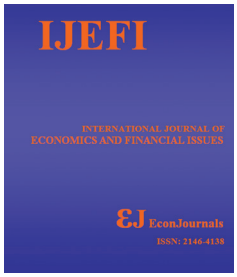

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Capital Structure Determinants: New Evidence from the MENA Region Countries

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ABSTRACT

The objective of this paper is to investigate empirically the determinants of capital structure for a sample of 1101 firms from 11 MENA region countries over the period 2003-2017. Using a comparative approach, we find that firm-specific determinants explain better differences in capital structure choices than other country-specific determinants. Comparisons between countries, sub-regions (GGC and non-GCC countries) and legal origin (Common and Civil law countries) show furthermore that there are differences in terms of significance and importance of capital structure determinants. The most important determinant in the MENA region is profitability. The firm's capital structure is positively impacted by size, tangibility of assets and private credit and it is negatively impacted by profitability, growth opportunities, GDP growth rate and stock market capitalization as a proportion of GDP. Moreover, we find that total leverage ratio, expressed in market values, give better results than leverage ratio expressed in book values and long-term leverage ratios expressed in book and/or market values. Finally, there is some evidence that the "Jasmine Revolution" has had an impact on firms' capital structure determinants. Specific-level determinants play a much more prominent role after the revolution than in the past.

Keywords: Leverage, MENA region, Corporate governance
JEL Classifications: G10, G30, G32, G38

1. INTRODUCTION

Since the pioneering work of Modigliani and Miller (1958), financial theory and empirical analysis highlight the importance of determining an extensive set of factors that could better explain the corporate financial choices. One of the most frequently asked questions in corporate finance is "How do firms choose their capital structures?" (Myers, 1984; Antoniou et al., 2008; Belkhir et al., 2016).

The two oldest and most extensively developed theories of capital structure are the trade-off (TOT) and the pecking order (POT) theories (e.g., Kumar et al. 2017; Ardalan, 2017; Jõeveer, 2013). According to the trade-off theory, «target debt ratios» exist and companies are expected to look for (Jalilv and Harris, 1984). An optimal capital structure is determined by a trade-off between interest tax shield and costs of financial distress (e.g., Kim, 1978; Miller, 1977; Scott, 1976; Kraus and Litzenberger, 1973). A few years later, a dynamic extension of this theory is developed and tested (e.g., Öztekin, 2015; Öztekin and Flannery, 2012; Huang and Ritter, 2009; Frank and Goyal, 2004).

According to the pecking order theory, firms must rely increasingly on internal sources of finance rather than external funds (e.g., Myers and Majluf, 1984; Myers, 1984). In fact, while respecting a certain hierarchy in funding sources (internal financing, then debt and finally equity financing), problems of asymmetric information would be of minor importance.

Both competitive theories still continue existing in parallel (e.g., Zeitun et al., 2017; Ardalan, 2017; Mokhova and Zinecker, 2014; de Jong et al., 2008; Frank and Goyal; 2008). In a recent paper summarizing the results of studies on capital structure determinants, Kumar et al. (2017) reveal the dominance of pecking

order the origin explaining theoretically as well as statistically the financial choices of firms.

Much more recently, new theories and further research are developed: institutional theory (e.g., North, 1990), the law and finance (e.g., La Porta et al., 1998) and the market timing theory (e.g., Baker and Wurgler, 2002). The institutional theory provides a framework to show the important role played by the institutional quality in the determination of the corporate financing choices (e.g., Awartani et al., 2016). Well-functioning institutions can mitigate asymmetry information problems (e.g., Myers, 2001), reduce the transaction costs (e.g., Bevan and Danbolt, 2002) and facilitate, amongst other things, the access to various financing sources.

Findings suggest that the determining factors of capital structure are not exclusively dependent on firms' characteristics (e.g., Venanzi, 2018; Antoniou et al., 2008; Beck et al., 2008; de Jong et al., 2008; Bancel and Mittoo, 2004; Booth et al., 2001). Using a macro-micro economic approach and based on a large sample of firms of G-7 countries, Rajan and Zingales (1997) explore the importance of country-specific factors on firms' capital structure.

The review of the literature reveals that it is not evident to identify the key determinants of firms' capital structure (e.g., Dell'Acqua et al., 2013; Harris and Raviv, 1991; Titman and Wessels, 1988). A set of factors has been however, identified, including firm-specific and country-specific factors. Among the most important firm-specific factors are the size, the profitability, the tangibility and, to a lesser degree, the growth opportunities. Country-specific determinants are also important to explain how firms can choose between debt and equity. They are directly related to countries' economic, financial and legal developments. The most frequently cited factors are the gross domestic product growth rate, the market capitalization-to-GDP ratio, the private credit-to-GDP ratio, the corporate governance indicators…

An important question then arises: Which of these determinants are the most influential: are they firm or country specific determinants? This issue is raised by Daskalakis and Psillaki (2007), de Jong et al., (2008) and more recently by Öztekin (2015), Kayo and Kimura (2011).

Answers to these and many more questions are firstly emerging from developed countries and then from around the world (e.g., Öztekin, 2015; Alves and Ferreira, 2011; de Jong et al., 2008; Gungoraydinoglu and Öztekin, 2011; Fan et al., 2012; Öztekin and Flannery, 2012). The debate on capital structure determinants is obviously still ongoing. It stimulates interest not only in developed countries (e.g., Rajan and Zingales, 1995; Giannetti, 2003; Antoniou et al., 2008; Frank and Goyal, 2009; Foster and Young, 2013; Dell'Acqua et al., 2013…) and European countries (Bancel and Mittoo, 2004), but also in developing countries (e.g., Booth et al., 2001; Bas et al., 2009), emerging markets (e.g., Mateus and Terra, 2013; Foster and Young, 2013;Gurcharan, 2010; Mitton, 2007), the Gulf Cooperation Council "GCC" countries (e.g., Khaki and Akin, 2020;Yousef, 2019; Zeitun et al., 2017), transitional economies (e.g., Bylo and Çankaya, 2019; Decloure, 2007), the MENA region countries (e.g., Cherni, 2022;Touil and Mamoghli, 2020;Belkhir et al., 2016; Farooq, 2015).

Interest in capital structure determinants in least developed countries and more specially, in the MENA region countries, is significantly increasing in the last few years (e.g., Köksal and Orman, 2015; Fan et al., 2012). Comparative researches are undertaken but findings are still rare and inconclusive (e.g., Kumar et al., 2017; Rodriguez and al., 2017; Graham et al., 2015). Farooq (2015) investigates the relationship between capital structure and ownership structure in the MENA region, during the period 2005-2009. Controlling shareholders fear a loss of control and prefer therefore debt over equity, which explains the increase of the proportion of debt in the capital structure. Agency conflicts between insiders and outsiders influence, in fact, corporate decisions and more precisely financing decisions. It is rather difficult for companies to raise debt when problems of information asymmetry are more important (e.g., Rajan and Zingales, 1995). Awartani et al. (2016) discuss the effects of other corporate governance indicators on corporate debt maturity in the MENA region. The first results show that the MENA firms have very limited recourse to long-term debt. The use of long-term debt is, however, more evident in countries characterized by a better quality of their institutions: better regulatory effectiveness, stronger rule of law, and better protection of creditor rights. The same is true when financial intermediaries are more developed: the access to long-term debt is less difficult. More short-term debt is used in most MENA counties, reflecting the low quality of the institutional environments. The countries of this region are characterized by a high level of corruption.

Touil and Mamoghli (2020) show that traditional determinants of capital structure have direct effects on leverage ratios; these effects depend strongly on the quality of institutions. In the context of good quality institutions, the effects of profitability, non-debt tax savings and growth opportunities are strengthened; those of firm size and returns volatility are, however, reduced. The authors also show that the institutional environment can influence, both directly and indirectly, the firm's adjustment speed to target debt ratio in the MENA region. Using a sample of listed firms of ten countries from the MENA region, Belkhir et al. (2016) find that, over the period 2003-2011, the speed of adjustment to target leverage ratios varies from one country to another. They also suggest that firms make less use of debt financing in countries characterized by institutional weakness.

Nouira and Bellouma (2019) develop a dynamic panel data model. Results show significant effects of size, profitability, asset tangibility and rating on firms 'capital structures choices in the MENA region over the period 2006 - 2015.

This paper contributes to the current debate on the capital structure determinants. It provides new evidence from 1101 non-financial firms of 11 countries of the MENA region over a more recent period 2000 - 2017. One of the major events of the reporting period relates to the Global Financial crisis of 2007-2008. The second major event that stood out the majority of the countries

in this region is the Tunisia's Jasmine revolution and the Arab Spring (2010-2011).

Another originality of this paper is the focus on regional differences in the sample covered. In fact, differences exist in each country, and between sub-regions: GCC countries characterized by oil-exported-based economies and the other countries of the MENA region.

We adopt, in fact, a comparative approach to contribute to the debate on capital structure determinants in the MENA region. Special consideration is given to cross-county comparisons; comparisons are made not only between countries and sub-regions but also between legal origins.

We organize the remaining of the paper as follow. The next section sets out a detailed review of the existing literature. The hypotheses related to the objectives of this paper are developed in the same section. We discuss determinants of capital structure at the levels of firm, country, region and legal origin. A description of the methodological procedures (data employed, variable measurement, sampling, empirical models) is given in Section 3. Section 4 reports the empirical results while section 5 concludes the paper.

2. HYPOTHESIS AND RESEARCH METHODOLOGY

2.1. Hypothesis

Theoretical and empirical studies tend to show that the choice between equity and debt financing is determined by a set of factors. Some are internal to the firms, while others belong to the economic, financial and institutional environment in which they operate. The most frequent contributing factors cited are: the size, the asset tangibility, the profitability and the growth opportunities (e.g., Belkhir et al., 2016; Dani et al., 2016; Mateus and Terra, 2013; de Jong et al., 2008; Rajan and Zingales, 1997). These factors are considered to represent the firm-specific determinants. The country-specific determinants include the GDP growth rate and the inflation rate (economic determinants), the market capitalization/GDP and the private credit/GDP (financial determinants), the rule of law and the corruption (legal determinants).

In this paper, a set of assumptions is developed to determine the effect of firm and country-level factors on capital structure decisions in the MENA region over the 2000-2017 period. As well, we rely on a large number of hypotheses to identify the most important determinants of capital structure in the region. Additional assumptions are needed, taking into account the diversity of the different countries, sub-regions, legal origin and sub-periods.

2.1.1. Firm - specific determinants

Firm-specific determinants selected for use in this study are size, tangibility, profitability and growth opportunities. First, we supposethat firm size, an inverse proxy for probability of bankruptcyand information asymmetry, has a positive effect on leverage ratios in the MENA region. Larger firms are, in fact, less likely to face financial distress and bankruptcy. They are supposed to have easier access to capital markets.The access to capital markets is supposed to be costly and more difficult in this regional context because of multiple crises of finance (e.g Khaki and Akin, 2020; Zeitun et al., 2017; Antoniou et al., 2008; Daskalakis and Psillaki, 2008; Mitton, 2007; Flannery and Rangan, 2006; Huang and Song, 2006; Deesomsak et al., 2004; Hovakimian et al., 2004; Aggarwal and Jamdee, 2003; Booth et al., 2001; Rajan and Zingales, 1995; Fama and French, 2002; Wiwattanakantang, 1999; Harris and Raviv, 1991…). According to the static trade-off theory[1], larger firms can borrow at more favorable interest rates, are generally more diversified and have a lower risk of default.

Second, we assume that more profitable firms in the MENA region have to avoid any external source of funding even if they have increased access to alternative sources of finance. Raising debt is relatively costly in countries characterized by institutions not sufficiently well developed to help mitigate information asymmetry between lenders and firms. Contrary to the trade-off theory, the pecking order theory supposes a negative relation between debt and profitability (Zeitun et al., 2017; Rodrigues et al., 2017; Belkhir et al., 2016; Kayo and Kimura, 2011; Sbeiti, 2010; Céspedes et al., 2010; Antoniou et al., 2008; Deesomsak et al., 2004; Harris and Raviv, 1991; Rajan and Zingales, 1995; Wald, 1999; Frank and Goyal, 2009; Aggarwal and Jamdee, 2003; Nagano, 2003; Mitton, 2007; Cheng and Shiu, 2007; Flannery and Rangan, 2006).

Third, we suppose that firms holding more tangible assets tend to have, on the contrary, higher leverage ratios, and this, according the trade-off theory. Holding more tangible assets, which can be used as collateral for loans, reduces, in fact, the risk for the lender as well as the direct costs of bankruptcy. In emerging markets, and indeed elsewhere in the world, we accept that firms face more difficulty gaining confidence among bankers if they have not tangible assets (e.g., Khaki and Akin, 2020;Zeitun et al., 2017; Rodrigues et al., 2017; Fan et al., 2012; Frank and Goyal, 2009; Antoniou et al., 2008; Mitton, 2007; Flannery and Rangan, 2006; Aggarwal and Jamdee, 2003; Rajan and Zingales, 1995; Harris and Raviv, 1991; Friend and Lang, 1988…).

Fourth and as regards the growth opportunities, empirical results are also mixed and do not lead to any robust conclusion. We suppose a negative relation between growth opportunities and leverage in the MENA region, which is consistent with agency and trade-off theories but in total contradiction with the hierarchy theory. According to these theories, in order to minimize conflicts between stockholders and bondholders, arising from asset-substitution and underinvestment, firms with high growth opportunities avoid debt financing and thus prefer equity financing for their new projects (Zeitun et al., 2017; Fan et al., 2012; Gurcharan, 2010; de Jong et al., 2008; Antoniou et al., 2008; Mitton, 2007; Frank and Goyal, 2004; Deesomsak et al., 2004; Aggarwal and Jamdee, 2003; Fama and French, 2002;Rajan and Zingales, 1995).

1 Information asymmetry considerations (deJong et al., 2008)

2.1.2. Country-specific determinants

Referring to both theoretical and empirical studies, it is equally essential to discuss the positive and negative impacts of different country-specific factors. To date, the great majority of researchers agree that country-specific factors influence the leverage ratios of firms (Demirgüç-Kunt and Maksimovic, 1999; Booth et al., 2001; Claessens et al., 2001; Bancel and Mittoo, 2004…). An original paper, presented by de Jong et al. (2008), examines not only the direct impact of country-specific factors, but also the indirect impacts. Three main sets of factors are involved in this paper: macro-economic, financial and legal factors.

We suppose that the two economic factors, the GDP growth rate and the inflation rate, are negatively correlated with the leverage ratios of firms in the MENA region. According to Demirgüç-Kunt and Maksimovic (1999), annual growth ratein national GDP can be considered as an indicator of the financing needs of firms. Some require a positive impact on leverage ratio (Mokhova and Zinecker, 2014; Muthama et al., 2013; Fan et al., 2012; Gurcharan, 2010; Bas et al., 2009; de Jong et al., 2008; Mitton, 2007; Beck et al., 2005; Booth et al., 2001) while others argue exactly the opposite impact (Venanzi, 2017; Riaz et al., 2014; Kayo and Kimura, 2011; Gurcharan, 2010; Gajurel, 2006…). The impact of GDP growth on leverage is thus uncertain (Zeitun et al., 2017). As argued by Myers' hypothesis (1977), especially the pecking order theory, we suppose that firms with large growth opportunities tend to use less debt. In this context, it is widely accepted that a relationship exists between the growth rate of individual firms and the growth rate of the economy; investment opportunities are, in fact, correlated (Gurcharan, 2010).

Again, we suppose a negative relationship between theinflationand the capital structure. In fact, an inflationary environment is likely to discourage lenders to provide long-term debt: debt contracts are generally nominal contracts (Venanzi, 2017; Mokhova and Zinecker, 2014; Gurcharan, 2010; Fan et al., 2012; Gajurel, 2006; Booth et al., 2001…).

Two other variables are taken into account, and reflect the level of stock and bond market development of each country: "market capitalization/GDP" and "private credit/GDP". We expect that costs of equity are lower where stock markets are well developed. Firms have more supply of funding and corporate leverage is, therefore, negatively influenced by the stock markets development (Venanzi, 2017; Mitton, 2007; Cheng and Shiu, 2007; Giannetti, 2003; Booth et al., 2001; Demirgüç-Kunt and Maksimovic, 1996…). Conversely, we suppose that corporate leverage is positively influenced by the bond market development. Access to credit is easier. Creditors make greater levels of credit. Thus, credits are available at lesser costs (Venanzi, 2017; Cheng and Shiu, 2007…). Other factors proposed in the pioneering works of LLSV (1998) and related to corporate governance can be added: The anti-director rights index and the creditor rights index (LLSV, 1998), the "Legality" index (Berkowitz et al., 2003), the "rule of law"; the "regulatory quality", the "corruption"…

The legal framework plays, in fact, a crucial role in explaining key differences in the capital structure of firms in developed and developing countries (Cheng and Shiu, 2007; Giannetti, 2003…). A legal environment which offers good protection of anti-directors rights favors equities over bonds. Thus stronger shareholder rights lead to lower leverage (Alves and Ferreira, 2011; Cheng and Shiu, 2007; LLSV, 1997, 1998…). On the contrary, the relation between creditor rights index and leverage is supposed to be positive. In fact, good protection of creditor rights helps firms to have better and easier access to credit; the cost of the financial debt is so low (Venanzi, 2017; Alves and Ferreira, 2011; Cheng and Shiu, 2007; LLSV, 1997, 1998…). We suppose, in this paper, that firms are expected to rely less on debt financing when capital markets are more stringently regulated. A better legal framework, as measured by higher "Rule of law"[2] index, is associated with lower leverage (Belkhir et al., 2016; de Jong et al., 2008; Berkowitz et al., 2003…).

2.2. Research Methodology

2.2.1. Data

A review of the theoretical and empirical literature reveals that results on capital structure determinants are highly dependent on the data collection and the variable choices. It is therefore important to begin by highlighting the existing problems faced in collecting data on firms and countries from the MENA region[3]. In this paper, we use two principal databases: The Worldscope from Thomsen Financial for firm-level data (e.g., Belkhir et al., 2016; Clark et al., 2009; Cheng and Shiu, 2007; Decloure, 2007; Wald, 1999) and the World Bank's World Development Indicators for macro-economic and financial data. The other country-level institutional data are collected from the Governance Indicators Database of the World Bank.

The first sample covers all non-financial listed companies from 11 MENA countries: Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Turkey and United Arab Emirates[4].Companies must, in fact, be listed on their own domestic markets during the period between 2003 and 2017 (e.g., Fan et al., 2012; Mateus and Terra, 2013; Antoniou et al., 2008; Deesomsak et al., 2004; Bancel and Mittoo, 2004; Pagano et al., 2002).

The definition of certain variables is also problematic. The majority of studies arenot limited to only one leverage ratio (e.g., Fan et al., 2012; Frank and Goyal, 2009; Cheng and Shiu, 2007; de Jong et al., 2008; Giannetti, 2003; Booth et al., 2001; Wald, 1999). Yousef (2019) uses, for example, six proxies for leverage. In this paper, four leverage ratios are used to measure the notion of capital structure: the total book leverage (Lev_{BV}), the total market leverage (Lev_{MV}), the long-term book leverage ($LTLev_{BV}$) and the

2 Control of corruption and regulatory quality are two additional legal variables.

3 Many problems exist regarding the availability and accessibility of indispensable data of corporate governance and firms' capital structures in countries different from those of developed countries (e.g., deJong et al., 2008; Cheng and Shiu, 2007; Driffield et al., 2007; Deesomsak et al., 2004; Fan and Wong, 2002; Rajan and Zingales, 1995).

4 MENA countries are: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Palestine, and Yemen. Sudan and Turkey are also included in the MENA region. In this paper, we exclude countries for which data are not sufficiently available.

Table 1: Description of the variables

Variable	Description
Leverage ratios	
Book leverage (LevBv)[8]	Total book debt (Worldscope Item, WC03255) to total assets (Worldscope Item, WC 02999).
Marketleverage (Lev_{MV})	Total book debt divided by the result of total assets minus common equity (Worldscope Item, WC03501) plus market equity (Worldscope Item, WC08001).
LT book-leverage	Long-term debt (Worldscope Item, WC03251) to total assets
LT market-leverage	Long-term debt divided by the result of total assets minus common equity plus market equity.
Firm-leveldeterminants	
Size (Size)	Natural log of total assets (Worldscope Item, WC07230)[9]
Tangibility (Tang)	Property, plant and equipment (Worldscope Item, WC02501) to total assets
Profitability (Prof)	Earnings before interest, taxes, depreciation, and amortization (Worldscope Item, WC18198) to total assets
Growth opportunity (MTB)	The result of total assets minus book equity plus market capitalization divided by total assets.
Country-level determinants	
Macro-economic determinants	
GDP growth rate	Growth rate of real of GDP[10]
Inflation	Rate of increase in CP[11]
Financial determinants	
Market capitalization	Total stock market capitalization to GDP[12]
Private credit	The domestic credit to private sector to GDP[13]
Legal determinants	
Rule of law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contractenforcement, propertyrights, the police, and the courts, as well as the likelihood of crime and violence. Estimategives the country's score on the aggregateindicator, in units of a standard normal distribution, i.e., rangingfromapproximately−2.5-2.5.
Corruption	Control of Corruption captures perceptions of the extent to which public power isexercised for private gain, includingbothpetty and grand forms of corruption, as well as "capture" of the state by elites
Regulatoryquality	RegulatoryQuality captures perceptions of the ability of the government to formulate and implementsoundpolicies and regulationsthat permit and promoteprivatesectordevelopment. Estimategives the country's score on the aggregateindicator, in units of a standard normal distribution, i.e., rangingfromapproximately−2.5-2.5.

long-term market leverage ($LTLev_{MV}$). In fact, leverage ratios can be expressed on book or market values[5] (e.g., Gurcharan, 2010; Frank and Goyal, 2009; Antoniou et al., 2008; Mitton, 2007; Cheng and Shiu, 2007; Deesomsak et al., 2004; Fama and French, 2002; Booth et al., 2001; Rajan and Zingales, 1995)[6]. They can be calculated using total debt (e.g., Zeitun et al., 2017; Öztekin, 2015; Gurcharan, 2010; Antoniou et al., 2008; Mitton, 2007; Deesomsak et al., 2004; Rajan and Zingales, 1995) or long-term debt (e.g., Kayo and Kimura, 2011; de Jong et al., 2009; Hall et al., 2004; Booth et al., 2001; Demirgüç-Kunt and Maksimovic, 1999; Wald, 1999; Titman and Wessels, 1988). One of the issues that deserves our attention is to determine which «leverage ratio» is better able to explain the firms' financial decisions incountries in the MENA region. Results can depend greatly on the choice of the leverage ratio (e.g., Bokpin, 2009; Frank and Goyal, 2009; Cheng and Shiu, 2007; Booth et al., 2001; Rajan and Zingales, 1995; Harris and Raviv, 1991).

Once leverage ratios are defined and regardless of the method of calculation chosen, it is widely accepted that leverage ratio may be explained either by firm-specific factors, such as the size, the tangibility, the profitability and the growth opportunities or by other country-specific factors such as the GDP growth and the inflation rates, the market capitalization and the private credit reported to GDP, the rule of law[7]. Definitions of all variables used in the analysis are summarize in Table 1.

2.2.2. Methodology

In this paper, we try to revisit the notion of capital structure determinants in the MENA region using a set of micro and macro-economic data. Our initial dataset included all firms from 11 countries in the MENA region. However, significant processing of the data is necessary.

We first exclude all financial (SIC codes between 6000 and 6999) and utility firms (SIC codes between 4900 and 4999) because of their specific regulations[14] (e.g., Mateus and Terra, 2013; Psillaki

5 A majority opts for book values (e.g., Venanzi, 2017; Bancel and Mittoo, 2004; Brounen et al., 2004 Graham and Harvey, 2001…). Accounting data are more easily accessible; managers focus on book values when setting the financial structure of firms. Including book values is, furthermore, straightforward, in countries with less developed financial markets, (e.g., Venanzi, 2017; Mateu and Terra, 2013).

6 Some studies indicate that leverage ratios expressed in market values give the best results (e.g., Gurcharan, 2010; Wiwattanakantang, 1999; Suto, 2003; Deesomsak et al, 2004; Welch, 2004; Elsas and Florysiak, 2008), others show the opposite (e.g.,Mateus and Terra, 2013; Titman and Wessels, 1988; Graham and Harvey, 2001; Barclay et al, 2003; Decloure, 2007). According to Venanzi (2017), a very high correlation exists between book and market values of leverage ratios.

7 Twootherlegalindicators are established : the «Control of corruption» index and the «Regulatoryquality» index.

8 Worldscope Item, (WC08236)

9 Log (Total Assets dollar) or Log (Total Salesdollar) (Worldscope Item, WC07240).

10 NY.GDP.MKTP.KD. ZG

11 NY.GDP.DEFL.KD. ZG

12 CM.MKT.LCAP.GD. ZS

13 FS.AST.DOM.GD. ZS

14 Firms lacking SIC codes are also excluded.

Table 2: Firm's distribution by country

Country	Firms	Observations
Bahrain	17	463
Egypt	160	4 303
United ArabEmirates UAE	53	1 428
Morocco	54	146
Tunisia	70	1 867
Jordan	96	2 618
Kuwait	104	2 789
SaudiArabia	129	3 519
Qatar	24	646
Turkey	299	7 994
Oman	95	2 498
Total	1101	28 271

and Daskalakis, 2009; de Jong et al., 2009; Frank and Goyal, 2003; Korajczyk and Levy, 2003; Fama and French, 2002). Some other firms are then excluded because of their leverage ratios: Leverage ratio should not be negative, null or greater than one (e.g., Alves and Ferreira, 2011; Céspedes et al., 2010; Antoniou et al., 2008; Cheng and Shiu, 2007; Deesomsak et al., 2004; Hall and Jörgensen, 2005; Baker and Wurgler, 2002). We exclude, furthermore, firms with negative total assets, market capitalization or total equities values (e.g., Clark, 2010; Frank and Goyal, 2005; Hall and Jörgensen, 2005; Welch, 2004). Continuous information need to be available at least over a 3-year period from 2000 up until 2017 (e.g., Touil and Mamoghli, 2020; Belkhir et al., 2016; Alves and Ferreira, 2011) and all firm-level variables, including the debt to capital ratios (dependent variables), must be winsorized at the top and bottom 1 percentiles; the purpose being to mitigate the effect of extreme and outliers on the analysis[15] (e.g., Oliveira et al., 2017; Liao et al., 2015; Köksal and Orman, 2015;Dell'Acqua et al., 2013; Alves and Ferreira, 2011; Clark et al., 2009; Öztekin and Flannery, 2012;Frank et al., 2008; Aggarwal and Jamdee, 2003; Kremp, 1995). We, finally, assess whether companies have all indispensable variables for the empirical study (e.g., Mateus and Terra, 2013; Antoniou, GuneyandPaudyal, 2008).

After data processing, the final sample consists of 1 101 non-financial listed firms with a total of 28271 observations (Table 2). The following table reports the distribution of the firms by country.

Following prior work, we use two econometric models to examine the capital structure determinants of 1 101 firms in the MENA region over the period 2000-2017. The first model "Micro" includes only firm-level variables, whereas the second model "Micro-Micro" also includes country-level variables.

The "Micro" model can be presented as follow:

$$Lev_{ij,t} = \alpha_0 + \alpha_k X_{ij,t-1} + \varepsilon_{i,t} \quad (1)$$

where "$Lev_{ij,t}$" is one of the four different measures of firm i's leverage ratio at time t in country j. "X_{it-1}" is a vector of firm-level factors (size, tangibility, profitability and growth opportunity) that can influence the capital structure decisions. These factors represent the independent variables and are lagged 1 year, avoiding reverse causality problems. The financial choice of a firm "i" at the instant "t" depends, in fact, on its specific characteristics at "t-1" (e.g., Alves and Ferreira, 2011; Gurcharan, 2010; Deesomsak et al., 2004; Rajan and Zingales, 1995; Bevan and Danbolt, 2002).[16] "α_k" are the specific coefficients to be determined and "εi, t" is the error-term.

The leverage is thus supposed to be a linear function of k specific-firm variables. Other relevant factors taking into consideration the economic, financial and institutional environment may also affect the capital structure decisions of firms. The model "Micro-Micro" can be formalized as:

$$Lev_{ij,t} = \alpha + \alpha_k X_{ij\,t-} + \beta_m Y_{j\,t-} + \varepsilon_{i\,t} \quad (2)$$

Where the dependent variable, "$Lev_{ij,t}$" is one of the four different measures of firm i's leverage ratio at time t in country j. "$X_{ij,t-1}$" and "$Y_{j,t-1}$" are, respectively, vectors of firm-level and country-level factors that can explain the financial choices of firms in the MENA region. The country-level factors are the GDP growth rate, the inflation rate, the market capitalization/GDP, the private credit/GDP and the rule of law. The α and β are the coefficients and "ε_{it}" is the error term.

In our regression equations, two dummy variables are also included in order to enhance the robustness of the analysis: industry-dummies and year-dummies (e.g., Faroq, 2015; de Jong, et al., 2008; Kayo and Kimara, 2011). Firms in MENA region can be classified according to their specific industry. The largest contributor sectors to the economy, in this region, are: manufacturing, tourism, energy and renewable energy and the corporate service sectors.

The two models "Micro" and "Micro-Macro" are estimating using the Ordinary Least Squares "OLS" regression analysis and the panel data. In this paper, we perform the Hausman test to decide whether to use fixed or random effects model. Hausman tests are conducted to examine the presence of endogeneity in the panel model and to compare the results. If we opt for a change in estimation method, it is because we would like to show if results on the MENA region are sensitive to the choice of the econometric model used. We also want to know which of the econometric methods provides a better explanation of the financial choices of companies in this region.

The majority of studies indicate that the results seem insensitive to the choice of the econometric method (e.g., Rajan and Zingales, 1995; Wald, 1999; Foster and Young, 2013). The "OLS" approach is currently used (e.g., Gurcharan, 2010; Deesomsak et al., 2004; Song and Philippatos, 2004). However, some researchers prefer the fixed effects specifications to consider heterogeneity across countries (e.g., Naceur et al., 2017; Alves and Ferreira, 2011; Booth et al., 2001; Hirota, 1999). Awartani et al. (2015), alternatively, prefer the random effects panel data estimation technique.

15 Expressed in logs, the firm size, is the only variable which is not winsorized.

16 Rajan and Zingales (1995) and Bevan and Danbolt (2002) define their independent variables as lagged on four and three-year average, respectively.

The two developed models are adopted and tested in all the countries of the MENA region, taken together. We admit, thus and in accordance with international studies, that the impact of firm and country-specific factors on leverage can be the same (e.g., Faroq, 2015; Fan et al., 2012; Booth et al., 2001; Giannetti, 2003; Deesomsak et al., 2004; Song and Philippatos, 2004). The "Micro" model is, however, also tested at country level; the aim is to justify the use of some other external factors which may affect the firms' capital structure. Of course, results ca also be influenced by the geographical regions, and the legal origin.

The MENA region can be divided into three sub-regions: the Gulf Corporation Council "GCC" (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates), the Levant[17] (Egypt, Jordan and Turkey) and the North Africa (Egypt, Morocco and Tunisia). Moreover, and following the pioneering work of LLSV (1998), each country of the MENA region should be classified according to its legal regime: civil or common law. The majority of countries of the MENA region are civil law countries: Egypt, Jordan, Kuwait, Morocco, Qatar, Tunisia and Turkey (e.g., Faroq, 2015; Claessens and Klapper, 2002). Besides, the quasi-totality of countries from the MENA region represent bank-based systems (e.g., Kayo and Kimura, 2011; Demirgüç-Kunt and Levine, 2004).

3. RESULTS

3.1. Descriptive Statistics

The tables and figures below present descriptive statistics of leverage ratios and the factors that may explain their evolution over the period 2003-2017.

17 Mediterranean and coastal countries of the area.
18 GCC countries : Bahrain, UAE, Kuwait, Qatar, Saudia Arabiaand Oman.
19 Non-GCC countries : Egypt, Morocco, Tunisia, Jordan and Turkey.
20 Egypt, Morocco, Tunisia, Jordan, Kuwait, Qatar and Turkey.
21 Bahrain, UAE,Saudia Arabia and Oman.

3.1.1. Leverage ratios

Descriptive statistics on leverage ratios (Table 3) are presented by country and for all countries in the MENA region (Panel A). They are also presented by sub-regions (Panel B) and by legal origin (Panel C).

All the leverage ratios used vary between the different countries of the MENA region as well as between the sub-regions: GCC countries and non-GCC countries. There are also differences between Common law countries and Civil law countries. The study period lasts between 2003 and 2017 and the total number of countries is 11.

Over this period, the total debt ratios, expressed in book values and in market values, are 25.8% and 22.4% respectively (Panel A). Long-term debt expressed in book values amounts to 13.7% while long-term debt expressed in market values amounts to 11.7%. Expressed in book values and calculated from total debt, debt ratios vary between 29.6% in Oman and 18.3% in Bahrain. Expressed in market values, they vary between 16.2% in Morocco and 26.6% in Oman. For long-term debt ratios, they vary between 18.2% in Qatar and 9.9% in Bahrain (debt expressed in book values) and between 15.4% in UAE and 8.4% in Morocco (debt expressed in market values).

In total, we can conclude that among the least indebted countries over the period 2003-2017 are Bahrain and Morocco. In contrast, Qatar and Oman are among the most heavily indebted. In GCC countries, indebtedness is higher than in non-GCC countries; the only exception is long-term debt expressed in market values (Panel B). Debt is also higher in Common law countries than in Civil law countries, regardless of the debt ratio used (Panel C). However, among the GCC countries, Qatar and Kuwait are the exception with their legal origin. Indeed, all other GCC countries are Common Law countries.

Table 3: Descriptive statatistics of leverage ratios

Country	Book leverage		Marketleverage		LT Book leverage		LT Marketleverage	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Panel A: Leverage ratios by country								
Bahrain	0.183	0.126	0.186	0.125	0.099	0.119	0.099	0.124
Egypt	0.243	0.187	0.207	0.176	0.121	0.137	0.098	0.124
Jordan	0.207	0.133	0.215	0.156	0.1	0.092	0.100	0.103
Kuwait	0.241	0.175	0.186	0.189	0.14	0.125	0.101	0.110
Morocco	0.207	0.137	0.162	0.133	0.106	0.098	0.084	0.087
Oman	0.296	0.201	0.266	0.196	0.157	0.155	0.140	0.149
Qatar	0.247	0.189	0.202	0.169	0.182	0.164	0.152	0.150
Saudia Arabia	0.263	0.174	0.208	0.155	0.158	0.146	0.128	0.132
Tunisia	0.294	0.22	0.235	0.211	0.161	0.161	0.137	0.177
Turkey	0.275	0.189	0.25	0.184	0.127	0.125	0.114	0.118
UAE	0.252	0.16	0.25	0.17	0.158	0.146	0.154	0.151
All	0.258	0.184	0.224	0.180	0.137	0.136	0.117	0.129
Panel B : Leverage ratios by sub-region								
GCC countires[18]	0.26	0.18	0.219	0.179	0.153	0.144	0.128	0.135
Non-GCC countries[19]	0.257	0.186	0.227	0.181	0.125	0.129	0.109	0.124
Panel C : Leverage ratios by legal origin								
Civil law[20]	0.254	0.184	0.22	0.182	0.129	0.13	0.109	0.123
Common law[21]	0.269	0.181	0.234	0.174	0.155	0.149	0.136	0.141

Table 4: Descriptive statistics of firm and country-specific determinants

Country	Firm-specific determinants				Country-specific determinants						
	SIZE	TANG	PROF	GROWTH	GDP Gr	Inflation	Mket Cap	Priv Cred	Corruption	Rule of law	Regulatory
Panel A: Descriptive statistics by country											
Bahrain	11.426	0.435	0.116	1.006	0.051	0.047	0.833	0.576	0.247	0.489	0.673
Egypt	13.926	0.435	0.123	1.346	0.043	0.111	0.388	0.389	−0.640	−0.297	−0.526
Jordan	10.438	0.429	0.068	1.203	0.046	0.047	0.990	0.764	0.214	0.333	0.192
Kuwait	11.069	0.277	0.086	1.749	0.044	0.048	1.213	0.688	0.182	0.404	0.140
Morocco	14.218	0.298	0.145	1.635	0.043	0.012	0.561	0.587	−0.285	−0.175	−0.185
Oman	10.020	0.468	0.114	1.291	0.034	0.062	0.429	0.434	0.355	0.462	0.562
Qatar	14.973	0.346	0.099	1.507	0.101	0.056	0.888	0.469	0.921	0.717	0.512
S Arabia	14.515	0.441	0.132	1.658	0.044	0.050	0.633	0.408	−0.034	0.104	0.068
Tunisia	11.736	0.300	0.134	1.654	0.033	0.041	0.167	0.692	−0.112	−0.015	−0.158
Turkey	12.720	0.348	0.102	1.297	0.059	0.094	0.274	0.435	−0.033	0.024	0.258
UAE	15.128	0.346	0.086	1.189	0.044	0.045	0.477	0.626	1.055	0.526	0.719
All	12.685	0.3736	0.1086	1.4260	0.0477	0.0681	0.4457	0.5121	0.0176	0.1233	0.1152
Panel B : Descriptive statistics by sub- region											
GCC countries	12.628	0.384	0.107	1.523	0.045	0.052	0.626	0.525	0.305	0.359	0.315
Non GCC countries	12.723	0.367	0.109	1.361	0.049	0.079	0.360	0.504	−0.175	−0.035	−0.019
Panel C: Descriptive statistics by legal origin											
Civil law	12.552	0.352	0.105	1.424	0.050	0.074	0.416	0.530	−0.087	0.054	0.022
Common law	13.052	0.433	0.117	1.432	0.041	0.053	0.527	0.462	0.300	0.310	0.368

3.1.2. Evolution of leverage ratios

Figure 1 shows the evolution, over the 2003-2017 period, of to talleverage ratios. As a whole, the debt ratios recorded an upward trend between 2003 and 2017, such as the total leverage ratio, expressed in accounting values, increases to 24.2% in 2017, an increase of 21.6% compared to 2003.

A comparison of the evolution of debt ratios between countries, sub regions and/or legal origin also reveals significant differences.

Indeed, when the debt ratio used is the total debt expressed in book values, sometimes it is the GCC countries that seem to be the most indebted and sometimes the reverse is true. Over the period 2006-2012, GCC countries took on more debt compared to other countries in the MENA region. When the debt ratio used is the total debt expressed in market values, it is the non-GCC countries that appear to be the most indebted, except for the period 2008-2012.

Regarding long-term debt expressed in book values (Figure 2), descriptive statistics show higher debt levels in GCC countries than in non-GCC countries, starting in 2004. In 2013, the two sub-regions have almost the same level of debt. The results are not very different with debt ratios expressed in market values: we observe a higher level of debt in the GCC countries, especially over the period 2006-2012.

Finally, regarding the legal differences in the MENA region, Figure 3 shows that Common law countries are more indebted than Civil law countries, mainly over the period 2007-2012 and for total debt ratios. However, debt levels are getting closer, whether expressed in book or market values, from 2013.

For Long Term debt ratios and as is shown in Figure 4, there is an upward trend throughout the study period, with the exception of recent years. In fact, from 2015, debt levels seem to be on the decline, which is particularly the case for Common law countries.

3.1.3. Capital structure determinants

Descriptive statistics for all the variables that may explain the levels of corporate debt in the MENA region are presented in the following table (Table 4):

These statistics are presented by country and then for all countries in the MENA region (Panel A). They are also presented by sub-region (Panel B) as well as by legal origin (Panel C). With regard to company-specific variables, statistics show that companies in the United Arab Emirates (UAE) are large compared to other companies in countries in the region and more specifically Oman; the average being 12.685. On the other hand, Oman has the most significant tangible assets. In fact, the tangibility of assets varies between 46.8% in Oman and 27.7% in Kuwait; the average is 37.36%. In the MENA region, profitability is 10.86% and varies between 14.5% in Morocco and 8.6% in the United Arab Emirates (UAE) and Kuwait. Growth opportunities, which represent the last firm-specific determinant retained in this study, range from 1.749 in Kuwait to 1.006 in Bahrain with an average of 1.4260.All of these firm specific factors show higher levels in Common law countries than in Civil law countries (Panel C). Size and profitability are more important in GCC countries than in non-GCC countries, unlike the other two factors which are the tangibility of assets and growth opportunities (Panel B).

As for the country specific variables, the comparisons show notable differences in the levels of development of the stock markets as well as in the quality of the institutional framework and more specifically the legal framework. The same is true for economic development. The GDP average growth rate amounts to 4.77% and varies between 10.1% in Qatar and 3.3% in Tunisia while the average inflation rate is 6.81% and varies between and 1, 2% in Morocco and 11.1% in Egypt (Panel A). These two economic factors are more important in non-GCC countries and in civil law countries (Panels B and C).In non-GCC countries, the financial development factors, which are market capitalization compared to GDP and private credit also compared to GDP, are on the contrary

less important than in GCC countries (Panel B). The difference is more remarkable for stock market development, which is more assertive in Common law countries than in Civil law countries. On the other hand, the latter grant companies more private loans expressed as a percentage of GDP than common law countries (Panel C). On average, market capitalization to GDP stands at 44.57% over the period 2003-2017 while private credit to GDP amounts to 51.21% (Panel A). If the first factor of financial development varies between 1.213 in Kuwait and 0.167 in Tunisia, the second varies between 0.692 in Tunisia and 0.389 in Egypt. Thus, Tunisia is distinguished by an excessive reliance on debt to the detriment of other sources of financing such as issuing shares.

Regarding legal variables, the descriptive statistics show a clear difference between Common law countries and Civil law countries and GCC countries and non GCC countries (Panels B and C).Indeed, it turns out that there is much to be done to create a more satisfactory and secure legal environment in civil law and non-GCC countries; the aim being of course to stimulate competition and promote investment. The values of the legal factors used are negative in non-GCC countries, whereas in GCC countries they amount to 0.305 for "Corruption," 0.359 for "Rule of law" and to 0.315 for "Regulatory" (Panel B). These factors also take higher values in Common Law countries than in Civil Law countries (Panel C). Countries characterized by an inadequate legal framework are Egypt, Morocco and Tunisia (Panel A). The legal variables all have negative values.

3.1.4. Evolution of firm-specifc determinants of capital structure

A comparative approach over time is also designed in this article. In the following figures, we try to represent the evolution of different firm-specific determinantsof capital structure in the MENA region over the period 2003-2017. Particular attention is paid to differences in legal origin (Civil law versus Common law) (Figure 5) and geographical affiliation (GCC countries versus non-GCC countries) (Figure 6).

3.1.5. Evolution of country-specifcdeterminants of capital structure

For country-specific factors, their evolution, over the 2003-3017 period, can be illustrated by the following figures. Figure 7 gives an overview by legal origin, whereas Figure 8 gives an overview by geographic sub-region.

Thus, it turns out that the MENA region is characterized by notable differences at the level of countries, geographic sub-regions and legal origins. All the differences in debt ratios and the factors that may explain these ratios in the MENA region suggest that there may be significant differences in corporate finance policies.

3.2. Correlation Matrix

It emerges from the correlation matrix below (Table 5) that the correlation is stronger between long-term debt expressed in book values and long-term debt expressed in market values (0.916) than between total debt expressed in book values and total debt expressed in market values (0.887).

Moreover, we note that whatever the measure of leverage ratio adopted, the correlations between the size of the companies and the tangibility of the assets are positive but correlations between with the profitability and the growth opportunities are negative.

As for the positive effects (size and tangibility), they are greater with long−term debt, while as regards the negative effects (profitability and growth opportunities), they are greater with total debt. Moreover, concerning country-specific factors and their effects on debt ratios, the correlation matrix shows positive effects with the following three factors: private credit to GDP, corruption and regulatory and negative effects with GDP growth and reported market capitalization to GDP, regardless of the debt ratio used. The positive effects of the rule of law and the negative effects of the inflation rate are only significant with long-term debt.

3.3. Regression Results

Two classic econometric methods are proposed: Ordinary Least Squares "OLS" and panel data (fixed effect versus variable effect). If we opted for a change in estimation method, it is because we would like to know whether or not our results are sensitive to the choice of the econometric method used (Serghiescua and Văideanb, 2014; Matemilola et al., 2013; Serrasqueiro and Nunes, 2008…). We also want to know which of the econometric the financial methods offers a better explanation of choices of companies in MENA countries.

In their study of the largest industrialized countries, the Group of Seven G7, Rajan and Zingales (1995) have used two different methods: the Tobit model and the Ordinary Least Squares "OLS" method. The results are similar. Wald (1999) proposes the heteroscedastic Tobit model. In his study of the determinants of structure in the G-5 countries, he shows that the results obtained do not depend on the method used. In fact, the results are the same whether it is the Tobit model or the Ordinary Least Squares "OLS" model (Foster and Young, 2013). Gurcharan (2010), Deesomsak et al., (2004), Song and Philippatos (2004) and many others have used the classical ordinary least squares method to determine the impact of traditional capital structure variables on debt. On the other hand, Alves and Ferreira (2011) worked on panel data and more specifically on fixed-effects models, following the example of Hirota (1999), Booth et al. (2001) and many others. The two methods adopted more recently by Memon et al., (2015) are ordinary least squares and panel data.

We use Ordinary Least Squares and panel data when the model is tested globally. Therefore, we assume that the impact of capital structure determinants on leverage ratios is the same for all firms in all countries in the region. In the following, the method that gives better results will be retained in terms of explanatory power and significance. The next step is to present the results by country, geographical sub-region and finally by legal regime.

The following observations emerge from these tables:

- Long-term debt expressed in book values explains better the financial choices of companies in MENA countries, regardless of the method and legal variable used. Expressed in market values, it is the total indebtedness that serves to explain better these financing decisions between stocks and debts. However, total debt expressed in market values gives the best results.
- Of all the variables used to explain the financial choices of

Table 5: Correlation matrix

Variable	LevBV	LevMV	LTLevBV	LTLevMV	SIZE	TANG	PROF	GROWTH	GDP growth	Inflation	Mket Cap	Private Credit	Corruption	Rule of law	Regulatory
LevBV	1.000														
LevMV	0.887***	1.000													
	(0.000)														
LTLevBV	0.735***	0.620***	1.000												
	(0.000)	(0.000)													
LTLevMV	0.687***	0.739***	0.916***	1.000											
	(0.000)	(0.000)	(0.000)												
SIZE	0.105***	0.081***	0.157***	0.139***	1.000										
	(0.000)	(0.000)	(0.000)	(0.000)											
TANG	0.098***	0.065***	0.213***	0.182***	0.033**	1.000									
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)										
PROF	−0.227***	−0.323***	−0.146***	−0.222***	0.129***	0.030**	1.000								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)									
GROWTH	−0.151***	−0.414***	−0.086***	−0.282***	−0.009	0.008	0.381***	1.000							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.413)	(0.463)	(0.000)								
GDP growth	−0.020	−0.045***	−0.016	−0.037**	0.037***	0.010	0.082***	0.054***	1.000						
	(0.059)	(0.000)	(0.146)	(0.001)	(0.000)	(0.349)	(0.000)	(0.000)							
Inflation	0.010	−0.005	−0.023*	−0.035**	−0.009	0.018	0.041***	0.026*	0.240***	1.000					
	(0.349)	(0.641)	(0.031)	(0.002)	(0.386)	(0.083)	(0.000)	(0.016)	(0.000)						
MketCap	−0.088***	−0.120***	−0.018	−0.052***	−0.081***	0.054***	0.034**	0.115***	0.185***	−0.113***	1.000				
	(0.000)	(0.000)	(0.140)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)					
Private Credit	0.007	0.026*	0.027*	0.041***	−0.163***	−0.134***	−0.141***	0.011	−0.226***	−0.443***	0.244***	1.000			
	(0.533)	(0.018)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.331)	(0.000)	(0.000)	(0.000)				
Corruption	0.014	0.035**	0.072***	0.087***	−0.065***	−0.028**	−0.085***	−0.022	0.090***	−0.118***	0.327***	0.182***	1.000		
	(0.173)	(0.002)	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.051)	(0.000)	(0.000)	(0.000)	(0.000)			
Rule of law	−0.002	0.003	0.062***	0.062***	−0.240***	−0.011	−0.073***	0.013	0.085***	−0.124***	0.451***	0.185***	0.820***	1.000	
	(0.815)	(0.773)	(0.000)	(0.000)	(0.000)	(0.293)	(0.000)	(0.254)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Regulatory	0.036***	0.060***	0.044***	0.066***	−0.153***	−0.004	−0.067***	−0.038***	0.163***	−0.088***	0.243***	0.088***	0.813***	0.758***	1.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.674)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
n	12266														

P values in parentheses, *P<0.05, **P<0.01, ***P<0.001

Table 6: Number of positive and/or negative significant coefficients

Coefficients	Size	Tangibility	Profitability	GROWTH
Panel A: Total leverageexpressed in book values « Lev_{BV}»				
Number of (significant) positive coefficients	9 (8)	9 (8)	0	6 (3)
Number of (significant) negative coefficients	2 (1)	2 (1)	11 (11)	4 (3)
Panel B: Long termleverageexpressed in book values« $LTLev_{BV}$»				
Number of (significant) positive coefficients	8 (7)	9 (9)	0	7 (3)
Number of (significant) negative coefficients	3 (0)	2 (1)	11 (9)	4 (3)
Panel C: Total leverageexpressed in market values « Lev_{MV}»				
Number of (significant) positive coefficients	9 (8)	9 (9)	0	1 (1)
Number of (significant) negative coefficients	2 (0)	2 (1)	11 (11)	10 (10)
Panel D: Long termleverageexpressed in market values« $LTLev_{MV}$»				
Number of (significant) positive coefficients	8 (8)	9 (8)	0	1 (1)
Number of (significant) negative coefficients	3 (0)	2 (1)	11 (8)	10 (9)

Table 7: Capital structure determinants: GCC-countries versus non-GCC countries

Variables	Panel A: LevBv		Panel B: LTLevBv		Panel C: LevMv		Panel D: LTLevMv	
	GCC	Non-GCCcountries	GCC	Non-GCCcountries	GCC	Non-GCCcountries	GCC	Non-GCCcountries
SIZE	0.024***	0.014***	0.028***	0.014***	0.017***	0.011***	0.022***	0.012***
	(9.079)	(8.045)	(13.125)	(11.732)	(7.321)	(6.936)	(11.313)	(10.293)
TANG	0.108***	0.029*	0.203***	0.113***	0.092***	0.021	0.186***	0.103***
	(7.233)	(2.303)	(17.123)	(13.354)	(6.913)	(1.791)	(16.892)	(12.990)
PROF	−0.546***	−0.486***	−0.219***	−0.273***	−0.470***	−0.422***	−0.172***	−0.251***
	(−11.518)	(−15.665)	(−5.808)	(−12.980)	(−11.136)	(−14.788)	(−4.917)	(−12.719)
GROWTH	−0.020***	−0.003	−0.021***	0.001	−0.081***	−0.064***	−0.055***	−0.028***
	(−3.630)	(−0.894)	(−4.935)	(0.295)	(−16.563)	(−18.196)	(−13.680)	(−11.468)
GDPgrowth	−0.047	−0.139	−0.006	−0.135	−0.051	−0.175	−0.011	−0.149
	(−0.291)	(−1.050)	(−0.049)	(−1.530)	(−0.356)	(−1.439)	(−0.089)	(−1.806)
Inflation	−0.067	0.050	0.032	0.057	−0.074	0.045	0.014	0.091
	(−0.428)	(0.408)	(0.261)	(0.670)	(−0.533)	(0.401)	(0.118)	(1.143)
MketCap	−0.106	−0.047	−0.027	−0.050**	−0.099	−0.082**	−0.033	−0.069***
	(−1.644)	(−1.661)	(−0.520)	(−2.632)	(−1.731)	(−3.139)	(−0.699)	(−3.904)
Private Credit	0.382*	0.188***	0.276*	0.183***	0.312*	0.202***	0.248*	0.193***
	(2.245)	(4.025)	(2.034)	(5.785)	(2.062)	(4.679)	(1.977)	(6.493)
Rule of law	0.199**	−0.008	0.159**	0.005	0.142*	−0.017	0.137**	0.002
	(2.752)	(−0.255)	(2.765)	(0.275)	(2.201)	(−0.611)	(2.582)	(0.116)
Constant	−0.158	−0.025	−0.302**	−0.152***	0.043	0.076	−0.163	−0.093**
	(−1.103)	(−0.596)	(−2.633)	(−4.827)	(0.338)	(1.945)	(−1.535)	(−3.152)
Observations	1872	4052	1845	3899	1872	4052	1845	3899
R2	0.213	0.143	0.301	0.200	0.353	0.251	0.346	0.253

t statistics in parentheses, *P<0.05, **P<0.01, ***P<0.001

Table 8: Capital structure determinants: Common law versus Civil law

Variables	Panel A: LevBv		Panel B: LTLevBv		Panel C: LevMv		Panel D: LTLevMv	
	Civil	Common	Civil	Common	Civil	Common	Civil	Common
SIZE	0.015***	0.024***	0.014***	0.028***	0.012***	0.017***	0.012***	0.022***
	(8.568)	(8.175)	(12.170)	(12.187)	(7.479)	(6.519)	(10.900)	(10.296)
TANG	0.046***	0.077***	0.116***	0.200***	0.033**	0.073***	0.106***	0.184***
	(3.820)	(4.805)	(13.986)	(15.924)	(3.002)	(5.046)	(13.807)	(15.478)
PROF	−0.480***	−0.570***	−0.274***	−0.194***	−0.418***	−0.491***	−0.251***	−0.153***
	(−15.814)	(−11.393)	(−13.137)	(−4.911)	(−15.061)	(−10.853)	(−13.004)	(−4.087)
	−0.006	−0.013*	−0.002	−0.018***	−0.064***	−0.082***	−0.028***	−0.056***
	(−1.682)	(−2.190)	(−0.603)	(−3.911)	(−18.947)	(−15.263)	(−12.184)	(−12.728)
GROWTH	−0.185	0.007	−0.171*	0.107	−0.232*	−0.102	−0.199**	0.060
	(−1.655)	(0.032)	(−2.257)	(0.661)	(−2.281)	(−0.545)	(−2.836)	(0.387)
Inflation	0.038	−0.020	0.039	0.061	0.029	−0.092	0.049	−0.001
	(0.463)	(−0.113)	(0.691)	(0.446)	(0.395)	(−0.578)	(0.929)	(−0.008)
MketCap	−0.036	−0.184*	−0.038*	−0.022	−0.071**	−0.192*	−0.057***	−0.022
	(−1.384)	(−2.058)	(−2.165)	(−0.315)	(−2.976)	(−2.364)	(−3.508)	(−0.327)
PrivateCredit	0.178***	0.419*	0.171***	0.244	0.195***	0.302	0.183***	0.171
	(4.076)	(1.993)	(5.722)	(1.474)	(4.893)	(1.584)	(6.603)	(1.087)
Rule of law	0.002	0.250**	0.014	0.147*	−0.008	0.198*	0.011	0.116
	(0.059)	(2.721)	(0.749)	(2.035)	(−0.323)	(2.381)	(0.648)	(1.697)
Constant	−0.000	−0.064	−0.147***	−0.352**	0.091*	0.149	−0.085**	−0.191
	(−0.009)	(−0.447)	(−5.250)	(−2.867)	(2.532)	(1.150)	(−3.274)	(−1.645)
Observations	4286	1638	4122	1622	4286	1638	4122	1622
R2	0.145	0.211	0.206	0.311	0.262	0.334	0.262	0.339

Table 9: The Arabian Jasmine Revolution and its effect on capital structure determinants

Variables	Panel A: LevBv		Panel B: LTLevBv		Panel C: LevMv		Panel D: LTLevMV	
	Before	After	Before	After	Before	After	Before	After
SIZE	0.009***	0.020***	0.012***	0.020***	0.007**	0.015***	0.010***	0.016***
	(3.600)	(11.267)	(6.509)	(15.226)	(2.916)	(8.983)	(6.011)	(12.392)
TANG	0.051**	0.054***	0.130***	0.147***	0.032*	0.050***	0.115***	0.137***
	(3.142)	(4.495)	(11.359)	(16.757)	(2.210)	(4.492)	(11.162)	(16.286)
PROF	−0.451***	−0.531***	−0.228***	−0.272***	−0.357***	−0.477***	−0.188***	−0.249***
	(−11.251)	(−15.707)	(−8.087)	(−10.887)	(−10.087)	(−15.237)	(−7.438)	(−10.445)
GROWTH	-0.011*	−0.005	−0.004	−0.005	−0.062***	−0.073***	−0.030***	−0.038***
	(−2.300)	(−1.195)	(−1.244)	(−1.672)	(−14.552)	(−19.141)	(−9.863)	(−13.252)
GDPgrowth	−0.216	0.052	−0.156	0.080	−0.252	−0.000	−0.163	0.097
	(−1.297)	(0.328)	(−1.333)	(0.695)	(−1.713)	(−0.001)	(−1.553)	(0.884)
Inflation	0.109	0.066	0.048	0.052	0.048	0.089	0.018	0.084
	(1.719)	(0.880)	(1.076)	(0.935)	(0.863)	(1.284)	(0.460)	(1.587)
MketCap	−0.082	−0.045	−0.038	−0.018	−0.071	−0.088	−0.031	−0.034
	(−1.466)	(−0.874)	(−0.971)	(−0.486)	(−1.421)	(−1.831)	(−0.865)	(−0.931)
PrivateCredit	0.319*	0.084	0.146	0.087	0.248*	0.124*	0.116	0.121**
	(2.304)	(1.344)	(1.500)	(1.888)	(2.027)	(2.145)	(1.329)	(2.761)
Rule of law	−0.100	−0.030	−0.037	−0.030	−0.133	−0.028	−0.052	−0.029
	(−1.194)	(−0.997)	(−0.620)	(−1.344)	(−1.796)	(−1.017)	(−0.979)	(−1.393)
Constant	0.127	−0.138	−0.047	−0.268***	0.249***	0.006	0.026	−0.182***
	(1.581)	(−1.872)	(−0.829)	(−4.672)	(3.519)	(0.086)	(0.520)	(−3.334)
Observations	2174	3750	2166	3578	2174	3750	2166	3578
R2	0.159	0.155	0.204	0.234	0.289	0.265	0.260	0.273

Figure 1: Evolution of total leverage ratios: GCC countries versus non-GCC countries

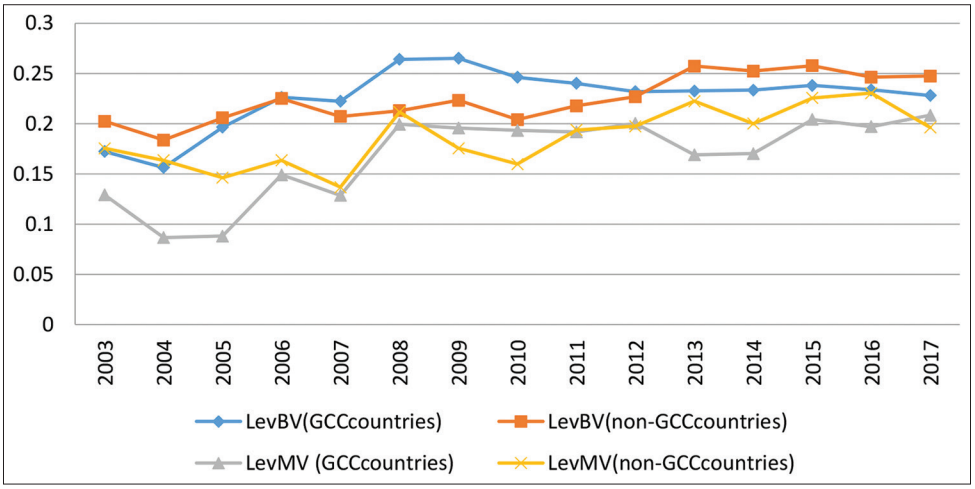


Figure 2: Long-term leverage development: GCC countries versus non-GCC countries

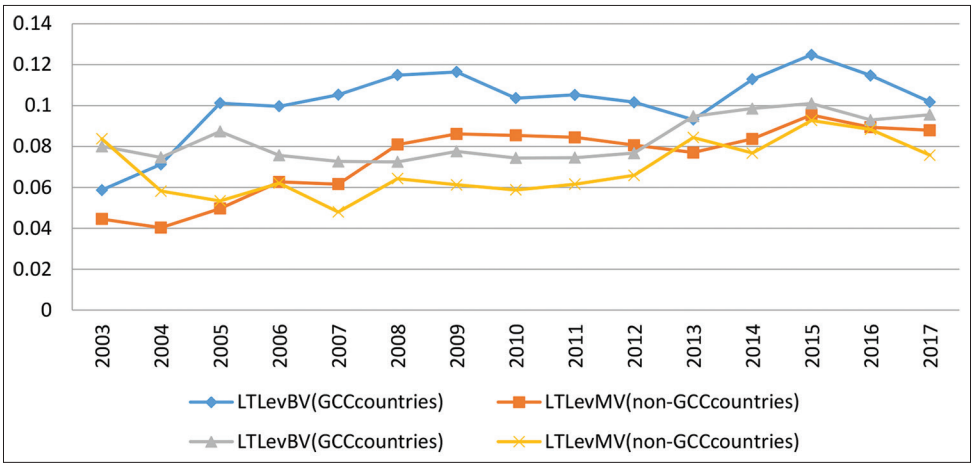


Figure 3: Evolution of total leverage ratios: Common law versus Civil law

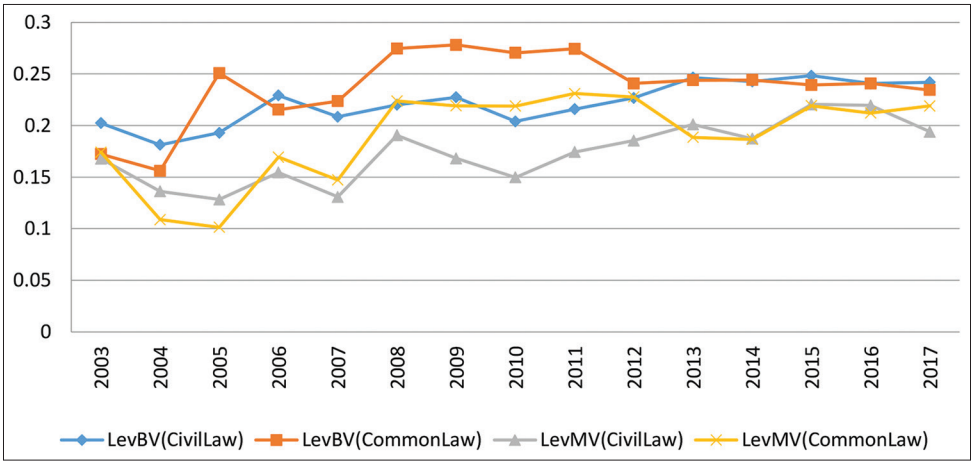
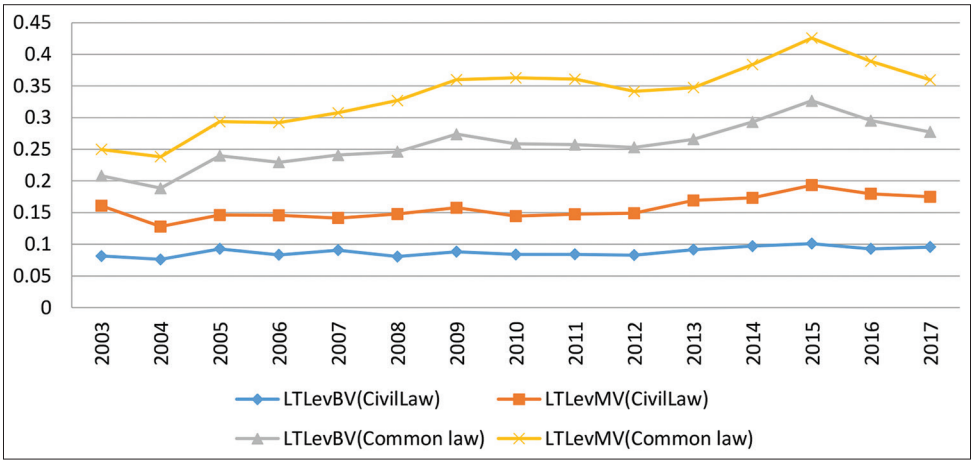


Figure 4: Long-term leverage development: Common law versus Civil law



Source: Survey results

Figure 5: Evolution of firm specific determinants by legal origin

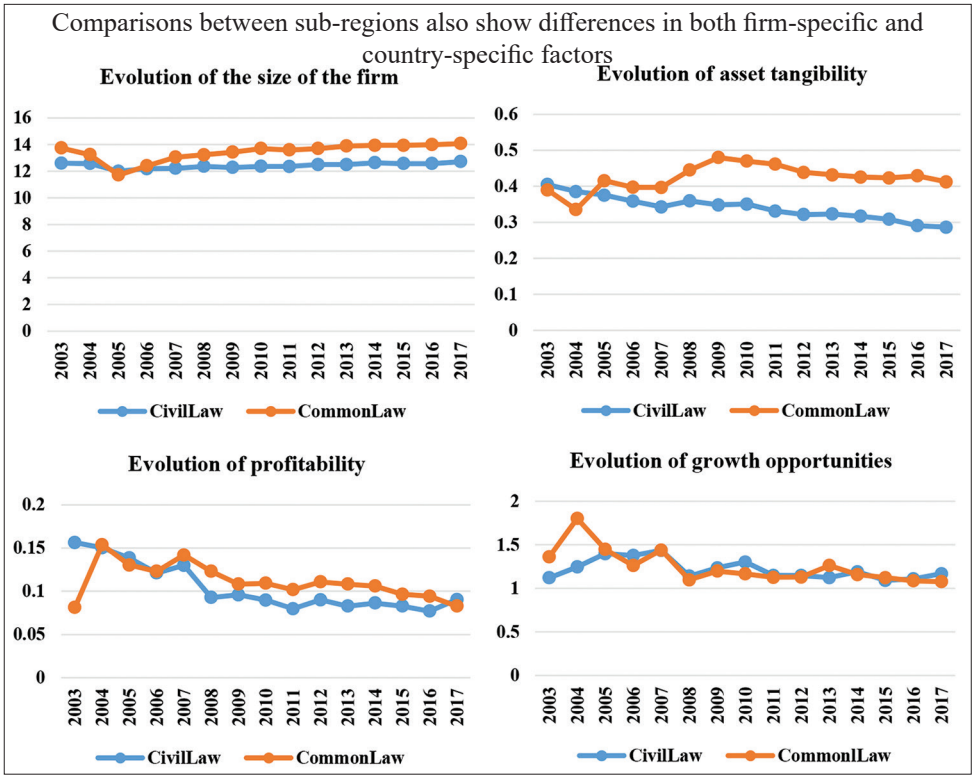
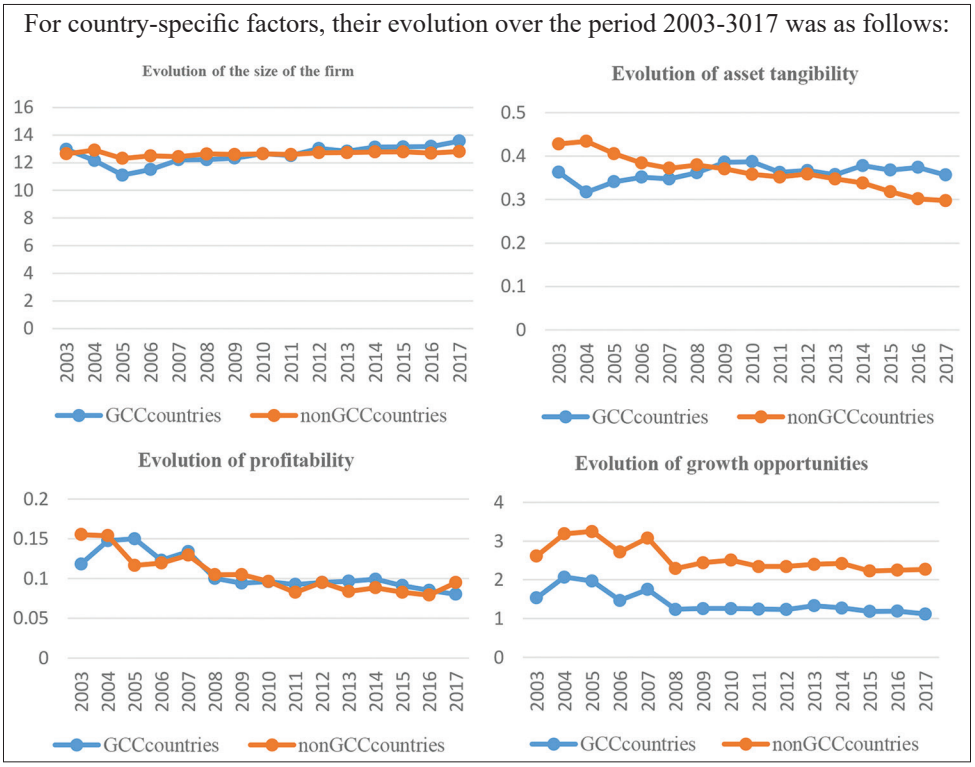


Figure 6: Evolution of firm specific determinants by geographic sub-region



companies in the MENA region, there are some variables that seem to have contrasting effects on leverage; sometimes positive and significant, sometimes negative and significant. Their effects depend not only on the method chosen but also on the debt ratio chosen. These are mainly the legal variable "Rule of law" and the two growth variables: GROWTH (growth of companies) and GDP growth (growth of countries). These last two variables have the expected negative signs with debt ratios expressed in market values.

- The results of the Micro and Micro-Macro-economic (MM) models show a validation of all the hypotheses put forward and developed, and this in accordance with the predictions of the dominant theories of the structure of capital, namely the arbitrage theory and the pecking order theory.
- Overall, the hypotheses are well verified with positive and significant effects of the size of the companies, the tangibility of the assets, the inflation rate and the bank credit granted to the private sector. The effects of the other variables on leverage are rather negative: profitability, growth rates of the company and the country, the size of the stock market and the "rule of law".
- In almost all cases, the results are significant, regardless of the debt ratio used; confirming the robustness of our results. However, we note that the debt ratios expressed in market values give slightly better results. Furthermore, it emerges from all of the results presented that the effects of firm-specific factors are greater and more significant than those that are country-specific. The size and tangibility of assets positively influence corporate debt, while growth opportunities and profitability have negative effects.
- With regard to macroeconomic and institutional factors, and with the exception of the two financial development factors (Market Capitalization/GDP and Private Credit/GDP), the other economic factors (GDP growth and inflation) and legal factors (Rule of law) are less significant. The macroeconomic and institutional factors that positively influence the financial choices of companies in the MENA region are: inflation, private credit and "Rule of law". For the other factors, negative effects are observed: GDP growth and market capitalization/GDP.

Let's admit that testing the models on all the countries in the region does not allow us to know whether the capital structure differs from one country to another. We assume, in fact, that the coefficients of the factors likely to explain the financial choices of companies are the same for all the countries of the region.

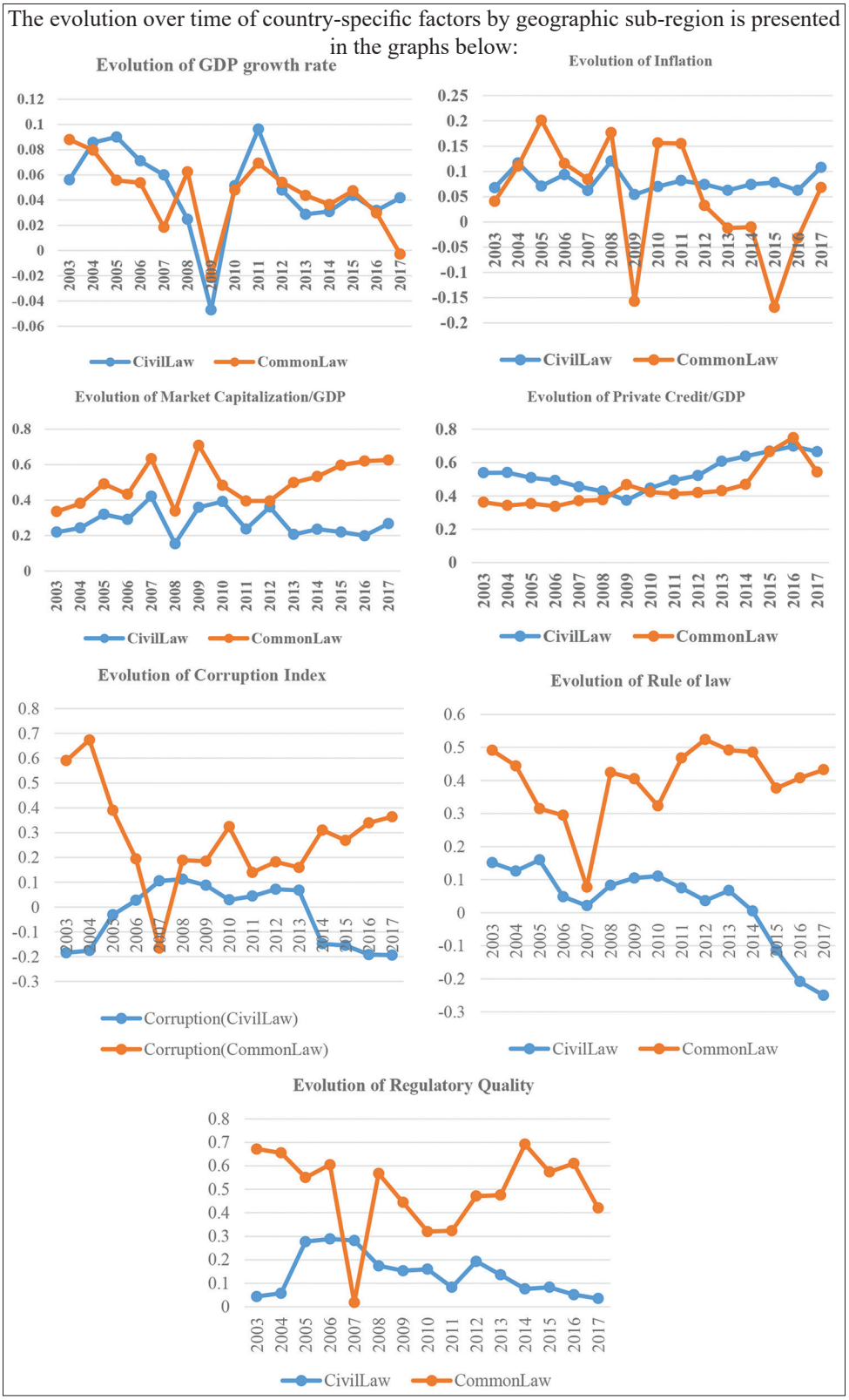
In the next Table 6 and following Öztekin (2015), Alves and Ferreira (2011), Cheng and Shiu (2007), we present a summary of the results obtained from the micro-economic model tested by country[22] in which only company-specific variables are retained[23].

This table shows that the least sensitive factor to the choice of debt ratio is profitability. Hereafter, we cite the two other traditional factors of capital structure: the tangibility of assets and the size of the company. On the other hand, growth opportunities show contrasting effects on leverage, which are less significant when the latter is expressed in book values. Expressed in market values, leverage is negatively correlated with growth opportunities; which is consistent with the predictions of arbitrage theory.

22 The results by country are presented in the appendix.

23 We retain Ordinary Least Squares as the estimation method. We have just seen that the results are not sensitive to the choice of the econometric method and that the explanatory power (R2) is, nevertheless, higher when the model is estimated by the method of ordinary least squares (OLS) with dummy variables specific to each country, each industry and each year.

Figure 7: Evolution of country-specific factors by legal origin

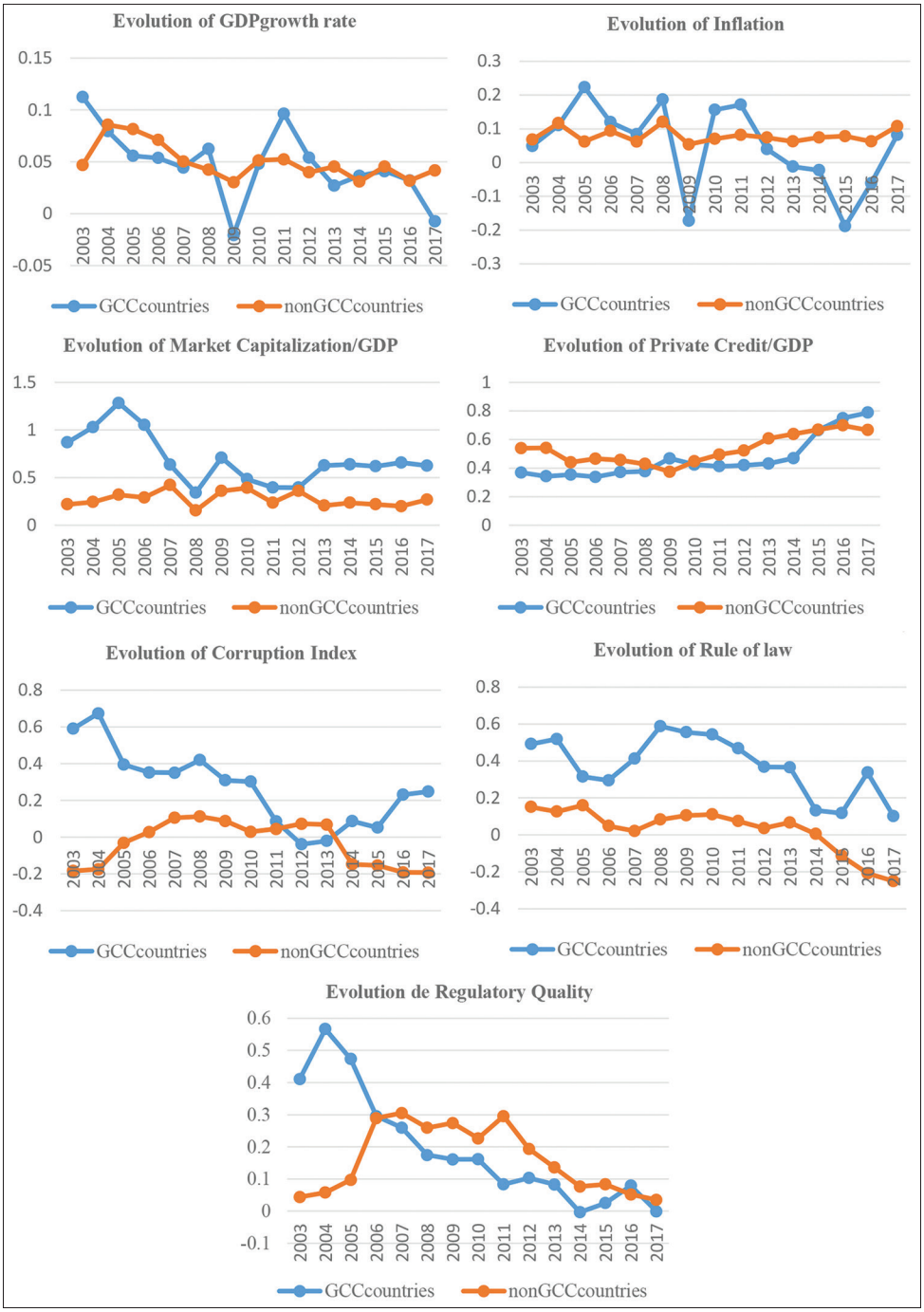


Other comparisons reveal differences between geographic sub-regions and between common law and civil law countries (Table 7). These comparisons do not concern only company-specific factors but also country-specific factors.

The differences between sub-regions reveal, as shown in the table below, show that:

The most determining factors of the capital structure are the factors specific to the companies, also called traditional factors and which are the size, the tangibility of the assets and the opportunities for growth. These factors better explain corporate financing decisions in the Gulf region than in other MENA regions. In this region, the positive effects of asset size and tangibility are higher. The same

Figure 8: Evolution of country specific determinants by geographic sub-region



is true of the negative effect of growth opportunities. The only exception concerns the profitability variable where it turns out that it exerts a less significant effect on the financing choices of companies in the Gulf countries than in the other countries, and this when the debt ratio is calculated from total debt (Panel B and Panel D).

Of all the country-specific factors, only credit granted to the private sector has the same positive and significant effect both in the Gulf countries and in the other countries of the region, regardless of the ratio of chosen indebtedness; this effect is greater in the Gulf countries. The negative effect of stock market capitalization relative to GDP, the second determinant of financial development and which reflects the size of the stock market, is also significant in non-GCC countries. It is not significant with the total debt expressed in book values and in the Gulf countries, regardless of the debt ratio used. On the other hand, in the Gulf countries, it turns out that the legal framework, represented by the "Rule of law" factor, exerts a positive and significant effect on corporate financing decisions. This factor is of no importance for other countries in the region. The same applies to other economic determinants, GDP growth rate and inflation rate. They have no significant effect on leverage, either in the Gulf countries or in the other countries of the region.

Overall, corporate financing choices between equity and debt seem to be better explained in GCC countries than in other MENA countries.

Comparisons between common law and civil law countries (Table 8) similarly show differences in corporate financing decisions in the MENA region. Here again, we must admit the superiority of the results obtained in Common Law countries, regardless of the debt ratio used.

The main results are:

- Company-specific factors have larger effects in common law countries than in civil law countries and with ratios expressed in market values rather than with ratios expressed in book values. One exception should be noted: profitability plays a more important role in civil law countries than in common law countries, when indebtedness is calculated on the basis of long-term debt.
- Of all the economic, financial and legal factors, no factor always exerts a significant effect on indebtedness, regardless of the ratio chosen. However, it should be noted that negative and significant effects are observed: GDP growth rate and stock market capitalization relative to GDP, sometimes in common law countries, sometimes in civil law countries. The same is true of the positive effect of private credit in relation to GDP and of the "Rule of law."

3.3.1. Robustness test

The most recent studies carried out on the determinants of the structure of capital in companies in the MENA countries are less extensive with regard to the effects of the Jasmine Revolution on the financing decisions of companies in this region. Having started in January 2011 in Tunisia, the majority of countries in this region have nevertheless been deeply affected by this revolution. The predominant idea in this part is to test the effects of the Arabian Jasmine Revolution on the determinants of capital structure. Our study covers the period 2003-2017; a first sub-period (2003-2010) and a second sub-period (2011-2017).

The results shown in the table above (Table 9) show that after the revolution, debt-equity financing decisions depend more on firm-specific factors than on country-specific factors, regardless of the debt ratio chosen, whether total or long-term. Expressed in book or market values. These factors are the size, the tangibility of the assets as well as the profitability. As for the other factors external to companies, they play a more or less weak role in determining the financial choices of companies; their effects are sometimes contrasting and change with the debt ratio used.

Overall, these factors contribute to create larger significant pre-revolution effects when debt ratios are calculated from total debt. When debt ratios are calculated from long-term debt, these effects become higher after the revolution. Therefore, the results depend on the choice of the debt ratio, and more specifically on the maturity of the debt (total debt versus long-term debt).

4. CONCLUSION

This study offers comparisons between the determinants of the capital structure of companies in different countries of the MENA region but also between Gulf Cooperation Council (GCC) companies (Khaki and Akin, 2020; Obay, 2018; Sbeiti, 2010) and companies non-GCC countries and between civil law countries and common law countries (Farooq, 2015; La Porta et al., 1997). It is conducted on a final sample composed of 1101non-financial listed companies belonging to different sectors of activity in 11 countries of the MENA region. The study period spans from 2003 to 2017.

In recent years, a wide-ranging debate has in fact focused on the countries of this region as well as on the effects of the latest economic, financial and institutional changes that have affected them to different degrees; the Arab "Spring" or Arab Revolutions of 2011 is a very good example.

This study on the determinants of capital structure is not limited to only firm-specific factors to explain financing decisions in the MENA region. A range of economic, financial and legal indicators are defined and used to improve the debate on the determinants of capital structure in this region.

The results obtained using classical estimation methods, as a whole, support the predictions of the two predominant theories of capital structure; namely Arbitrage Theory and Hierarchical Funding Theory. Positive and significant effects of company size and asset tangibility are identified. Negative and also significant effects of profitability are observed. The effects of growth opportunities on the capital structure are mixed, sometimes positive sometimes negative, and depend on the choice of the debt ratio (expressed in book values or in market values). The results also show that private credit and "rule of law" have such positive effects on indebtedness (i.e. the majority of comparisons) while the size of the stock market, calculated from the stock market capitalization ratio divided by the Gross Domestic Product (GDP) (Levine and Zervos, 1996), has the opposite effect. Of all the factors used in this study, both at the micro and at the macro-economic scale, the tangibility of assets and the profitability of companies seem to play the most important role in determining the financial choices of companies in the MENA region.

However, differences are observed in the importance of these effects on the financial choices of companies, both between countries in the same region and between countries in different sub-regions and/or with different legal systems. They are also remarkable when it comes to comparing the effects of all of these factors over two different periods: before and after the "Arab revolutions" of 2011. It turns out, in fact, that, even if the effects are of the same sign, they are not of the same magnitude and/or the same significance.

The debate should still be focused on the choice of the debt ratio to be used for companies in the countries of the MENA region:

- Should debt ratios expressed in book values or in market values be used?
- Should we limit ourselves to total debt or consider total debt? (Obay, 2018).

Identifying other possible factors that may further explain firm financing decisions in the MENA region is likely to improve the results of this study. Dalwai and Sewpersadh (2021) propose, as an example, the efficiency of investment in intellectual capital and

institutional governance as determinants of capital structure in the two MENA sub-regions: GCC and non -GCC regions. Farooq (2015) studies the effect of concentration of ownership structure on the capital structure of firms in the MENA region.

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