, due to the shortcomings they know in the distribution networks, which forced some countries to take procedures that aims to enabling small and medium enterprises to marketing its products.

One of the reasons that help the emergence of this marketing problem is the absence of a complete marketing plan, due to the its costs, which affects the budget of the firm in the early stages of its establishment, and limit the access of the firm's product into the external markets.

2 The opportunities for Algerian SMEs

The Algerian government has very well understood the importance of the role played by SMEs in the economic development (job creation, production, innovation, etc.) and social (participation in training and integration of young people), and for this reason, support and development devices for SMEs have been set up, to help them strengthen their creation and development structures. This type of organization is presented in different forms

- National Agency for Support to Youth Employment (ANSEJ)
- the National Agency for Administration of micro-credits (ANGEM)
- National Fund for unemployment insurance (CNAC).

2.1 National Agency for Support to Youth Employment (ANSEJ)

2.1.1 Presentation of the agency

Created in 1996, the ANSEJ is intended to support the employment of young unemployed people under the age of 35 years. It is the most important and popular device of creation and support in the country.

This device concerns two types of investment:

- The investment of creation, which relates to the creation of new micro-enterprises by one or more young promoters.
- And the investment of extension which concerns the investments realized by a micro-enterprise in situation of expansion.

2.1.2 The financing methods

Two financing methods are presented within the framework of the ANSEJ system

The triangular financing: it is a method in which the financial contribution of the young promoters is completed by an interest-free loan granted by ANSEJ and by a bank credit.

This type of financing is structured on two levels:

The first level

- the amount of investment up to 2.000.000 DA
- Personal contribution:5%
- Interest-free credit (ANSEJ):25%
- Bank credit:70%

The second level the amount of investment from 2.000.001 DA to 10.000.000 DA

Personal contribution

- Specific areas : 8%
- Other areas :10%

Interest free credit (ANSEJ) : 20%

Bank credit

- Specific areas : 72%
- Other areas : 70%

Mixed financing: in this type of financing the financial contribution of the young promoter(s) is completed by an interest-free loan granted by ANSEJ.

The structure of this type of financing is divided into two levels:

Level one

- Investment amount up to 2.000.000 DA
- Personal contribution : 75%
- Interest free loan (ANSEJ) : 25%

Level tow

- Investment amount is between 2.000.001 DA and 10.000.000 DA
- Personal contribution : 80%
- Interest free loan (ANSEJ) : 20%

2.2 The National Agency for Administration of micro-credits (ANGEM)

2.2.1 Presentation of the agency

Created in 2004 by the executive decree N°:04-14 of 22/01/2004, ANGEM represents a tool to fight against unemployment, targeting the development of individual capacities of people aged 18 and over, without stable and regular income, to support themselves by creating their own activity.

2.2.2 The financing methods

The contribution of the ANGEM for investments superior to 100 000 DA and equal or inferior to 400000 DA.

Under the creation of activities by the acquisition of small materials and raw material

- raw material of starting: personal contribution l 5%.
- Non-remunerated loan (PNR) of ANGEM at 25 %.
- Bank credit at 70%.

The personal contribution is reduced to 3%, the non-remunerated loan to 27% and the bank credit to 70% when:

- The beneficiary is the holder of a diploma or a recognized equivalent title;
- The activity is located in a specific area, in the south or in the highlands.

For the purchase of raw materials, the borrower cannot benefit from a bank loan. In this case, the financing is provided by ANGEM is distributed as follows:

- Personal contribution 10%.
- Non-remunerated loan (PNR) of ANGEM 90%

2.3 National Fund for unemployment insurance (CNAC).

2.3.1 Presentation of the agency

Created in 1994, the fund is intended for unemployed people between the ages of 30 and 50, who invest in industrial activities and/or services.

2.3.2 The financing methods

The investments to be made under this framework is based exclusively on a triangular type of financing, which brings together the promoter, the bank and the CNAC. The maximum level of investment cost is set at 10 million dinars

First level

- Personal contribution: 1%
- Interest-free credit (CNAC):29%
- Bank credit:70%

Second level : Investment amount superior to five (05) million dinars and inferior or equal to ten (10) million dinars

- Personal contribution : 2%
- Interest free credit (CNAC) : 28%
- Bank credit : 70 %

Conclusion

SMEs are the most dynamic economic entities, and potentially the most successful units in promoting the economy. Business creation is the driving force behind the renewal of the economic tissue, job creation, creativity and local innovation.

However, SMEs suffer from several problems that can slow down its development, namely; lack of information, domination of the informal sector administrative and financial obstacles. These will decrease the ability of growth.

The main weakness for SMEs remains the difficulty in accessing credit. Generally, SMEs prefer the type of internal financing to meet at least part of their working capital or equipment needs. This financing has the advantage to protect them against financial dependence that may arise from engaging with other financial organizations.

However, it should be noted that internal funding is rarely sufficient to finance the growth of the firm which has to turn to external financing, in particular the banking sector which is most targeted by SMEs in developing countries, particularly Algeria because of the inadequacy of the financial market.

Chapter 02: capital structure, theoretical and empirical aspects

Chapter 02: capital structure, theoretical and empirical aspects

Introduction

The question of the capital structure of firms has been the subject of debate since the work of Miller and Modigliani (1958). They were the first to conduct a theoretical analysis of the impact of the financial structure, particularly on the debt/equity ratio and on the value of the firm.

Since 1958, there has been a succession of studies on the financing behavior of firms, giving rise to numerous theories. However, these theories are only validated under hypothetical assumptions. The end of the 1950s also marked the beginning of an excess of empirical studies on firms financial structure. Most of these studies seek to show the main determinants of debt, focusing only on large and listed companies and not on small and medium-sized enterprises (SMEs).

Several authors mention that there is a tendency to apply the theoretical precepts of classical corporate finance to the case of SMEs since, ultimately, these firms are characterized by the same problems as large firms and listed companies, they mean mainly agency problems and problems of information asymmetry. Which, according to them, differentiates SMEs from other companies.

This chapter will allow us to identify the different theories of capital structure and have a brief review on the previous empirical studies about its determinants.

To achieve our work, we have structured this chapter as follows:

- Part 1 : A literature review about capital structure theories
- Part 2: the main determinants of capital structure
- Part 3: the empirical studies about capital structure

Part 01: A literature review about capital structure theories

The capital structure theories are very important, due to the fact that every single company has to make a decision about what capital structure they should choose. In this part, we will discuss the main capital structure theories and their application. We start with a definition of capital structure, the cost of financing and the Weighted Average Cost of Capital (WACC). Then, we will discuss the work of Modigliani-Miller. After that, we will talk is about the trade-off theory (TOT) and the pecking order theory (POT). Then, the agency cost theory and will review the market timing theory and finally the life stage theory which is related to the SMEs.

The different theories of capital structure are related to the arbitrage between debt and equity, these theories are mainly distinguished by the importance given to different factors such as the consideration of taxation, the risk of financial distress, market imperfections and agency costs.

1 Capital Structure Definition

Capital structure is defined as the specific mix of debt and equity a firm uses to finance its operations. To explain the capital structure decisions we use capital structure theories. They are based on asymmetric information, tax benefits associated with debt use, bankruptcy cost and agency cost

2 Definition of Cost of Capital

The cost of capital is a very important tool for the valuation of investments. It is the rate of return that the debt or equity holders would accept in exchange for their supply of capital. Using this tool help firms to decide which projects or investments they should take. It is also widely used as a discount rate to predict the present value of the investment cash flows. There are different methods for calculating the cost of capital, but we provide the most relevant one to capital structure, which is the weighted average cost of capital (WACC). Before we calculate the WACC, we need the cost of debt and the cost of equity.

2.1 Cost of Debt

The cost of debt is relatively simple and less controversial than the cost of equity. On the one hand, due to debt tax shield, the cost of debt capital is generally lower than that of equity capital; On the other hand, the weight of debt in total financing is relatively small.

The Cost of debt is generally considered equal to interest expenditure/debt[1] . This method defines cost of debt capital as:

$$r_d = \frac{E}{D}$$

Where:

E is the interest expenses

D is debt

r_d is the before-tax cost of debt

2.2 Cost of Equity

Several methods are used to estimate the cost of equity. These are the capital asset pricing model, dividend-discount model and the bond yield plus risk premium. In this section we use the dividend-discount Model and the formula of cost of equity is given by[2]:

$$P_0 = \sum_{i=0}^{\infty} \frac{(D_i)}{(1 + r_e)^i}$$

Where:

P_0 : is the price per share at the current period

D_i : is the dividend per share in period i

r_e : is the cost of equity

2.3 Weighted Average Cost of Capital

The WACC can be defined as:

$$\text{WACC}=(\frac{E}{V} \times r_e) + (\frac{D}{V} \times r_d \times (1 - t_c))$$

Where:

E: the market value of the firm's equity

D: the market value of the firm's debt

V=E+D

[1] Garcíameca, E. (2011**)," Ownership Structure and the Cost of Debt",**. European Accounting Review, 20, 389-416.

[2] Li, H.H," **Cost of Capital: Literatures Review about Calculation Methods and Influencing Factors"**. Journal of Service Science and Management, 12, 360-370

t_c : the corporate tax rate

r_e : the cost of equity

r_d : the cost of debt

3 The capital structure theories

3.1 Traditional approach

According to the traditional view, there exits an optimal capital structure which means a debt to equity ratio (leverage) that maximize the value of the firm; it assumes that the debt funds are cheaper than equity funds, The implications of this is to say that debt has a double effect, a positive effect which is the replacement of an expensive fund by a cheaper one and a negative effect which is increasing the financial risk.

The financial risk is measured by the volatility of the return on equity. It is on the basis of this volatility that shareholders and lenders increase the required rate of return by including a risk premium. Therefore, there is an optimal level of leverage such that the positive effect of debt is equal to its negative effect.

3.2 Modigliani-Miller Theories

3.2.1 In a world with no taxes

In their paper, Modigliani and Miller (1958) [1]argued that under a specific set of assumptions the company capital structure financing decision is irrelevant to its market value. These assumptions were relaxed later in subsequent studies to unlock a substantial amount of research towards capital structure theory.

The Modigliani and Miller (1958) restrictive assumptions are:

1. All investors have complete knowledge of what future returns will be.
2. All firms within an industry have the same risk regardless of capital structure.
3. No taxes
4. No transactions costs.
5. There are no bankruptcy costs.
6. Individuals can borrow as easily and at the same rate of interest as the corporations.

[1] Franco. M; Merton H. M,"**The Cost of Capital, Corporation Finance and the Theory of investment**", The American Economic Review, Vol. 48, No. 3. (Jun, 1958), pp. 261-297.

7. All earnings are paid out as dividends (thus, earnings are constant and there is no growth).

Under these assumptions, M &M announce their two propositions:

Modigliani and Miller (1958) First Proposition

Modigliani and Miller show the following proposition: "The market value of any firm is independent of its capital structure and it is given by capitalizing its expected return[1]

all other things being equal" , which means exactly that : "The value of the levered firm is the same as the value of the unlevered firm

they argued the following formula :

$$V_u = V_l$$

Where:

V_l : value of the levered firm

V_u : value of the unlevered firm

Modigliani and Miller (1958) Second Proposition

The second proposition of Modigliani and Miller essentially claims that company's cost of equity is directly proportional to its leverage level this proposition is demonstrated as follows:

The weighted average cost of capital WACC includes both cost of debt and cost of equity

$$WACC = (\frac{E}{E+D} \times r_e) + (\frac{D}{E+D} \times r_d)$$

For the unlevered firm we have:

$$WACC = r_{ue}$$

With

r_{ue} : is the rate of return of the unlevered equity

By replacing (2) in (1) we get

$$r_{ue} = (\frac{E}{E+D} \times r_e) + (\frac{D}{E+D} \times r_d)$$

[1]Franco. M; Merton H. Op.cit.,

$$r_e = r_{ue} + (r_{ue} - r_d) \times \frac{D}{E}$$

We can clearly notice that the cost of equity of the levered firm is a linear function of its leverage.

However these results are accepted only in their context, the hypotheses of the M&M model are irrelevant, in particular the non-existing of tax and the perfect market which makes the model contradictory to the empirical observation, thus, To be more realistic, Modigliani and Miller reformulated the two previous propositions taking into account the tax in an article published in 1963 named a correction[1].

3.2.2 Modigliani and Miller (1963) Corrections

In this communication, Modigliani and Miller (1963) revisited their previous propositions in an attempt to correct errors they committed. In their original paper, Modigliani and Miller (1958) proposed that under a set of assumptions there is no relation between the firm capital structure and its value. They also added that firms should try to maximize their use of debt to take advantage of the tax shield. However, their new revised models state there is still a benefit of using debt over equity but it also includes risks and costs that should be taken into consideration. They also added that firms could use retained earnings as a substitute for debt as it could be cheaper in some instances.

3.3 Trade-off Theory

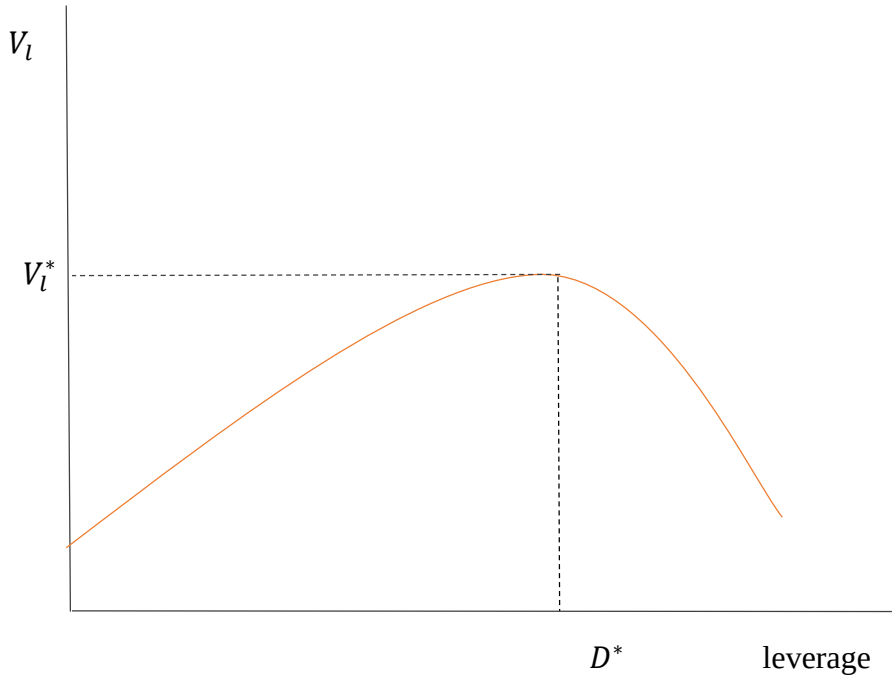
The two papers we discuss in the previous section, which were done by Modigliani and Miller (1958), lead Kraus and Litzenberger (1973)[2] to suggest a hypothesis. Their hypothesis is to introduce market imperfections in the form of the costs of bankruptcy and corporate taxes to the model. In other words, we could assume that there are benefits and costs associated with the use of debt. The addition of the corporate tax to the model shows that using leverage would reduce the amount firms pay in corporate income tax. On the other hand, the use of bonds would require the firm to pay a fixed amount and if they cannot meet it they will be

[11]F .Modigliani et M .Miller, **«Corporate Income Taxes and the Cost of Capital: A Correction, American"** Economic Review, juin, 1963.

[2] Kraus, A. & Litzenberger, R. (1973). "**A state-preference model of optimal finance leverage"**. The Journal of finance, vol. 28(4), pp. 911-922.

bankrupted and pay the costs. Therefore, we could say that Kraus and Litzenberger (1973) shifted the focus into deciding the level of debt that would take the most of the tax advantage and minimize the probability of bankruptcy to maximize the market value of the firm. The dynamic form of trade-off theory assumes that the actual capital structure of a particular firm at a particular moment in time does not necessarily equal the target capital structure of that firm but the firm dynamically adjusts its capital structure to a moving target. The figure below illustrate the trade-off theory

Figure 0-1 : the trade-off theory



Where

D^*: is the optimal debt

V_l^* : is the optimal value of debt

3.4 Pecking Order Theory

This theory assumes that given information asymmetry between stakeholders, firms will resort to internally generated funds first to finance their growth, then debt before equity in order. The main backbone of the theory is the introduction of the asymmetric information

between the company insiders and outsiders and how this would affect the firm capital structure. It is developed and supported by Myers and Majluf (1984) [1]who were the first to propose the Pecking order theory. However, in fact it was first discussed in the literature by Donaldson (1961) who conducted a survey study and found results to support this behavior of firms. It states that investors or shareholders have less information about the true value of the firm assets and therefore will monitor the manager's financing decisions to forecast the future of the firm. Furthermore. The pecking order theory has no assumption about the optimal capital structure or leverage ratio. However, its main idea is that managers tend and try to minimize adverse costs and that the capital structure is the result of the firm financing requirement over time.

Myers (1984) suggested the following assumptions of the pecking order theory:

1. Firms prefer internal finance.

2. They adapt their target dividend payout ratios to their investment opportunities, although dividends are sticky and target payout ratios are only gradually adjusted to shifts in the extent of valuable investment opportunities.

3. Sticky dividend policies, plus unpredictable fluctuations in profitability and investment opportunities, mean that internally generated cash flow may be more or less than investment outlays. If it is less, the firm first draws down its cash balance or marketable securities portfolio.

4. If external finance is required, firms issue the safest security first. That is, they start with debt, then possibly hybrid securities such as convertible bonds, then perhaps equity as a last resort.

3.5 Agency Cost Theory

In this theory, the model is based on how to use capital structure as disciplinary tool to keep the interest of managers, shareholders and debt holders in the same direction, which is to

[1] Myers, S, C.; Majluf, N, S. (1984). "**Corporate financing and investment decisions when firms have information that investors do not have**". Journal of Financial Economics. 13 (2): p.187–221

maximize the value of the firm. Jensen and Meckling (1976)[1] discuss two kinds of conflicts that might arise between the stakeholders of the firm. These are:

1. Conflict between managers and shareholders.

2. Conflict between equity shareholders and debt holders.

the conflict between managers and shareholder will generally be about operating decisions. This problem could be solved by using debt since it gives the power to the bondholders to force liquidation. Further- more, Jensen (1986) states that using debt; firms will incur interest payments, which would decrease the cash flow available for self-interested managers.

On the other hand, conflict between shareholders and debt holders because of the investment return is higher than the payment to the debt holders and then shareholders will get most of the profit. However, if the investment returns are low the debt holders will suffer from the loss. Therefore, shareholders might encourage risky investments that debt holders would not support. This is known as the asset substitution effect.

3.6 Signaling Theory

It was assumed by MM that investors have the same information about a firm's prospects as its managers-this is called symmetric information. However, managers in fact often have better information than outside investors. According to Ehrhardt & Brigham (2011) this is called asymmetric information, and it has an important effect on the optimal capital structure. Signaling theory states that corporate financial decisions are signals sent by the company's managers to investors in order to shake up these asymmetries. These signals are the cornerstone of financial communications policy. According to Gangeni (2006), the argument here is that management will only issue debt or equity if there are not enough internal resources to finance the desired investments or the risk is not in line with the anticipated returns. In this case, the emphasis will be on identifying what trends in the type, level and reliability of the information supplied. So the managers would not issue additional equity if they thought the current stock price was less than the true value of the stock (given their inside information).Hence, investors often perceive an additional issuance of stock as a negative signal, and the stock price falls.

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[1] Jensen, M. and Meckling, W. (1976): "**Theory of the firm: managerial behavior, agency costs and ownership structure**", Journal of Financial Economics 3, 305–360

3.7 Market timing theory

The market timing theory of capital structure says that firms issue new stock when their share price is overvalued and they repurchase their shares when their share price is undervalued. Accordingly, fluctuations in stock price will effect on corporate financing decisions and ultimately corporate capital structure[1].

There are two versions of equity market timing that result in the same capital structure dynamics the first one is a Dynamic version of Myers and Majluf, this version emphasizes on rationality of managers and investors. Issuing equity happens straightly when positive information reveals which it is cause of reducing information asymmetry between the firm's management and shareholders. Whenever information asymmetry reduces share price increases. Therefore, each firm times the market in its own

The second version of equity market timing according to Baker and wurgler (2002) is that managers raise equity when cost of equity is abnormally low, because they think investors are irrational. Also Graham and Harvey found amazing signs of market timing by managers in other ways. They observe executives try to time interest rates by issuing debt when market interest rates are exclusively low. Their findings significance was moderately strong that firms attempt to time the market with this way. They also found large firms are focusing on market timing very specially. This insinuates that firms are more probably to time interest rates when they have a large or sophisticated treasury department.

Baker and Wurgler documented how capital structure is affected by the historical ratio of market-to-book equity. They also conclude as follows:

1. Firms with low leverage tend to raise funds when their valuation is high, on the other side, high leverage firms tend to raise funds when their valuation is low.
2. Volatility in market valuation, extremely affect capital structure[2].

3.8 Life cycle Theory

[1] Géraldine MINIAO, « **Les déterminants de la structure du capital des BRCIS** », HEC Montréal, Aout 2012,p 8-9.
[2] M.H. Tilehnouei , B. Shivaraj ,"**A Brief Review of Capital Structure Theories** ",Research Journal of Recent Sciences, October (2014),p.113-118

According to Utami & Inanga (2012)[1], firms in different life cycle stages have different characteristics, especially regarding the information asymmetry. Mature firms have less information asymmetry whereas growth firms have more. This is because mature and older firms are more closely followed by analysts and are better known to investors and, hence, should suffer less from problems of information asymmetry. This theory recognized a ,

Life cycle theory has tried to explain the financial behavior of firms. In the start-up stage, the firm usually faces difficulties in accessing external finance due to certain characteristics of the firm and the entrepreneur. For example: characteristics related to the desire to keep control of the business. This condition leads the owner-manager to finance his firm with his own funds. Furthermore, the financing is mainly based on equity and debt. This is mainly the beginning of the growth phase of the firm and therefore equity alone is not sufficient.

At the growth stage, the firm will have three main sources of financing to use, which are : self-financing, debt and the capital markets, With this last one, the participation of other actors is unavoidable. To avoid this situation, the entrepreneur can decide to choose the external sources of financing which will not make him lose the control of his of his company.

At the maturity stage, the firm will have access to several sources of financing and it is expected to have a track record in order to gain the confidence of the various partners. Thus, informational transparency is supposed to be present. In addition, companies are supposed to have important guarantees in order to get the loans they need[2]

[1]Siti Rahmi Utami,Eno L. Inanga,"**The Relationship between Capital Structure and the Life Cycle of Firms in the Manufacturing Sector of Indonesia**», Journal of Finance and Economics,- Issue 88 (2012), p 70-90
[2]M. DJIBRILLA HAMIDOU, **« Les facteurs déterminants du diagnostic financier des PME : cas de 119 PME camerounaises »**, Université de QUEBEC, Décembre 2014, P 31-32.

Part 02: the main determinants of capital structure

The determinants of the capital structure of firms have been the subject of several theoretical predictions as to their relationship to the financial structure of firms. In this part, we will focus on the following determinants: age, liquidity, profitability, tangibility, size, sector, non-debt tax shield and the self-financing capacity

1 Age

The age of a firm is a standard measure of reputation in capital structure models. Banks and bondholders tend to know more about firms and entrepreneurs before granting a loan and evaluating their credit worthiness. When the managers are concerned with the reputation of the company they tend to act wisely and avoid high-risk projects in favor of safer and more profitable projects. The age is considered as a main determinant of the capital structure.

The trade-off theory and the agency cost theory predict a positive relationship between the age of the firm and leverage, firms that have been in the industry for longer period of time have better access to borrowing, since they have established relationship with the lenders, who keep track of their financial record and reputation. On contrary findings by Mechaelas et al (1999), and Petersen, and Rajan (1994) are parallel with the pecking order theory hypothesis that state the usage of debt financing decreases with age, the argument is that the firm is able to build up a sustainable amount of retained earnings as they aged and there for, found no reason to seek external funding[1] .

2 Liquidity

Liquidity ratios have both a positive and a negative effect on the capital structure decision, liquidity is defined as the ratio of current assets to current liabilities. This ratio shows the ability of the firm to cover its short- term financial commitments and it measures the liquidity of the firm. The trade-off theory believes that a positive relationship exists between leverage and liquidity because a higher liquidity ratio can support a relatively higher debt ratio due to greater ability of a firm to satisfy short-term contractual obligations on time. However, the pecking order theory has a contrary view. This theory believes a negative relationship exists between liquidity and leverage because firms with enough liquidity may use internally available funds to finance investment. Liquidity (LIQ) can be measured also as the number of

[1] Noryati Ahmad, **"Does Age of the Firm Determine Capital Structure Decision? Evidence from Malaysian Trading and Service Sector**", International Business Management ,January 2015, p 200-206

days account receivable plus the number of days of inventory minus the number of days account payable i.e. cash conversion cycle or as the ratio of current assets to total assets

3 **Profitability**

There are conflicting financial theoretical predictions on the effects of profitability on capital structure .The trade-off theory is generally interpreted as predicting a positive relation between firm profitability and leverage. This is because default risk is lower and interest tax shields of debt are more valuable for profitable firms.

On the other hand and as explained by the pecking order theory, profitable firms tend to primarily use internal capital for their financing needs, avoiding the costs of external debt. In other words, given the information asymmetry between corporate managers and outsiders, firms have a preference for internal sources of financing rather than external ones. Even if profitable firms can obtain an easier access to leverage than less profitable organizations, they will prefer internal funds as the cost for external capital might be higher. This reasoning supports the assumption that SMEs profitability is negatively related to leverage

The Return on asset (ROA) is used as a measure of profitability. Profitability is defined as the ratio of earnings before interest, tax (EBIT) and depreciation to total assets This is the most common measure in studies that tested the factors affecting capital structure. The importance of this element of the company's profitability strongly affects the financial risk to the company. The greater the profitability of the company, the less the possibility of failure and the more the ability to borrow and achieve tax savings. On the other hand, the greater the profitability of the company, the greater it’s ability to finance its activities and fund expansion of its profits and thus rely less on external sources of funding

4 **Tangibility**

Tangibility is defined as the ratio of total fixed assets to total assets. Titman and Wessels (1988), Rajan & Zingales (1995), Fama & French (2000) argue that the ratio of total fixed assets to total assets (tangibility) should be an important factor for capital structure. The static trade-off theory predicts a positive relation between leverage and tangibility. This is because tangible assets are easier to collateralize and they suffer a smaller loss of value when firms go into distress.

The pecking order theory, on the other hand, is generally interpreted as predicting a negative relation between leverage and tangibility, since the low information asymmetry associated with tangible assets makes the issuance of equity less costly Harris & Raviv, (1991) Empirical studies generally find a positive correlation between tangibility and leverage. It exists in empirical studies discovered by, Titman & Wessels (1988), Harris & Raviv (1991), Rajan & Zingales (1995), among others. A few empirical studies defines tangibility as the ratio of net fixed assets to total assets.

5 **Size**

Many studies outline that firm size is a relevant determinant of the capital structure. It is measured by the natural logarithm of sales, assets, and number of employees.

Large firms tend to be more diversified which reduces their exposure to bankruptcy. This indicates the existence of a positive relationship between the firm size and debt capacity. So larger firms with less asymmetric information problems should tend to have more equity than debt and thus have lower leverage. It may be able to take advantage of economies of scale in issuing long-term debt, and may even have bargaining power over creditors; thus, it will be able to borrow at lower cost.

Whereas Small and medium sized firms is likely to worsen the information asymmetry between the owner-manager and potential capital lenders. As a result, the cost of debt may be higher for SMEs than for large firms. On the other hand, Ang et al. (1982) specify that bankruptcy costs are relatively higher for small companies, because large firms show more stability and hold more diversified portfolios of activities. This situation supports a positive relationship between firm size and total and long-term debt, and a negative one between size and short-term debt. These results signify that large firms usually choose long-term debt, while small companies prefer short-term debt.

6 **Sector**

Theoretical and empirical studies have supported the existence of different capital structures between different industries. This difference in capital structures comes from the nature of the firms' assets as well as the sector's ability to withstand in crises.

According to Myers (2001), debt ratios change depending on the industry. For example, large oil companies have relied primarily on debt for external financing. Other relatively heavy

users of debt include the utility, petrochemical, transportation, telecommunications, forest products, and real estate development industries. At the other extreme, large pharmaceutical companies generally have low debt ratios, with their cash and marketable securities holdings exceeding their outstanding balances, making them net lenders. Debt ratios are also low or negative for many large growth companies. In general, industry debt ratios are low or negative when profitability and business risk are high. Intangible assets are also associated with low debt ratios.

7 **Non-debt tax-shield**

A tax shield is a reduction in taxable income for a firm achieved through claiming allowable deductions such charitable donations, amortization, and depreciation. Numerous studies argue that NDTS are substitutes for the tax advantages of debt financing. Since depreciation and investment credits reduce the tax base, the firm may not benefit much from the tax savings associated with debt if these NDTS are large, and therefore and therefore, a firm with more NDTS should use less debt.

8 **Self-financing capacity**

Self-financing is mainly made up of retained earnings and depreciation. This variable is at the heart of our empirical investigation as it is subject to controversy in theory. Indeed, the arbitrage models anticipate a positive relationship between the firm's performance and its debt as soon as the tax benefit of debt increases with earnings. On the other hand, the pecking order theory give self-financing a negative effect on debt based on the assumption that firms prefer internal financing to external financing.

Part 03: the empirical studies about capital structure

1 Famous previous studies about capital structure

1.1 Rajan & Zingales study 1995

This study was conducted by Rajan and Zingales (1995) where they studied and compared the G7 countries at that time. These countries were United States, Japan, Germany, France, Italy, United Kingdom and Canada. The main objective of their paper was to investigate if other countries' capital structures were different from the United States. They found that the level of leverage in firms is similar across 5 of the countries in the sample except for Germany and the UK, which are lower in their leverage. They also added that there are substantial differences in the institutional characteristics. The differences could by summarized by different tax and bankruptcy costs, corporate control and banks' historical roles. Furthermore, they found that the correlation between leverage and other determinants of capital structure in the US is similar in other countries as well[1].

1.2 S.Titman & R.Wessels study 1988

Through a study based on about 469 American institutions in which information was available about various Model variables in the period between 1974 and 1982, Using three ratios to measure financial leverage as a dependent variable (long term debt LTD/BVE , short term debt STD/BVE , convertible debt C/BVE , When using the long-term debt ratio as a dependent variable, it was found that there is a positive statistically significant relationship with the wealth variable; And with negative statistical significance with the non-diversification variable in products and the size variable, and there was no statistical significance for the other independent variables, and when using the short-term debt ratio, it became clear that there is a negative statistically significant relationship between the dependent variable and the non-diversification variable in products (Uniqueness) and the size variable , there was no statistical significance for the other independent variables, and when the last dependent variable was used, the convertible debt ratio, there was no statistical significance for the independent variables.

[1] R. G. Rajan and L. Zingales, « What Do We Know about Capital Structure? Some Evidence from International Data », The Journal of Finance, VOL L, N°5, December 1995, p 1453

1.3 Wald (1999)

Wald (1999) investigated a sample of 5 developed economies, which are France, Germany, Japan, United Kingdom and United States. Although similar in choice of sample with Rajan and Zingales (1995), he explained that instead of focusing on testing theories, his focus will be on firm characteristics namely size, risk, growth and inventories. The results of his study are in line with Rajan and Zingales (1995) in terms of similar debt levels across countries. His findings included that profitability, research & development, tax and moral hazard have a predictable relation and are all stable for the countries in the sample. On the other hand, growth, risk, size and inventories have different relations in the countries of the study. The differences might suggest that institutional characteristics have substantial power in explaining capital structure[1].

1.4 Booth et al study (2001)

a key study by Booth et al. (2001) examines a sample of 10 developing countries. The main focus of the paper was to test if capital structure decisions differ if the firm is in a developed or developing country. They also study if the classic factors affecting capital structure of a single economy are the same in developed and developing countries. The findings of this study conclude that the same factors affect both developed and developing countries. Yet, several differences do exist and they conclude that this evidence proves the impact of institutional characteristics on capital structure[2].

2 Studies on the SMEs capital structure determinants

2.1 Foreign studies

2.1.1 Cole (2008)

Cole (2008) focused his research on small enterprises, primarily because he felt that the existing literature is not a reference for small enterprises. He believed that testing trade off theory and pecking order theory can determine the variables that affect the capital structure of

[1] Wald, J. K. (1999), '**How firm characteristics affect capital structure: An international comparison**", Journal of Financial Research 22(2), 161–87

[2] Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001), '**Capital structures in developing countries**', The Journal of Finance 56(1), 87–130.

SMEs.He conducted a research on a sample of small enterprises in the USA and concluded that leverage is negatively related to size and profitability and positively with tangible assets[1].

2.1.2 Bas, Muradoglu, and Phylaktis (2009)

Bas, Muradoglu, and Phylaktis (2009) analysed capital determinants focusing their research on SMEs in developing counties. The main determinants they discovered are tangible assets and profitability, which are negatively related to the leverage, then size and growth which are positively related to the leverage[2]

2.1.3 Psillaki and Daskalikis (2008) SMEs in Greece and France

Daskalakis and Psillaki (2008) in their research analyzed capital structure determinants of Greece and French SMEs. One of their goals was to discover if the determinants are the same in both countries. They showed there are similarities as well as differences in the capital structures. In both countries, there is a positive relation between size and leverage and also tangible assets and profitability are negatively related to leverage. Growth is positively related to leverage only in France. Authors concluded that Greek companies are more leveraged than French, which also have more tangible assets[3].

2.1.4 Degryse, Goeij, and Kappert (2010) SMEs in the Netherlands

SMEs in the Netherlands where they proved that leverage is positively related to size, tangible assets, growth and negatively to profitability. Dutch SMEs use profit to borrow less. As they are more profitable, they are financed by internally generated funds supporting the pecking order theory. It has also been shown that more Dutch SMEs use long-term financing compared to short-term financing[4]

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[1] Cole, R. A. 2013. "**What Do We Know about the Capital Structure of Privately Held Firms? Evidence from Surveys of Small Business Finance»**, Financial Management 42 (4): 777–813.
[2] Bas, T., G. Muradoglu, and K. Phylaktis. 2009. "**Determinants of CapitalStructure in Developing Countries**." http://www.efmaefm.org/ 0EFMSYMPOSIUM/2010-China/papers/determinants□20of □20capital□20structure□20in□20developing□20countries.pdf
[3] Daskalakis, N., and M. Psillaki. 2008. "**Do Country of Firm Explain Capital Structure? Evidence from smes in France and Greece**.", Applied Financial Economics 18:87–97
[4] Degryse, H., P. de Goeij, and P. Kappert. 2010. "**The Impact of Firm and Industry Characteristics on Small Firms Capital Structure**.", Small Business Economics 38 (4): 431–47

2.1.5 Song (2005) SMEs in Sweden

Song (2005) showed that Swedish SMEs use twice as much short-term borrowing in relation to long-term borrowing. He showed that leverage is positively related to size, growth and tangible assets and negatively to profitability[1].

2.2 Algerian studies

2.2.1 The study of Y. KORAÏCHI (2004/2005)

This study examines a sample of 128 Algerian SMEs in the period of 2001-2003, it shows that the pecking order theory is the most appropriate theory to explain the capital structure decision made by the Algerian SMEs.When using the total debt as a dependent variable, it was concluded that there is a positive significant relationship between the dependent variable and the profitability variables, the construction sector, public works and the transport sector, and a statistically significant inverse relationship with the growth variable.

When using the long-term debt variable as a dependent variable, the researcher found that there is an inverse relationship with a statistical significance between the dependent variable and the variables of the size of the institution and the hotel sector, and a direct statistically significant relationship with the variable of the trade sector. And When using the short-term borrowing rate, it was concluded that there is a direct statistically significant relationship between the dependent variable and the variables of the level of guarantees and the service sector, and a statistically significant inverse relationship with the growth variable[2].

2.2.2 LAIEB (2010-2011)

Through a study based on a sample of 126 small and medium enterprises in the period between 2006-2009, the researcher chose the total debt rate as a dependent variable for the study, and it was found that there is a relationship Direct, statistically significant between the dependent variable and the enterprise size variable, and a statistically significant inverse relationship with the net private funds variable, and the growth, profitability and volume of

[1] Song, H.-S. 2005. "**Capital Structure Determinants: An Empirical Study of Swedish Companies**" cesis Electronic Working Paper Series 25, Centre of Excellence for Science and Innovation Studies, Stockholm

[2] ي. قريشي ، **سياسات تمويل المؤسسات الصغيرة والمتوسطة في الجزائر: دراسة ميدانية**، أطروحة دكتوراه دولة في العلوم الاقتصادية، كليةالعلوم الاقتصادية وعلوم التسيير، جامعة الجزائر, 2005/2004 ,ص 269-276

guarantees variables had no statistical significance, and this was explained by the fluctuation of the activity of small and medium enterprises.

As for the legal form, the researcher noted that the institutions that benefit the best from financing opportunities are partnership companies, and this is due to the solidarity of the partners to repay the debt at the due date[1].

2.2.3 The study of M. GUERRACHE (2014/2015)

The study of M. GUERRACHE aims to explain the financial behavior of a sample of of Algerian firms for a period spread between 2005 and 2008. These firms have been selected for several reasons, most probably because of the fiscal changes that occurred during this period. The interest of his study is to try to find the most interpretative theory of the financial behavior of Algerian private firms.

Among the results of his study, he found that:

- There is a significant positive relationship between long and medium term debt and collateral (0.124) such that, firms with strong guarantees will have easy access to bank debt. Thus, there is a negative relationship between total debt and collateral with a low level of significance (-0.089). This, according to him, is due to the increase in short-term loans (the largest proportion of total debt is short-term debt), this was confirmed by the inverse relationship with a high degree of significance between total debt and short-term debt (-0.178).
- According to the author, there is no significant relationship between size and long- and medium-term debt, and this is due to the lack of trust between banks and firms. Also, a significant positive relationship between size and short-term debt.
- There is a significant negative relationship between profitability and total debt, also with long and medium term debt, which confirms, according to him, the pecking order theory, such that companies with high profitability prefer to finance their needs through self-financing, if this is insufficient, they turn to debt financing[2].

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[1] ي. العايب،**"إشكالية تمويل المؤسسات الاقتصادية: دراسة حالة المؤسسات الصغيرة والمتوسطة في الجزائر"**، أطروحة مقدمة لنيل شهادةدكتوراه علوم في العلوم الاقتصادية، كلية العلوم الاقتصادية وعلوم التسيير، جامعة منتوري قسنطيينة 2011/2010 ص 384-390

[2] قراش محمد, **"محددات السياسة المالية للمؤسسات الجزائرية الخاصة. دراسة حالة لعينة من المؤسسات الجزائرية في الفترة بين 2005 و 2008",**أطروحة لنيل شهادة الدكتوراه في علوم التسيير, المدرسة العليا للتجارة, 2014/2015 ,ص 282-284

Conclusion

In this chapter, we have presented the different theories and the different explanatory factors of the capital structure and its impact on the value of the firm, as well as some foreign and Algerian empirical studies, which, through several variables, tried to explain the level of debt of the firms.

Empirical studies show that there is no global theory of financial structure and that arbitrage models and hierarchical models dominate simultaneously in explaining firms financial behavior. Moreover, geographical specificity of empirical studies on the capital structure of SMEs in emerging countries limits their general explanatory capacity.

Chapter 03: An empirical study about the SMEs capital structure determinants

Chapter 03: An empirical study about the SMEs capital structure determinants

Introduction

The objective of this chapter is to conduct an empirical analysis of the determinants of capital structure of the Algerian SMEs.

In order to do so, we will proceed with the analysis of two econometric models using the total- debt as a first model, and the short-term debt as a second model. It should be noted that our study will focus on the determinants that we have seen in the theoretical part.

This chapter is divided into three (3) parts as follows:

- Part 01: Methodology of the study.
- Part 02: A descriptive Analysis.
- Part03: Estimation of the model and analysis of results.

Part one: Methodology of the study

This part is dedicated to the presentation of our sample as well as the source of our data and the different variables of our econometric model, in addition to the estimation method.

1 Presentation of the sample

Our sample is composed of 50 Algerian small and medium-sized enterprises (SMEs) that operate in three sectors of activity: construction sector, industry sector, and the service sector.

The law N°01-18 of December 12,2001 laying down the law of orientation on the promotion of small and medium sized enterprises stipulate that " The SME is defined ,whatever its legal status, as a good and/or services production enterprises that is characterized by[1]:

- employing full time from 1 to 250 employees;
- generating an annual turnover not exceeding 2 billion DA, or whose annual balance sheet total does not exceed 500 MDA
- That meets the criteria of independence [2]

The distribution of the firms by sector of activity is presented in the following table:

Table 3-1: Distribution of firms by sector

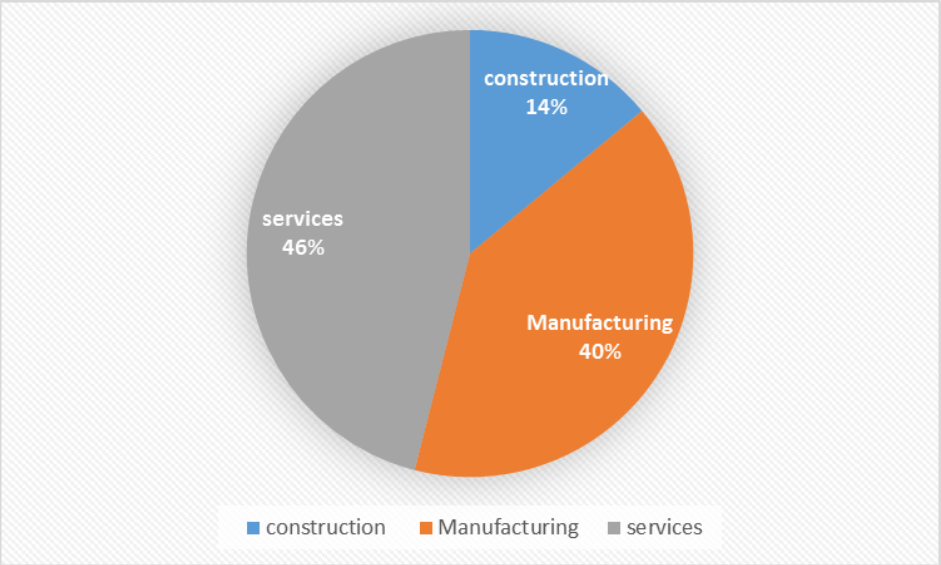
Sector	Construction	manufacturing	services	Total
Number of firms	7	20	23	50
Percentage	14%	40%	46%	100%

Source: elaborated by us through the collected data.

From the table we can see that the companies in our sample were chosen randomly, most of the firms belong to the service sector (transport and communication, commercial and services), then we have the industry sector with 20 firms and at last we have the construction sector with 7 firms.

[1] La loi d'orientation sur la promotion de la PME n° 01-18 du 12.12.2001, Ministère de PME et de l'Artisanat.
[2]whose capital is not held at 25% or more by one or more other persons.

Figure 3-1: Distribution of firms by sector



Source: elaborated by us through the collected data.

In terms of the legal form of the firms, which expresses their status according to the legislation, we can notice that the firms in this sample are divided into four categories: limited liability company LLC, General partnership, sole partnership with limited liability and Joint-stock company

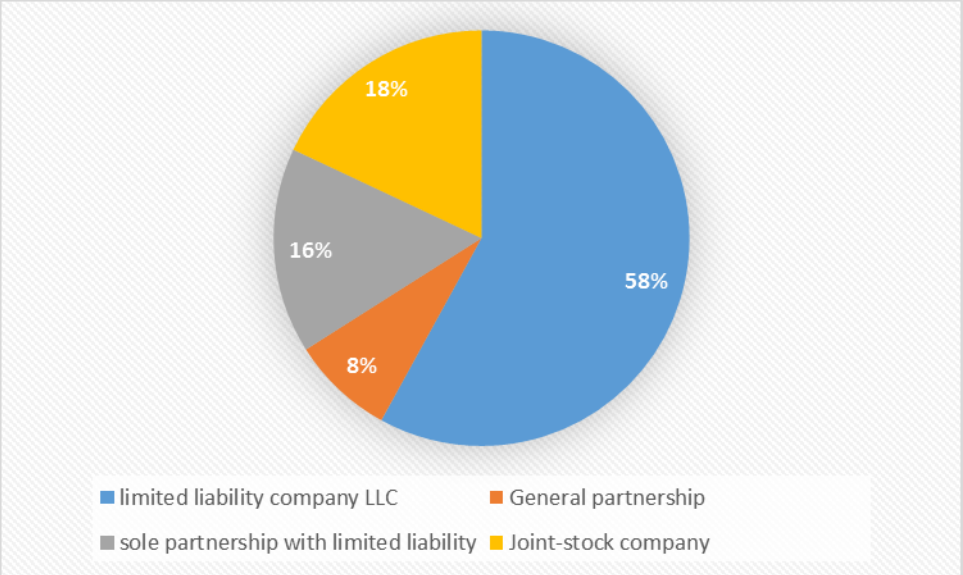
The following table shows the distribution of the firms according to their legal form :

Table 3-2: Distribution of the firms according to their legal form

Legal form	**Limited liability company LLC**	**General partnership**	**Sole partnership with limited liability**	**Joint-stock company**	**total**
Number of firms	29	4	8	9	50
percentage	58%	8%	16%	18%	100%

Source: elaborated by us through the collected data.

Figure 3-2: Distribution of the firms according to their legal form



Source: elaborated by us through the collected data.

We can clearly see that the majority of the firms in this sample are limited liability companies LLC with a percentage of (58%) , 18% of the firms are joint-stock companies , 16% are sole partnership with limited liability, the rest of firms (8%) are general partnership.

2 Data Collection and Source

In order to conduct our empirical study, we need some qualitative and quantitative data related to the four years periode of 2016 to 2019 on the firms constituting our sample. Consequently, having the financial statements of these companies, notably the balance sheets and income statements, is considered a necessary condition for the realization of this study

The data used in this study comes from a database that we have personally created from the statistical and fiscal declarations of the firms that have been deposited at the National Center of commerce Register[1].

3 Variables of the model

In the following, we define all the variables chosen for the statistical analysis as well as their measures. We will describe the dependent variables and the independent variables. Then we summarize the models tested later.

[1] https://sidjilcom.cnrc.dz (Last accessed 16/09/2021)

3.1 The dependent variables

These are the variables to be explained using the independent variables; we distinguish three dependent variables that we will test in three separated models. The first variable to be explained is the total debt ratio, the second the short-term debt ratio and the third is long-term debt ratio.

Total debt ratio:

$$\text{TD} = \frac{\text{total debt}}{\text{total assets}}$$

Long-term debt ratio:

$$\text{LTD} = \frac{\text{long term debt}}{\text{total assets}}$$

Short-term debt ratio:

$$\text{STD} = \frac{\text{short term debt}}{\text{total assets}}$$

3.2 The independent variables

The choice of independent variables is made mainly based on the theory of the capital structure of the firm as well as on the previous empirical studies.in the following we are going to represent the ten independent variables chosen in our study

3.2.1 Age

The age of the business is fundamental in the study of capital structure of the firms . For this reasons, the financial provider such as banks evaluate the creditworthiness and reputation of the SMEs according to their age. The age variable is measured by the number of years SME was in the business by looking at the date of the registration until the year of 2019 .Thus; the following hypothesis is proposed to test the age factor:

H1: There is a positive relationship between the age of SMEs and the firms leverage.

3.2.2 The size Log (turnover)

There are several indicators of size such as total assets, number of employees and turnover. In our study, we choose the total assets indicator as a measure for size

$$\text{size} = \log(\text{total assets})$$

The following hypothesis is proposed to test the size factor

H1: there is a positive relationship between the size of SMEs and the firm's leverage.

3.2.3 Tangibility:

Also called the collateral value of assets; it is about the type of assets the firm holds and serve as a guaranty for the loans The tangibility of assets is measured by tangible assets to total assets

$$\text{tang} = \frac{\text{tangible assets}}{\text{total assets}}$$

The hypothesis that we want to test is the following

H3: there is a positive relationship between the assets tangibility of SMEs and the firm's leverage

3.2.4 Profitability

This variable is used to measure the capacity of the firm to generate a revenue related to its total asset, in our study we will use the return on asset ROA as a measure of profitability

$$\text{ROA} = \frac{\text{EBIT}}{\text{Total assets}}$$

The following hypothesis is proposed to test the profitability factor

H4: there is a positive relationship between the profitability of SMEs and the firm's leverage

3.2.5 Liquidity

The liquidity variable has been taken into consideration by several studies, in our study we measure the liquidity by dividing the cash and cash equivalent by current liabilities

$$\text{LIQ} = \frac{\text{cash and cash equivalent}}{\text{current liabilities}}$$

We will test the following hypothesis

H5: there is a negative relationship between liquidity and the firm's leverage

3.2.6 Self-financing capacity

This variable allows us to measure the financial independence of the institution, and is calculated by dividing the capacity of self-financing by Total assets, the capacity of self-

financing is represented by the cash flows which is equal to the net income plus depreciation, this variable was used based on theoretical studies of the subject.

The self-financing capacity variable is measured as follows:

$$\text{SFC} = \frac{\text{cash} - \text{flow}}{\text{total assets}}$$

The following hypothesis is used to test self-financing factor

H6: there is a negative relationship between self-financing capacity and leverage

3.2.7 Non-debt tax shield

This variable allow us to measure the tax savings of the firms that are not related to the debt and it is calculated by dividing depreciation by total assets the formula is as follows:

$$\text{NDTS} = \frac{\text{depreciation}}{\text{total assets}}$$

We test this variable by the following hypothesis

H7: there is a negative relationship between the non-debt tax shield and the firm's leverage

Activity sector

The variable of activity sector allows us to use a dummy variable in our model, which is a variable that takes only 0 or 1 as values

We will use 1 for the firms from manufacturing and construction sectors and 0 for the firms from service sectors

The following hypothesis is suggested to test this variable:

H8: there is a positive relationship between the activity sector and the firm's leverage

4 Estimation method

4.1 Panel data Analysis

Panel data (or longitudinal data) are representative of a double dimension: individual dimension and time dimension: A balanced panel has the same number of observations for all individuals; an unbalanced panel is a panel where some individuals are missing observations[1]

[1] Bourbonnais.R,: **Économétrie,** dunod 9th dition,2015,p346

The advantage of using panel data are the following

1. Panel data enable controlling for individual heterogeneity
2. Panel data combine time series and cross-section observations, so it will includemore informative data, more variability, less collinearity among variables more degrees of freedom and more efficiency
3. Panel data are better suited to study the dynamic of change.
4. Panel data is better in detecting and measuring effects that cannot be observed normally in cross section or time sires data.
5. Panel data models allow us to construct and test more complicated behavioral model than purely cross-section or time series data.
6. Panel data are usually gathered at micro units, which could result in more accurate variables.

4.2 The models of panel data**:**

1.2.4.1 Common Effect Model or Pooled Least Square (PLS)

A panel data model approach is most simply because it combines only time series and cross section data. this model is not considered time and individual dimensions so it is assumed that the behavior of corporate data is the same in various periods. Thus the Ordinary Least Square (OLS) approach or the least squares technique to estimate the panel data model.

1.2.4.2 Fixed-effect model

The fixed-effect model explore the relationship between predictor and outcome variables within an entity (country, person, company, etc.). Each entity has its own individual characteristics that may or may not influence the predictor variables.

An important assumption for the fixed-effect model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others. If the error terms are correlated then FE is no suitable since inferences may not be correct.

The equation for the fixed effects model becomes:

$$\mathbf{Y}_{it} = \boldsymbol{\beta}_1 \boldsymbol{X}_{it} + \boldsymbol{\alpha}_i + \mathbf{u}_{it}$$

Where :

- α_i :(i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).
- Y_{it} : is the dependent variable (DV) where i = entity and t = time.
- X_{it}: represents one independent variable (IV).
- β_1 : is the coefficient for that IV,
- u_{it} ; is the error term

1.2.4.3 Random-effect model

unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model .

The equation for the random- effects model is given by :

$$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it}$$

Where:

- ε_{it} : is Within-entity error
- u_{it} : is Between-entity error

5 The selection of the model

5.1 Fisher test

Is a test to determine the model of whether Common Effect (CE) or individual Effect (IE) is most appropriately used in estimating panel data.

If Results:

H0: Select CE (p> 0.05)

H1: Select IE (p <0.05)

5.2 Hausman Test

Hausman test test is a statistical test to select whether the most appropriate Fixed Effect or Random Effect model is used.

If Result:

H0: Select RE (p> 0.05)

H1: Select FE (p <0.05)

6 Tobit Model

The Tobit model is developed by Tobin (1958).Who introduced a new method for estimating limited dependent variables.

In our study we are trying to explain the influence of some independent variables on the firm's leverage, which is always between 0 and 1, thus the appropriate model for our study is the tobit model.

We should mention that the Tobit model fits only with the random-effect models.

Part 02: A descriptive analysis

In the previous section, we presented the different variables of the models. In what follows, we will analyze these variables by some statistics and calculate the correlation matrix in order to study the impact of these variables on level of leverage.

1 The descriptive analysis of the variables

The table below represents the descriptive statistics of the variables: number of observations, mean, standard deviation, the minimum and the maximum.

Table 3-3: descriptive statistics of the variables

Variable	Obs	Mean	Std. Dev.	Min	Max
TD	200	0.6574491	0.2516811	0.0043326	0.9818256
STD	200	0.4724739	0.2748577	0.0008813	0.9699053
LTD	200	0.1901686	0.2040703	0	0.8795622
TANG	200	0.277855	0.279913	0	0.9764121
ROA	200	0.0266738	0.090706	-0.496534	0.357461
NDTS	200	0.2122489	0.2190022	0	1.010804
SFC	200	0.2197089	0.2117638	-.1949573	0.8559497
Liq	200	0.9325259	4.371607	0.0004088	54.63641
Age	200	13.68	6.300483	4	24
Size	200	19.29393	1.481617	16.04983	23.63828
SEC	200	0.545	0.4992205	0	1

Source: elaborated by us using Stata 14.

The dependent variable:

The descriptive statistics of the dependent variables show that the mean of total debt is close to 65.74% with a maximum value of 98.18% and a minimum value of 0.4%. While the mean of short-term debt and long-term debt is close to 46.72% and 19% successively with a minimum value of -18.58% and 0% and a maximum value of 96.99% and 87.95% successively.

We can clearly notice that the SMEs depands on the short term debt(47%). The level of long term debt is relativly low(19%) which cofirm our choice of the short term debt and total debt as a measures for leverage for SMEs in our study

The independent variables:

in regards to the independent variables the first thing to notice is the average rate (mean) of liquiditiy, which is relatevly high (93%) ,this result may explain the low level of long term debt , however , we can not rely on this explanation bcause of the high volatility (standerd deviation) of the liquidity variable (4.37).

2 Correlation Matrix

An analysis of the correlation coefficients is important in order to test the relationship between the dependent and independent variables and consequently to test the multi-collinearity that may exist between the independent variables on the other hand.

2.1 The correlation matrix for the total debt model

The first model aims to explain the level of total debt. The following table gives the correlation coefficient between the variables of the first model.

Table 3-4: The correlation matrix of the total debt model

	TD	Size	TANG	ROA	NDTS	liq	SFC	age	SEC
TD	1.00								
size	-0.258*	1.000							
TANG	-0.076	0.107	1.000						
ROA	0.140*	-0.084	-0.149*	1.000					
NDTS	0.016	-0.217*	0.195*	-0.050	1.000				
liq	-0.096	-0.146*	0.009	0.043	-0.053	1.0000			
SFC	0.148*	-0.277*	0.158*	0.236*	0.818*	-0.0454	1.000		
age	-0.216*	-0.074	0.015	-0.072	0.128	-0.0105	0.085	1.000	
SEC	-0.052	0.067	0.151*	0.002	0.278*	-0.1369	0.241*	-0.116	1.0000

Source: elaborated by us using Stata 14.

(*) significant at 5%

According to the table, we can notice that the total debt is positively correlated with only three independent variables, return on asset, liquidity and sector. And negatively correlated with

rest, which is unexpected. Several studies have shown the positive relationship tangibility, profitability, liquidity, age and the total debt ratio.

The value of the correlation between the variables NDTS an SFC is equal to 0.818 which is more than 0.5, that means that these two variables are partially correlated, in fact we did use a common measure which is the depreciations when we calculated the values of the two variables.

For the rest of the variables of our model all the correlations are less than 0.5 which means that there is no multicollinearity between the variables.

2.2 The correlation matrix for the short-term debt model

The second model studies the effect of the capital structure determinants on the short-term debt. The following table give correlation matrix of this model.

Table 3-5: The correlation matrix for the short-term debt model

	STD	size	TANG	ROA	NDTS	liq	SFC	age	SEC
STD	1.000								
size	-0.096	1.0000							
TANG	-0.218*	0.107	1.0000						
ROA	0.104	-0.084	-0.149*	1.000					
NDTS	-0.011	-0.217*	0.195*	-0.050	1.000				
liq	-0.260*	-0.146*	0.009	0.043	-0.053	1.000			
SFC	0.081	-0.277*	0.158*	0.236*	0.818*	-0.045	1.000		
age	-0.130	-0.074	0.015	-0.072	0.128	-0.010	0.085	1.000	
SEC	0.001	0.067	0.151*	0.002	0.278*	-0.136	0.241*	-0.116	1.000

Source: elaborated by us using Stata 14.

(*) significant at 5%

The correlation matrix shows that the short-term debt ratio has a positive relationship with only three variables, the sector, age and the self-financing capacity, and a negative relationship with the others. There is a significant correlation between the short-term debt and liquidity, which is expected and demonstrated by several empirical studies.

Part 03: Estimation of the model and analysis of results

In this part we will study the effect of the independent variables on the SMEs leverage .we will estimate and test two models, the total debt model and the short term debt model and also we need to estimate the long term debt model in order to have a better interpretation for the results

1 Presentation of tests results

1.1 Fisher test

After importing our data into Stata14 we first start with the Fisher test and the results are summarized in the following tables:

Table 3-6: Fisher test for the TD model

Fisher test
Fixed-effects (within) regression Number of obs = 200
Group variable: id Number of groups = 50
F test that all u_i=0: F(49, 143) = 12.33 Prob > F = 0.0000

Source: elaborated by us using Stata 14.

Table 3-7 : Fisher test for the STD model

Fisher test
Fixed-effects (within) regression Number of obs = 200
Group variable: id Number of groups = 50

F test that all u_i=0: F(49, 143) = 13.64	Prob > F = 0.0000

Source: elaborated by us using Stata 14.

As we mentioned in the previous section, the fisher test is used to choose between the individual effect model and common effect model. And according to the values of the fisher statistics in the previous tables above; which is less than the significance level (5%), we reject the null hypothesis, which is the existence of a common effect, and we accept the alternative hypothesis; which means that the individual effect model is the most appropriate model for our data.

1.2 Hausman test

Because the individual model is the model that fits the most with our data we need to choose between the fixed-effect model and the random-effect model, thus the following tables contain the results of the Hausman tests :

Table 3-8:Husman test for TD model

Hausman test for TD model
Test: Ho: difference in coefficients not systematic
chi2(7) = (b-B)'[(V_bV_B)^(-1)](b-B)
= 11.18
Prob>chi2 = 0.1308

Source: elaborated by us using Stata 14.

Table 3-9: Hausman test for STD model

Hausman test for STD model
Test: Ho: difference in coefficients not systematic
chi2(7) = (b-B)'[(V_bV_B)^(-1)](b-B)
= 11.93

Prob>chi2 = 0.1029

Source: elaborated by us using Stata 14.

The Hausman test indicates that the value of the chi2 statistic in both models (TD and STD) is more than the significance value 5%, thus we accept the null hypothesis, which says that the most appropriate model for our data is the random-effect model. In order to be even sure of this result, we will also run the "Breuch-Pagan Lagrangian Multiplier test for random effects" , and Because the random-effect model is the most appropriate model for our data, it allows us to use the Tobit model for the estimation of (STD) and (TD) models.

1.3 Breusch-Pagan Lagrange multiplier (LM)

The Breusch-Pagan test is used to test the significance of the random-effect model .the hypothesis of this test are the following

H0 : No random effects.

H1: Presence of random effects.

if the P-value of the LM statistic is less than the significance level (5%) , we will accept the alternative hypothesis and the random-effect model is significant.

Table 3-10: Breusch and Pagan Lagrangian multiplier test for random effect

Breusch and Pagan Lagrangian multiplier test for random effects		
TD [id, t] = Xb + u[id] + e[id,t]		
Estimated results :		
	Var	sd = sqrt(Var)
TD	0.0633434	0 .2516811
e	0 .014713	0 .1212973
u	0.0419734	0.2048741
Test: Var(u) = 0		
chibar2(01) = 136.64		
Prob > chibar2 = 0.0000		

Source: elaborated by us using Stata 14.

Table 3-11: Breusch and Pagan Lagrangian multiplier test for random effect

Breusch and Pagan Lagrangian multiplier test for random effects		
STD [id, t] = Xb + u[id] + e[id,t]		
Estimated results :		
	Var	sd = sqrt(Var)
TD	0.0755467	0 . 2748577
e	0 .0158128	0 . 1257488
u	0. 0533447	0. 2309647
Test: Var(u) = 0		
chibar2(01) = 148.78		
Prob > chibar2 = 0.0000		

Source: elaborated by us using Stata 14.

According to the results of the Breuche and Pagan test, the P- value of the LM statistic in both models (STD) and (TD) is less than the significance level (5%), thus the random effect model is a significant for estimating (STD) and (TD) models.

1.4 Unit root test

The unit root test is used to show whether the variables of the model are stationary or not. In our study we will use the Harris-Tzavalis unit-root test with the following hypothesis:

H0 : Panels contain unit roots ;

Ha : Panels are stationary.

If the p-value of the test statistic of the variable is less than the significance level (5%) this variable will be stationary.

Table 3-12: Harris-Tzavalis test

	Harris-Tzavalis test		
Variables	statistic	Z	p-value
ROA	-0.3742	-9.4665	0.0000
SEC	0.0000	- 4.891 2	0.0000
TANG	0.0157	- 4 .6993	0.0000
liq	- 0 .0806	- 5 .8763	0 .0000
NDTS	0.2130	-2.2863	0.0111
SFC	0.1982	-2.4680	0.0068
AGE	0.0000	-4.8912	0.0000
SIZE	0.0448	-4.3434	0.0000

Source: elaborated by us using Stata 14.

According to the results shown in the previous table the p-value for all variables is less than the significance level (5%) .so, the panels of our data are stationary.

1.5 Test for serial correlation

To test the autocorrelation, we will run the Wooldrigde autocorrelation test. The hypotheses are as follows:

H0: The errors are not autocorrelated.

H1: The errors are autocorrelated

The tables below show the results of this test

Table 3-13: Wooldridge test for autocorrelation

Wooldridge test for autocorrelation
H0: no first-order autocorrelation
F(1, 49) = 67.614
Prob> F = 0.0000

Source: elaborated by us using Stata 14.

Table 3-14: Wooldridge test for autocorrelation

Wooldridge test for autocorrelation
H0: no first-order autocorrelation
253 F(1, 49) = 27.781
Prob> F = 0.0000

Source: elaborated by us using Stata 14.

Through the result shown above , and for both models (STD) and (TD) , we note that the probability value is less than 5%; so we reject the null hypothesis and accept the alternative hypothesis that states that there is an autocorrelation in the sample, and based on all of the above, this result does not significantly affect the efficiency of the study ; this test is often important when the study sample is large and does not represent any problem for the when the period of the study is limited.

1.6 Homoscedasticity test

This test consists in examining the heteroskedasticity of the model. If this is the case, we conclude that there is a heteroskedasticity problem. The test is based on the following assumptions:

H0: Homoscedasticity of the residuals.

H1: Heteroskedasticity of the residuals

Table 3-15: Homoscedasticity test for TD model

lrtestheterohomosk, df (49)		
Likelihood-ratio test	LR chi2(49) =	-230.90
(Assumption: hetero nested in homosk)	Prob> chi2 =	1.0000

Source: elaborated by us using Stata 14

Table 3-16Homoscedasticity test for STD model

. lrtestheterohomosk, df (49)		
Likelihood-ratio test	LR chi2(49) =	-111.14
(Assumption: hetero nested in homosk)	Prob> chi2 =	1.0000

Source: elaborated by us using Stata 14.

According to the result of this test, we notice that the value of the probability (Prob>chi2 = 0.0000) is more than5% for both models, so we accept the hypothesis (H0),which means that there exist an Homoscedasticity of residuals.

Through most of the statistical tests, the model used has a high degree of significance and allows tointerpret the changes of the dependent variable in terms of the change of the independent variables, also it satisfies the hypotheses of regression using random-effects Tobit model.

2 Estimation of the models

in order to estimate the parameters of our models we run a random-effect Tobit regression under stata 14 for the “STD” and “TD” models , we should note that we also estimated the long term debt model “LTD” in order to have a more clear vision for the impact of the independent variables ,which allows a better interpretation of the result

the results are shown in the table below:

Table 3-17: Estimation of the models

VARIABLES	MODEL		
	TD	STD	LTD
TANG	-0.0070779	-0.1405618*	0.166813***
ROA	-0.3937863**	-0.6046534***	0.1928605
NDTS	-0.6523492***	-0.6868752***	0.0093208
SFC	0.6648515***	0.7851522***	-0.0527841
Age	-0.0090509	-0.0055473	-0.003298
SEC	0.0058252	0.0278809	-0.0356177
Liq	-0 .0032805	-0.0119235***	-0.0237907***
Size	-0.0583918***	-0.0184605	0.0097083
_cons	1.912616***	0.9289285***	0.6535487
Wald chi2(8)	62.66	68.90	23.65
Prob> chi2	0.0000	0.0000	0.0026
Rho	0.739998	0.7734623	0.6117512
Number of obs	200	200	200
Number of groups	50	50	50

Source: elaborated by us using Stata 14.

3 The equation of the models

3.1 First model (TD)

$$TD = -0.0070779TANG - 0.3937863\,ROA - 0.0055473\,age - 0.6523492NDTS - 0.0090509SFC + 0.0058252SEC - 0.0032822LIQ - 0.0583918SIZE + 1.912616$$

3.2 Second model (STD)

$$STD = -0.1405618TANG - 0.6046534ROA - 0.6868752NDTS - 0.0055473\,age + 0.7851522SFC + 0.0278809\,SEC - 0.0119235LIQ - 0.0184605SIZE + 0.9289285$$

4 Results interpretation

4.1 Tangibility

Most of previous studies have shown a positive relationship between leverage and tangibility, which is clear because tangible assets represent guarantee for loans and make access to finance easy for firms.

In our study we see such a different results for the effect of tangibility on leverage .we have a positive significant relationship between long term debt (LTD) and tangibility which is explained by the fact that tangible assets are guarantee for loans, this result fits with most of the capital structure theories. However we found a negative relationship between this variable and both total debt ratio and short term debt ratio, this result can be explained by the high level of short term debt (compared to the long term debt) that does not require any type of guarantee

4.2 Profitability

This variable has known a several interpretations by the theories, considering firms that achieve a high rate of profitability prefer to finance their needs through debt, and this is due to the tax benefits achieved by this decision.

For the of the pecking order theorie, they assume that there is an inegative relationship between this variable and the debt ratio, and this is due to the fact that firms that achieve a high percentage ofThe profitability prefers financing their projects through its activity, i.e. by self-financing, and then tries to finance the difference by borrowing. several studies have shown the inverse relationship between the profitability variable and the level of leverage such as Rajan&Zingales 1995, P.Gaud&E.Jani 2002, S.T.Hijazi&Y.Bentaraq 2006

However in our study we found a negative significant relationship between the profitability and the (TD) level and (STD)level.this result seem to confirm the predictions of the pecking order theory.

4.3 Non-debt tax shield

We found a negative significant relationship between the Non-debt tax shield and both (TD) level and (STD),this result fit with the previous studies such as the study of S.Titman&Wessels 1988. This is due to the possibility that the tax economy resulting from non-debt (such as depreciation) represents an alternative to the tax economy resulting from debt, which will encourage the firm to raise its self-financing capacity. According to the pecking order theory, firms that achieve high rates of self-financing do not adopt high rates of debt and this explains the inverse relationship between the two variables.

4.4 Self- financing capacity

We found a positive significant relationship between the Self- financing capacity and both (TD) level and (STD) level. We can explain this result by the fact that firms depends on the performance level in attracting short-term financial resources, and the ability of self-financing is considered as one of the most important indicators of performance, which justifies the direct relationship between the variables.

4.5 Liquidity

The liquidity variable has a negative significant relationship with only one model, which is the STD model, this can be explained by the fact that the high level of liquidity enable the firms to finance their short-term needs by their own sources. This result seems to confirm the prediction of the pecking order theory.

4.6 Sector and Age

We did not find any significant relationship between the sector or the Age of the firms and both (TD) model and (STD) model. This is may be due to the small size of our sample

Conclusion

This last chapter was devoted to the research of the impact of the capital structure determinants on the level of leverage of firms. We used a tobit model regression under panel data to estimate our models .our sample was composed of 50 SMEs observed on a period of 4 years from 2016 to 2019

The results of the two models show a negative significant relationship between tangibility, liquidity, profitability, non-debt tax shield and the STD level and the TD level. these results made us conclude that the pecking order theory is the theory that explains the most the fianacial behavior of the Algerian SMEs.

Conclusion

General Conclusion

The Algerian SMEs play an important role in the economy. They contribute substantially to the development of employment, to the creation of wealth and consequently to the economic and social well-being, but they suffer from a deficit in terms of organizational, technical and managerial skills and capacities; in addition to these difficulties the most common obstacle faced by SMEs whether in developed countries or developing countries is to find the funding sources needed to accomplish their growth. That is why it is important to study how SMEs choose their financing sources and which factors affect their financing decision, in other words how SMEs choose their capital structure.

The question of the capital structure of firms, understood as the distribution of debts and equity, has always given rise to debate and theoretical diversity.

In our work, we tried to answer the following question:

- **What are the determinants of the capital structure of the Algerian small and medium sized enterprises (SMEs)?**

In order to answer our question, we divided our research into two parts, a theoretical part and an empirical; in the theoretical part, we tried to understand the real situation of the Algerian SMEs by looking at their main funding sources, and their most common obstacles, we also took a brief review on the capital structure theories and the previous empirical studies conducted about this subject.

In the empirical part, we were able to test the impact of a few factors on the total debt ratio and short-term debt ratio, with the help of a regression model based on the method of estimating of Tobit model.

Results

The hypothesis of the existence of several funding sources available for SMEs is confirmed, in fact, there exist two essential funding methods: the internal finding and the external finding, the internal funds are those provided by the firm itself and the external funds represent the funds provided by institutions or individuals that comes from the outside of the firm. These sources can also be divided into debt financing and equity financing.

The hypothesis of the positive influence of profitability, tangibility of assets and age on the capital structure of firms is rejected.

The tangibility influence negatively the SMEs level of leverage, this result has not been expected since the tangible assets represent a guarantee for loans, we can explain this result by the fact the most of the total debt is composed of short term debt which does not require any kind of guarantee.

The profitability influence negatively the SMEs level of leverage, this result also has not been expected; the negative effect of profitability is explained by the fact that SMEs prefer to fund their need by their own sources which are the retained earnings.

The age influence negatively the SMEs level of leverage,

The hypothesis of the negative influence of liquidity and the non-debt tax sheild on the SMEs leverage is confirmed.

We found a negative significance relationship between the liquidity and the short-term debt; which fits with the belief that SMEs prefer the internal funds rather than the external funds.

For the non-debt tax shield we found a negative significant relationship with both models, which confirms the predictions of the pecking order theory.

Contribution

This thesis shows that Algerian SMEs follow the capital structure theories suggested in the developing countries. The work done in this thesis in regards to the SMEs capital structure is also a contribution to literature, very limited number of studies did investigate the Algerian SMEs capital structure. The results obtained seem to confirm that the theory that explains the most the Algerian SMEs capital structure is the pecking order theory.

Limits of the study

The main limit of this study is the small size of the sample, the results are based only on the data of 50 SME observed for only 4 years from 2016 to 2019.

In addition, most of the firms of our simple have no long term debt, which reflected negatively on our study. We could not have any significance between the independent variables and the long term debt ratio.

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ANNEXE

year	LTD	STD	TD	TANG	ROA	NDTS	SFC	age	SEC	size	liq
2019	0,06099791	0,69685134	0,75784926	0,49309682	-0,05920195	0,01641933	-0,031117363	21	0	20,3491299	0,1267757
2018	0,06850735	0,65374385	0,7222512	0,50638328	-0,119639	0,01557867	-0,074798332	21	0	20,3912153	0,20596799
2017	0,08291201	0,55769843	0,64061045	0,53150368	0,0126985	0,01492341	0,005385494	21	0	20,4152331	0,27944977
2016	0,08448689	0,59211081	0,6765977	0,4964462	0,02199626	0,01282444	0,021559182	21	0	20,5469361	0,1861549
2019	0,10340049	0,52569072	0,62909122	0,03810509	-0,05007195	0,09363975	0,032447077	11	0	18,9750556	0,49625642
2018	0,0991248	0,4866415	0,5857663	0,03652942	-0,03313596	0,08225262	0,086341564	11	0	19,0172857	0,67796304
2017	0,0417606	0,78544823	0,82720883	0,0228197	-0,00606955	0,03038839	0,019813254	11	0	19,8817122	0,9906894
2016	0,03730338	0,79890144	0,83620483	0,02439772	0,00733866	0,02274734	0,028736993	11	0	19,9945813	0,88676161
2019	0	0,21255468	0,21255468	0,01175875	-0,202722193	0,047035	-0,194957339	15	1	16,7112656	1,71355285
2018	0,04841644	0,35025462	0,39867106	0,00686868	0,11158364	0,02747472	0,113351101	15	1	17,2488915	0,33971777
2017	0,08385342	0,46978521	0,55363862	0,005948	0,1293627	0,02379201	0,123331489	15	1	17,3928079	0,31462791
2016	0,12945695	0,3351027	0,46455965	0,00918281	0	0,03673125	0,036731251	15	1	16,9585298	0,08784362
2019	0,13625287	0,70908101	0,84533388	0,24730773	0,03035251	0,13371281	0,14206632	5	1	19,5972178	0,00747007
2018	0,04980004	0,79327582	0,84307586	0,1423714	0,08428631	0,11836045	0,158371318	5	1	19,5272007	0,00420267
2017	0	0,83498468	0,83498468	0,03399971	0,03184914	0,14190273	0,146834843	5	1	19,1825949	0,00070863
2016	0	0,82865585	0,82865585	0,05948064	0,01883706	0,12717386	0,129601441	5	1	19,1146145	0,01562922
2019	0,20853518	0,43862333	0,6471585	0,84967854	0,03054733	0,1857544	0,216620686	16	1	18,5358941	0,00782072
2018	0,19032955	0,51580445	0,706134	0,62315766	0,03756693	0,1440092	0,181576133	16	1	18,6272448	0,36098146
2017	0,2273738	0,46644309	0,69381689	0,78577681	0,0455789	0,14918355	0,150472424	16	1	18,4494065	0,02403289
2016	0,24486655	0,42451512	0,66938167	0,82751008	0,06291123	0,13259983	0,157558279	16	1	18,3768258	0,0268319
2019	0,11473293	0,66494879	0,77968173	0,41212064	0,00452518	0,30307582	0,299895141	5	1	18,4847906	0,0340235
2018	0	0,72834246	0,72834246	0,36695257	0,12215773	0,24925021	0,337904803	5	1	18,2896551	0,42438658
2017	0,00526356	0,82480078	0,83006434	0,32230328	0,10112151	0,12844544	0,202391422	5	1	18,4811541	0,62001427
2016	0,10488101	0,50539844	0,61027945	0,23438002	0,07537715	0,20398403	0,276633786	5	1	17,436 16	0,96728995
2019	0,092587	0,76308488	0,85567188	0,42541496	0,00823345	0,02769954	0,034366205	21	1	19,0429292	0,07436056
2018	0,13734783	0,74424276	0,88159059	0,44148772	0,09909221	0,02119797	0,039193427	21	1	19,1935784	0,14861756
2017	0,11727734	0,10630151	0,22357885	0,43943354	0,02233723	0,9858502	0,0335536	21	1	19,3515534	1,03855376
2016	0,12964947	0,10901286	0,23866233	0,11178181	-0,10216115	1,01080389	-0,109486795	21	1	19,2512606	0,80569718
2019	0,42618073	0,5080195	0,93420022	0,039699	-0,08553995	0,08776378	0,078224971	10	1	20,9708764	0,2936883

2018	0,35388474	0,48752408	0,84140882	0,05039619	0,07265069	0,06585046	0,090302196	10	1	21,0347522	0,15395283
2017	0,02060306	0,80695569	0,82755876	0,05560816	0,05994748	0,04365604	0,070294744	10	1	21,1668068	0,18865872
2016	0,03935939	0,68294371	0,72230309	0,05317954	0,10686685	0,03917441	0,099910704	10	1	20,9379296	0,36742077
2019	0,3550777	0,03751979	0,39259749	0,02181898	0,06774611	0,0916231	0,133076282	10	0	17,8466615	22,6720287
2018	0,37952237	0,01556654	0,39508892	0,033905	0,07547454	0,08712983	0,111774661	10	0	17,7800846	54,6364125
2017	0	0,56265445	0,56265445	0,02092844	0,08140911	0,05456928	0,112633713	10	0	18,062848	0,38195067
2016	0,03231728	0,61996263	0,65227992	0,02161718	0,07986477	0,0448623	0,099161048	10	0	17,9408109	0,45436111
2019	0,10979476	0,63646884	0,7462636	0,35525482	0,04266169	0,75030563	0,792967319	23	0	18,5457609	0,43117583
2018	0,0596144	0,82015447	0,87976887	0,27302223	0	0,34125209	0,341252088	23	0	19,1564765	0,0502811
2017	0,03654836	0,90082175	0,93737011	0,11115711	0,01427802	0,14528478	0,155850517	23	0	19,6457374	0,0063301
2016	0	0,94894218	0,94894218	0,1148829	0	0,11398416	0,113984161	23	0	19,6652552	0,00588386
2019	0,03251465	0,847645	0,88015966	0,23472234	0,01714923	0,59329673	0,605987164	22	0	19,8368297	0,32989577
2018	0,03249267	0,86158106	0,89407373	0,27281237	0,01523063	0,55464692	0,56591759	22	0	19,837506	0,12922245
2017	0,03581492	0,85843425	0,89424917	0,34944752	0,01759884	0,56261633	0,576335893	22	0	19,7401559	0,08335364
2016	0,03630647	0,86589109	0,90219756	0,45282626	0,0167068	0,47275852	0,489465311	22	0	19,7254402	0,10418362
2019	0,15432107	0,74787834	0,90219941	0,85926102	-0,17600093	0,19816195	0,177718052	12	0	19,5021017	0,00867302
2018	0,18983805	0,66106258	0,85090063	0,82826379	-0,07904767	0,13235319	0,050155854	12	0	19,5933877	0,06903616
2017	0,22613195	0,55514976	0,78128171	0,81072831	-0,0741023	0,07924428	0,018972775	12	0	19,6493045	0,10911401
2016	0,22613195	0,55514976	0,78128171	0,77644487	-0,07875929	0,04094347	-0,023115817	12	0	19,5883548	0,00224234
2019	0	0,85589609	0,85589609	0,09107916	0,04233703	0,4512797	0,485443397	17	1	17,1579518	0,30754058
2018	0	0,87883702	0,87883702	0,10847063	0,05589491	0,47194947	0,514766118	17	1	17,0901276	0,05619456
2017	0	0,87883702	0,87883702	0,10847063	0,05589491	0,47194947	0,514766118	17	1	17,0901276	0,05619456
2016	0	0,899186	0,899186	0,15813161	0,02701707	0,44065879	0,461936533	17	1	17,0589681	0,12694738
2019	0,20333417	0,48986341	0,69319758	0,09144926	0,01191004	0,2532187	0,262389448	19	1	17,9269217	0,89476708
2018	0,16284669	0,59660319	0,75944989	0,05794513	0,01498568	0,20279832	0,21730171	19	1	18,1489633	0,71599655
2017	0,01550259	0,67012372	0,68562631	0,12193119	-0,27226257	1	0,727252177	19	1	17,9813083	0,52758963
2016	0,01550259	0,67012372	0,68562631	0,06703964	0,00565694	0,20116206	0,205735756	19	1	17,8749325	0,2923896
2019	0,25110897	0,25460316	0,50571212	0,07880594	-0,0009359	0,00195898	0,001155764	17	0	23,3931095	0,04368892
2018	0,25110897	0,25460316	0,50571212	0,86373112	-0,01025772	0,02147088	0,012667443	17	0	20,9988364	0,04368892
2017	0,20512075	0,25366771	0,45878845	0,00674408	0,04690371	0,01629423	0,052241747	17	0	20,9257978	0,20111362
2016	0,15554955	0,28808353	0,44363308	0,00768739	0,12223919	0,01751176	0,111635425	17	0	20,8294509	0,45067592
2019	0	0,96990533	0,96990533	0,18500962	-0,08998968	0,28689974	0,29589871	7	0	16,3929577	0,00185055
2018	0	0,86381645	0,86381645	0,24301668	0,07131516	0,12451111	0,166225507	7	0	16,6328787	0,03208987

2017	0,6857 3175	0,1837 9061	0,8695 2236	0,0306 0501	0,0438 3701	0,0578 5366	0,089789821	7	0	16,590 6746	0,0215 7265
2016	0,6176 2784	0,2697 5029	0,8873 7814	0,0304 1864	0,0307 5651	0,0380 0607	0,061873169	7	0	16,695 275	0,2629 8414
2019	0,0462 2034	0,6203 5031	0,6665 7065	0,0006 1639	0,0075 4994	0,0120 7256	0,015927385	9	0	19,919 9796	0,2879 4506
2018	0,0570 4917	0,6830 575	0,7401 0667	0,0019 7832	0,0323 0009	0,0094 9709	0,032243392	9	0	20,157 5108	0,1749 542
2017	0,1637 2412	0,6484 489	0,8121 7302	0,0003 8498	0,0183 6638	0,0071 3242	0,017861004	9	0	20,390 6699	0,0354 9486
2016	0,1812 5698	0,5883 341	0,7695 9108	0,0020 3855	0,0198 8711	0,0077 4176	0,02259246	9	0	20,127 5197	0,1448 4019
2019	0,2971 6998	0,2974 5055	0,5946 2053	0,2048 134	0,0787 9046	0,5742 0106	0,622150968	24	1	19,673 4028	0,0393 3461
2018	0,0935 312	0,3528 8881	0,4464 2001	0,1860 1954	0,1030 6314	0,7888 9447	0,844582586	24	1	19,337 7926	0,6425 1636
2017	0	0,2233 8869	0,2233 8869	0,2612 5801	0,0627 6247	0,1116 7389	0,154898947	24	1	18,981 3281	0,4172 4111
2016	0,0264 4776	0,2180 7801	0,2445 2577	0,2344 2624	0,0710 7073	0,1126 5304	0,161754119	24	1	18,944 3426	0,1055 2798
2019	0,2975 545	0,0175 7365	0,3151 2815	0,2066 7178	-0,1796 6441	0,6921 0187	0,685970996	20	1	17,972 1074	2,2065 2058
2018	0,0219 2425	0,0010 6465	0,0229 889	0,4676 0347	-0,4965 3412	0,0452 1595	0,041194021	20	1	20,631 4046	0,5659 5636
2017	0,0162 0504	0,0008 8131	0,0170 8635	0,6492 4388	-0,2615 2125	0,0344 8206	0,032363737	20	1	20,828 315	0,4593 391
2016	0,0084 6572	0,0054 2733	0,0138 9304	0,7165 8916	-0,3922 9598	0,0249 4248	0,021764886	20	1	21,072 148	0,1459 494
2019	0,0220 0561	0,3419 0704	0,3639 1265	0,3793 3873	0,2074 2939	0,2327 292	0,422293417	20	1	20,662 0399	0,9143 6636
2018	0,0290 819	0,5018 2205	0,5309 0395	0,3696 3616	0,3574 61	0,1883 2583	0,517261448	20	1	20,612 7236	0,1536 1803
2017	0,0402 9565	0,6952 0089	0,7354 9654	0,7530 812	0,2558 7967	0,2753 1773	0,510430327	20	1	19,990 0239	0,1732 072
2016	0,0554 8316	0,9032 5163	0,9587 3479	0,6965 7541	0,0430 6632	0,2729 8148	0,313104683	20	1	19,670 1878	0,1293 0207
2019	0,4241 172	0,1022 7418	0,5263 9137	0,5447 1651	0,0832 9605	0,4991 1833	0,563553347	19	1	17,251 5771	0,5462 8539
2018	0,4854 9445	0,1124 85	0,5979 7946	0,6190 8737	0,0902 195	0,3749 3777	0,451395664	19	1	17,269 2134	0,3476 8055
2017	0,5372 4483	0,1472 0174	0,6844 4657	0,7079 4292	0,0601 4398	0,2529 7096	0,300198925	19	1	17,300 4404	0,3000 8296
2016	0,5314 4899	0,2355 5474	0,7670 0373	0,7105 7444	0,0547 7279	0,1238 2029	0,165556365	19	1	17,441 6186	0,5973 2071
2019	0,0521 284	0,8110 8325	0,8632 1165	0,4349 3431	0,0145 8823	0,1869 7859	0,198113923	6	1	21,745 6788	0,0925 9031
2018	0,0571 4435	0,8162 8721	0,8734 3156	0,4586 831	0,0156 2998	0,1620 2593	0,174467378	6	1	21,738 42	0,0029 7679
2017	0,1857 7021	0,7004 3234	0,8862 0255	0,4668 524	0,0406 9834	0,1040 0644	0,136415572	6	1	21,741 3117	0,0320 4574
2016	0,2643 1532	0,6226 964	0,8870 1172	0,6408 0431	0,0335 9147	0,1443 8816	0,168377978	6	1	21,413 2593	0,0500 4164
2019	0	0,7903 5394	0,7903 5394	0,0415 6678	0,0573 1226	0,0309 6806	0,060671281	14	0	19,440 6241	0,1656 5785
2018	0,0212 371	0,8034 4703	0,8246 8413	0,0230 7604	0,0422 4624	0,0189 3198	0,048709106	14	0	19,466 674	0,4532 4545
2017	0,0005 1531	0,8100 9568	0,8106 1099	0,0368 9444	0,0335 3605	0,0142 5557	0,034384187	14	0	19,203 3132	0,2576 3061
2016	0,2228 9213	0,4997 2732	0,7226 1945	0,0180 896	0,0890 4839	0,0103 8694	0,048134043	14	0	18,709 361	0,2941 5704
2019	0,5001 3772	0,3114 4961	0,8115 8733	0,0080 3576	0,0119 6314	0,0417 655	0,047819905	13	0	18,379 5834	0,3599 6998
2018	0,3792 7719	0,4460 3999	0,8253 1718	0,0117 1488	0,0084 0995	0,0359 9025	0,009431361	13	0	18,422 5847	0,7448 7061
2017	0,4021 8198	0,2740 8296	0,6762 6493	0,0117 1506	0,0111 5294	0,0233 6288	-0,009506375	13	0	18,730 0514	0,7351 122
2016	0,1223 2739	0,4760 6074	0,5983 8813	0,0275 7006	0,0299 8144	0,0545 1233	0,081154038	13	0	18,611 1921	0,3672 4516
2019	0,0089 7117	0,5186 4835	0,5276 1952	0,1001 5162	0,1416 3452	0,0233 9214	0,104201699	22	0	21,189 6479	0,4233 0103

2018	0,0099 1921	0,4059 6047	0,4158 7968	0,1448 219	0,0719 7812	0,0378 1652	0,075217003	22	0	20,789 7075	0,5676 9093
2017	0,0080 7195	0,4838 1797	0,4918 8992	0,1341 9217	0,0999 4652	0,0284 791	0,088271106	22	0	20,862 9459	0,1038 0891
2016	0,0108 3452	0,4064 8189	0,4173 1641	0,1773 9517	0,0897 4913	0,0291 9582	0,067124676	22	0	20,600 8045	0,2423 2669
2019	0,1747 8688	0,0404 6379	0,1343 231	0,0094 1987	0,0168 2312	0,1317 5343	0,133116107	22	0	21,636 8921	0,0013 7669
2018	0,2134 9948	0,0699 0986	0,1435 8962	0,0159 3737	0,0096 8342	0,1604 9167	0,161299983	22	0	21,436 8251	0,0032 8847
2017	0,2434 3745	0,0928 1382	0,1506 2363	0,0919 744	0,1253 6501	0,1755 6948	0,188069234	22	0	21,305 5995	0,3260 3132
2016	0,2639 2037	0,1000 2311	0,1638 9726	0,1653 051	-0,0355 8493	0,1837 8277	0,180218219	22	0	21,224 8121	0,2770 7888
2019	0,6552 8488	0,1554 8335	0,8107 6822	0,1654 4848	0,0375 427	0,6473 3695	0,677618959	4	1	20,134 7083	1,1026 3163
2018	0,6617 0067	0,1777 9332	0,8394 9398	0,2401 268	0,0423 5062	0,5805 4096	0,614534622	4	1	20,124 9651	2,0558 677
2017	0,6915 0838	0,1755 1257	0,8670 2094	0,2464 1394	0,0542 8098	0,5407 6445	0,584471402	4	1	20,075 1135	2,1772 8696
2016	0,7442 3284	0,1591 5418	0,9033 8703	0,3362 2241	0,0308 7863	0,5152 7745	0,543425695	4	1	19,996 0895	1,9261 8138
2019	0,1098 8407	0,0030 6737	0,1129 5144	0,5525 1421	-0,0484 9644	0,2207 7618	0,016744417	4	1	23,415 12	0,0128 2592
2018	0,1373 949	0,0302 5074	0,1071 4417	0,4391 0267	-0,0372 3567	0,1432 1974	0,013677371	4	1	23,479 3686	0,0106 1252
2017	0,2914 2339	0,1858 788	0,1055 4459	0,5226 3787	-0,0738 4012	0,1696 9328	0,008754779	4	1	23,638 2807	0,0028 5986
2016	0,3289 4625	0,6458 6348	0,9748 0974	0,5422 7661	-0,0323 9584	0,1085 1769	0,105278104	4	1	21,393 8854	0,0109 2176
2019	0,0432 3328	0,8281 7689	0,8714 1017	0,0157 8105	0,0860 8672	0,0778 9249	0,141596672	8	0	20,010 6564	0,5943 5806
2018	0,0579 484	0,8672 4165	0,9251 9004	0,0143 579	0,0365 9289	0,1089 9618	0,131634299	8	0	19,554 3624	0,3497 8051
2017	0,0311 6182	0,8848 9435	0,9160 5616	0,0036 3536	0,0662 1383	0,0716 0578	0,120604018	8	0	19,955 1127	0,6192 9265
2016	0,0254 1765	0,8879 3624	0,9133 5388	0,0054 6021	0,0625 2883	0,0814 7048	0,127741817	8	0	19,810 6999	0,5870 5972
2019	0,6235 9766	0,0458 1446	0,6694 1212	0,2916 1061	0,0307 6879	0,0536 5965	0,080216542	17	0	18,415 7063	3,2251 7386
2018	0,6384 9083	0,0437 3501	0,6822 2584	0,1794 7715	0,0045 2719	0,0366 9705	0,047287449	17	0	18,430 2105	4,1730 1146
2017	0,4439 3404	0,2385 1466	0,6824 4869	0,0750 1168	0,0289 103	0,0246 5124	0,046044865	17	0	18,427 0651	0,1106 3559
2016	0,4439 3404	0,2385 1466	0,6824 4869	0,0750 1168	0,0289 103	0,0246 5124	0,142434299	17	0	18,427 0651	0,1106 3559
2019	0,2181 72	0,4449 1365	0,6630 8565	0,2476 705	0,0542 5442	0,4712 8977	0,489466283	16	1	19,593 7305	0,0710 7328
2018	0,1577 5674	0,5883 3727	0,7460 9401	0,2108 1035	0,0614 6987	0,3374 2263	0,372482016	16	1	19,821 1353	0,0683 209
2017	0,1325 8588	0,6798 6146	0,8124 4734	0,1910 3488	0,0626 8219	0,2572 9719	0,292974711	16	1	19,975 4467	0,0269 4488
2016	0,0435 5962	0,8112 921	0,8548 5173	0,2216 2909	0,0368 7407	0,1976 7258	0,214621443	16	1	20,020 7497	0,0428 7248
2019	0,1884 1652	0,4282 3658	0,6166 5309	0,6735 4332	0,0317 1508	0,5407 9314	0,552326758	7	1	20,581 8098	0,0079 0346
2018	0,4909 1489	0,2019 0248	0,6928 1737	0,7374 9402	0,0821 8084	0,2598 984	0,314167918	7	1	20,755 9107	0,1288 0642
2017	0,6129 5021	0,1602 5697	0,7732 0718	0,7393 8716	0,0758 1141	0,1455 4172	0,215483964	7	1	20,864 9198	0,3055 1202
2016	0,6603 4215	0,1783 2453	0,8386 6668	0,7842 2602	0,0701 9576	0,0764 2694	0,145277107	7	1	20,836 708	0,1637 8139
2019	0,0078 1406	0,4641 8162	0,4719 9567	0,2482 9654	0,0710 474	0,1420 6326	0,201822382	9	1	17,726 1687	0,5379 7336
2018	0,0080 6289	0,5087 8124	0,5168 4412	0,2323 1254	0,0704 325	0,1081 7144	0,115214689	9	1	19,997 4066	0,6239 3689
2017	0,0281 1169	0,5498 1177	0,5779 2346	0,2044 7289	-0,0048 7137	0,1112 5796	0,106386593	9	1	17,923 3061	0,0007 2414

2016	0,04139297	0,44939932	0,49079229	0,24175216	0,01506698	0,1138827	0,128949679	9	1	17,8952087	0,04645346
2019	0	0,05579184	0,05579184	0,43078838	0,01655644	0,25899565	0,275845333	10	1	20,2938107	0,77957015
2018	0,03994686	0,07360891	0,11355577	0,45423091	0,0938849	0,18617025	0,2762232	10	1	20,3389327	1,02181789
2017	0,11542864	0,0962537	0,21168234	0,49174986	0,25676343	0,0653705	0,313981316	10	1	20,4160393	3,67370554
2016	0,19741226	0,12709673	0,32450899	0,62127432	0,17269194	0,07601125	0,234431556	10	1	20,1916255	1,19523196
2019	0,38501166	0,19967782	0,58468948	0,0159711	0,05720664	0,48875819	0,54560451	23	1	17,765 7245	1,69073171
2018	0,44694333	0,13693114	0,58387446	0,0278096	0,00264549	0,55810873	0,560754214	23	1	17,6165663	1,83165432
2017	0,3636933	0,29984362	0,66353693	0,0182949	0,04106058	0,48718489	0,528245465	23	1	17,8226872	0,57250258
2016	0,39479515	0,28454051	0,67933566	0,0216926	0,01589119	0,57314818	0,58829072	23	1	17,7406311	0,43700539
2019	0,14466246	0,83472221	0,97938467	0,44868835	0,08093658	0,46610511	0,474198771	18	0	17,7940216	0,18533154
2018	0,29367564	0,59356486	0,8872405	0,59252565	-0,04210434	0,42322729	0,38112295	18	0	17,6893345	0,27746576
2017	0,39919837	0,40761515	0,80681353	0,86632905	0,116953	0,40078229	0,51773792	18	0	17,4682249	0,24208622
2016	0,67718401	0,24487179	0,9220558	0,77698526	0,03166845	0,43442105	0,466089509	18	0	17,4459978	0,61972359
2019	0	0,88230184	0,88230184	0,01519653	0,00615449	0,08277939	0,088957642	9	1	18,9940526	0,18122483
2018	0,12635791	0,75579914	0,88215704	0,09094705	0,02247152	0,0929386	0,115410121	9	1	18,3644602	0,34530315
2017	0,20051222	0,63070524	0,83121746	0,25091464	0,08277595	0,10775489	0,190530833	9	1	17,9027034	0,52555238
2016	0,29460414	0,57169354	0,86629767	0,38816272	0,03957847	0,09739933	0,136977805	9	1	17,5225399	0,12484332
2019	0,04931429	0,92182847	0,97114276	0,01780815	0,00180366	0,07841704	0,079878001	6	1	19,0763437	0,00413829
2018	0,04566166	0,92973543	0,97539709	0,01648913	4,0182E-06	0,0726088	0,069351063	6	1	19,1532987	0,02208565
2017	0,0495392	0,92647397	0,97601317	0,0177928	0,00284019	0,07877466	0,081075218	6	1	19,0717934	0,0449849
2016	0,04151686	0,94030872	0,98182558	0,01491145	0,00052198	0,06601795	0,070835645	6	1	19,2484581	0,26015335
2019	0,31947094	0,08658922	0,40606016	0,00305619	0,13547046	0,00183591	0,113412412	7	0	18,1633961	1,0738141
2018	0,209255	0,33171951	0,5409745	0,00371964	0,1125366	0,00093606	0,064176022	7	0	18,2129256	0,03758436
2017	0,21718361	0,37203466	0,58921827	0,00154073	0,12542667	0,00017119	0,077935547	7	0	18,1757361	0,08845644
2016	0,17989336	0,42933537	0,60922873	0	2,9982E-05	0	0,132842897	7	0	18,0158083	0,1802194
2019	0	0,55942536	0,55942536	0,77236092	0,07520913	0,82765417	0,855949682	4	1	19,4531695	0,00108685
2018	0,18964723	0,47902948	0,66867671	0,72008338	0,08096884	0,59403722	0,639905128	4	1	19,7079707	0,10425856
2017	0,31171958	0,42952968	0,74124926	0,79984539	0,04690738	0,51020696	0,524136407	4	1	19,7386954	0,02795836
2016	0,38107413	0,40451886	0,785593	0,76984297	-0,00101623	0,36651258	0,346868644	4	1	19,8908363	0,12481519
2019	0,27753116	0,69114821	0,96867937	0,01081929	0,00912127	0,00168985	0,003257205	19	1	21,6159392	0,0037624
2018	0,47869047	0,49193275	0,97062322	0,01220725	0,01572362	0,00128213	0,003098507	19	1	21,5404956	0,00676007
2017	0,39787566	0,56789517	0,96577083	0,00048114	0,01588341	0,00028253	0,004992173	19	1	21,1675354	0,02154398
2016	0,49813377	0,46465562	0,96278939	0,00084715	0,02002171	0,00072421	0,006660912	19	1	20,9359934	0,00346851
2019	0,87799747	0,00428663	0,8822841	0,93915863	-0,00793322	0,13427258	0,126339356	19	0	17,9061861	14,1932763
2018	0,87108695	0,00425289	0,87533984	0,95839128	0,00963579	0,10659119	0,116226978	19	0	17,914088	9,7836248

2017	0,87956223	0,00429427	0,8838565	0,96773945	0,00885814	0,10760481	0,11646295	19	0	17,9044055	7,51245918
2016	0	0,00433263	0,00433263	0,97641211	0,0066717	0,10854284	0,115214539	19	0	17,8955079	5,44423719
2019	0,07214223	0,20335273	0,27549496	0,03373019	0,03858311	0,05550571	0,079931439	22	0	18,8491378	0,52742087
2018	0,04898099	0,22285045	0,27183144	0,03340763	0,05705778	0,05567949	0,092349193	22	0	18,8097988	0,33297206
2017	0,07771003	0,19188001	0,26959004	0,03717565	0,05984102	0,05606788	0,096615128	22	0	18,7550543	0,57722482
2016	0,06247425	0,26151662	0,32399088	0,01929651	0,09242408	0,04916379	0,107793365	22	0	18,8439286	0,50067953
2019	0,01794668	0,39128677	0,40923345	0,25290565	0,07305994	0,16540852	0,224511147	7	0	21,564329	0,01271346
2018	0,03534953	0,35732994	0,39267947	0,30310055	0,08112076	0,1768329	0,240909818	7	0	21,4312839	0,03665063
2017	0,05430529	0,35640183	0,41070711	0,34104204	0,07437017	0,16505351	0,216767436	7	0	21,3499184	0,0443206
2016	0,07449548	0,39137537	0,46587085	0,20810069	0,07414509	0,15047622	0,205527457	7	0	21,3563564	0,00545353
2019	0,08712262	0,71966108	0,80678369	0,08154583	0,11251785	0,44737424	0,546729594	14	0	16,7254413	0,75776563
2018	0,17121619	0,64432522	0,81554141	0,24018199	-0,10865689	0,79926885	0,689541307	14	0	16,0498308	0,06017598
2017	0,13314879	0,66349282	0,79664162	0,22203129	0,18635188	0,49649694	0,639987887	14	0	16,4190736	0,68849282
2016	0,17122257	0,75121992	0,92244249	0,40168425	0,13727483	0,52230646	0,536033947	14	1	16,1675766	0,25404954
2019	0,01600545	0,48280145	0,4988069	0,02443968	-0,00732192	0,28772241	0,278618141	22	1	19,5238743	0,16614312
2018	0,01638606	0,58653044	0,60291651	0,03571732	0,05189025	0,25254669	0,298092602	22	1	19,8677874	0,18175165
2017	0,01864313	0,63734148	0,65598461	0,04681178	0,05377956	0,1990823	0,243557433	22	1	20,0267633	0,05656601
2016	0,02336117	0,65978985	0,68315102	0,0658124	0,04006609	0,17748791	0,209887383	22	1	20,0035348	0,07321589
2019	0,64711605	0,22136318	0,86847923	0,00056282	-0,0322662	0,02244224	-0,021872344	6	0	18,7109622	0,23027834
2018	0,54685084	0,27989659	0,82674744	0,02229199	-0,00236997	0,02357655	0,004732064	6	0	18,7257599	0,22942952
2017	0,26678244	0,53399125	0,80077369	0,00081799	-0,00350753	0,02229296	0,013154345	6	0	18,6893192	0,03342417
2016	0,460756	0,34546653	0,80622252	0,00170175	0,00979906	0,01979122	0,015081452	6	0	18,7618997	0,03211728
2019	0,20150155	0,42385742	0,62535896	0,09130231	0,08505048	0,50181234	0,54288757	7	1	18,413201	0,00465842
2018	0,18777595	0,5013796	0,68915555	0,09628125	0,12584015	0,45568136	0,534225991	7	1	18,4837486	0,02633625
2017	0,18777595	0,5013796	0,68915555	0,11905845	0,0853054	0,47486216	0,535718767	7	1	18,4047768	0,07716526
2016	0,1835854	0,54357488	0,72716027	0,12897004	0,07033095	0,40524232	0,451904832	7	1	18,5063182	0,05360748
2019	0,16872297	0,58752134	0,75624431	0,44582595	0,01716478	0,43165952	0,448824301	12	0	18,6731893	0,01365223
2018	0,27225684	0,47001197	0,74226881	0,54275351	-0,04986159	0,46436626	0,414504671	12	0	18,5444184	0,0029277
2017	0,26394955	0,42460031	0,68854986	0,51829676	-0,15369405	0,44291047	0,289932175	12	0	18,5319559	0,01961606
2016	0,27045388	0,33295207	0,60340596	0,42113247	0,06983344	0,38504895	0,454882382	12	0	18,7089313	0,47131246
2019	0,02978105	0,87270468	0,90248573	0,612281	-0,12959437	0,38327834	0,372773789	14	1	18,7204055	0,02412101
2018	0,00186459	0,10335673	0,10522133	0,64030644	-0,04976011	0,35903889	0,039283943	14	1	21,0165128	0,00085716

2017	0	0,10850499	0,10850499	0,6606045	-0,0974933	0,35538882	0,02792299	14	1	21,0277824	0,00040876
2016	0,00618591	0,0947638	0,10094971	0,7446084	-0,16281715	0,33844605	0,017587719	14	1	20,9618376	0,00632886

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
TD	200	.6574491	.2516811	.0043326	.9818256
STD	200	.4724739	.2748577	.0008813	.9699053
LTD	200	.1901686	.2040703	0	.8795622
TANG	200	.277855	.279913	0	.9764121
TANG	200	.277855	.279913	0	.9764121
ROA	200	.0266738	.090706	-.4965341	.357461
NDTS	200	.2122489	.2190022	0	1.010804
SFC	200	.2197089	.2117638	-.1949573	.8559497
age	200	13.68	6.300483	4	24
SEC	200	.545	.4992205	0	1
size	200	19.29393	1.481617	16.04983	23.63828
liq	200	.9325259	4.371607	.0004088	54.63641

Source : Stata 14

Correlation matrix

	TD	LTD	STD	size	TANG	ROA	NDTS
TD	1.0000						
LTD	0.2389*	1.0000					
STD	0.6987*	-0.5183*	1.0000				
size	-0.2586*	-0.1378	-0.0960	1.0000			
TANG	-0.0760	0.1987*	-0.2181*	0.1077	1.0000		
ROA	0.1403*	0.0225	0.1040	-0.0843	-0.1490*	1.0000	
NDTS	0.0161	0.0299	-0.0114	-0.2176*	0.1950*	-0.0503	1.0000
liq	-0.0965	0.2275*	-0.2608*	-0.1460*	0.0092	0.0434	-0.0536
SFC	0.1488*	0.0597	0.0816	-0.2771*	0.1588*	0.2364*	0.8181*
age	-0.2167*	-0.0886	-0.1301	-0.0748	0.0152	-0.0721	0.1285
SEC	-0.0523	-0.0732	0.0016	0.0671	0.1514*	0.0021	0.2789*

	liq	SFC	age	SEC
liq	1.0000			
SFC	-0.0454	1.0000		
age	-0.0105	0.0854	1.0000	
SEC	-0.1369	0.2417*	-0.1168	1.0000

Source: stata 14

Fisher test

```
. xtreg TD TANG ROA NDTS SFC age SEC liq size , fe
note: age omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       200
Group variable: id                              Number of groups   =        50

R-sq:                                           Obs per group:
     within  = 0.2969                                         min =         4
     between = 0.0309                                         avg =       4.0
     overall = 0.0637                                         max =         4

                                                F(7,143)           =      8.63
corr(u_i, Xb)  = -0.3870                        Prob > F           =    0.0000
```

TD	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TANG	-.0221314	.1026992	-0.22	0.830	-.2251361	.1808733
ROA	-.5296906	.1971588	-2.69	0.008	-.9194129	-.1399683
NDTS	-.7299941	.1144661	-6.38	0.000	-.9562584	-.5037298
SFC	.7198102	.1465361	4.91	0.000	.4301534	1.009467
age	0	(omitted)				
SEC	.1636448	.1437925	1.14	0.257	-.1205887	.4478783
liq	-.0024259	.0026888	-0.90	0.368	-.0077408	.0028889
size	-.0752206	.0243916	-3.08	0.002	-.1234352	-.0270059
_cons	2.038895	.4923194	4.14	0.000	1.065731	3.012058
sigma_u	.24123462					
sigma_e	.1212973					
rho	.79819498	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(49, 143) = 12.33                     Prob > F = 0.0000
```

Hausman test

```
.  hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
TANG	-.0221314	-.0070744	-.015057	.0679538
ROA	-.5296906	-.394003	-.1356876	.0776025
NDTS	-.7299941	-.6524926	-.0775015	.0351465
SFC	.7198102	.6649486	.0548615	.0628569
SEC	.1636448	.0058897	.1577551	.1315255
liq	-.0024259	-.0032805	.0008545	.0005765
size	-.0752206	-.0584111	-.0168095	.0179892

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

  Test:  Ho:  difference in coefficients not systematic

              chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =       11.18
            Prob>chi2 =      0.1308
```

Breuch-Pagan test

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        TD[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                      TD |    .0633434       .2516811
                       e |     .014713       .1212973
                       u |    .0419734       .2048741

        Test:   Var(u) = 0
                            chibar2(01) =   136.64
                          Prob > chibar2 =   0.0000
```

Unit root test

```
.  xtunitroot ht ROA

Harris-Tzavalis unit-root test for ROA
------------------------------------

Ho: Panels contain unit roots               Number of panels  =     50
Ha: Panels are stationary                   Number of periods =      4

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
------------------------------------------------------------------------------
                     Statistic         z         p-value
------------------------------------------------------------------------------
 rho                  -0.3742       -9.4665       0.0000
------------------------------------------------------------------------------

.  xtunitroot ht TANG

Harris-Tzavalis unit-root test for TANG
-------------------------------------

Ho: Panels contain unit roots               Number of panels  =     50
Ha: Panels are stationary                   Number of periods =      4

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
------------------------------------------------------------------------------
                     Statistic         z         p-value
------------------------------------------------------------------------------
 rho                   0.0157       -4.6993       0.0000
------------------------------------------------------------------------------
```

Wooldridge test

```
. xtserial TD TANG ROA NDTS SFC age SEC liq size, output

Linear regression                               Number of obs     =        150
                                                F(6, 49)          =          .
                                                Prob > F          =          .
                                                R-squared         =     0.2953
                                                Root MSE          =     .13115

                                   (Std. Err. adjusted for 50 clusters in id)
------------------------------------------------------------------------------
             |               Robust
        D.TD |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        TANG |
         D1. |  -.0892595   .0628236    -1.42   0.162    -.2155083    .0369893
             |
         ROA |
         D1. |  -.4233593   .1754082    -2.41   0.020    -.7758553   -.0708634
             |
        NDTS |
         D1. |  -.7175872   .1248062    -5.75   0.000    -.9683945   -.4667798
             |
         SFC |
         D1. |   .7400163   .1698828     4.36   0.000     .3986241    1.081409
             |
         age |
         D1. |           0  (omitted)
             |
         SEC |
         D1. |   .1956475   .0208042     9.40   0.000     .1538399    .2374551
             |
         liq |
         D1. |  -.0018117   .0006625    -2.73   0.009     -.003143   -.0004804
             |
        size |
         D1. |   -.079814   .0533404    -1.50   0.141    -.1870056    .0273775
------------------------------------------------------------------------------

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      49) =     67.614
           Prob > F =      0.0000

.
```

Estimation of the total debt model

```
. xttobit TD TANG ROA NDTS SFC age SEC liq size , ll(0) ul(1)

Obtaining starting values for full model:

Iteration 0:   log likelihood =  68.410767
Iteration 1:   log likelihood =  77.754845
Iteration 2:   log likelihood =  78.279431
Iteration 3:   log likelihood =  78.281075
Iteration 4:   log likelihood =  78.281075

Fitting full model:

Iteration 0:   log likelihood =  78.281075
Iteration 1:   log likelihood =  78.281075

Random-effects tobit regression                 Number of obs     =        200
Group variable: id                              Number of groups  =         50

Random effects u_i ~ Gaussian                   Obs per group:
                                                              min =          4
                                                              avg =        4.0
                                                              max =          4

Integration method: mvaghermite                 Integration pts.  =         12

                                                Wald chi2(8)      =      62.66
Log likelihood  =  78.281075                    Prob > chi2       =     0.0000
```

TD	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
TANG	-.0070779	.0752365	-0.09	0.925	-.1545387	.1403829
ROA	-.3937863	.1787562	-2.20	0.028	-.744142	-.0434307
NDTS	-.6523492	.1076533	-6.06	0.000	-.8633459	-.4413525
SFC	.6648515	.1298166	5.12	0.000	.4104156	.9192873
age	-.0090509	.0047769	-1.89	0.058	-.0184135	.0003116
SEC	.0058252	.057204	0.10	0.919	-.1062925	.1179429
liq	-.0032822	.0025745	-1.27	0.202	-.0083281	.0017637
size	-.0583918	.0162331	-3.60	0.000	-.0902081	-.0265755
_cons	1.912616	.3290492	5.81	0.000	1.267691	2.55754
/sigma_u	.2015091	.0225107	8.95	0.000	.1573889	.2456294
/sigma_e	.119445	.006953	17.18	0.000	.1058173	.1330726
rho	.739998	.0499104			.6337338	.8276501

```
          0  left-censored observations
        200     uncensored observations
          0 right-censored observations

.
```

Estimation of the short term debt model

```
. xttobit STD TANG ROA NDTS SFC age SEC liq size , ll(0) ul(1)

Obtaining starting values for full model:

Iteration 0:   log likelihood =  54.676551
Iteration 1:   log likelihood =  66.529312
Iteration 2:   log likelihood =  67.062196
Iteration 3:   log likelihood =  67.066781

Fitting full model:

Iteration 0:   log likelihood =  67.066781
Iteration 1:   log likelihood =  67.066781

Random-effects tobit regression                 Number of obs     =         200
Group variable: id                              Number of groups  =          50

Random effects u_i ~ Gaussian                   Obs per group:
                                                              min =           4
                                                              avg =         4.0
                                                              max =           4

Integration method: mvaghermite                 Integration pts.  =          12

                                                Wald chi2(8)      =       68.90
Log likelihood  =  67.066781                    Prob > chi2       =      0.0000
```

STD	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
TANG	-.1405618	.0809073	-1.74	0.082	-.2991371	.0180135
ROA	-.6046534	.1878394	-3.22	0.001	-.9728119	-.2364949
NDTS	-.6868752	.1123968	-6.11	0.000	-.9071688	-.4665816
SFC	.7851522	.1372349	5.72	0.000	.5161768	1.054128
age	-.0055473	.0053783	-1.03	0.302	-.0160886	.0049939
SEC	.0278809	.0632389	0.44	0.659	-.0960651	.1518268
liq	-.0119235	.0026764	-4.46	0.000	-.0171691	-.0066779
size	-.0184605	.0174087	-1.06	0.289	-.052581	.01566
_cons	.9289285	.3547847	2.62	0.009	.2335633	1.624294
/sigma_u	.2285717	.0251049	9.10	0.000	.1793671	.2777764
/sigma_e	.123701	.0071938	17.20	0.000	.1096014	.1378006
rho	.7734623	.0446775			.6770436	.8510966

```
      0  left-censored observations
    200     uncensored observations
      0 right-censored observations

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```

TABLE DES MATIERE