Industry Level and Country Level Determinants of Capital Structure: Evidence from Egypt

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Abstract

The purpose of this paper is to find out both the industry level and country level determinants of capital structure of Egyptian publicly traded non-financial firms. The study investigates the industry level and country level determinants of capital structure of Egyptian companies utilising data from the financial statements of 58 listed companies over the time period from 2003 to 2016. The study investigates whether the capital structure decisions in Egypt are closer to the assumptions of Trade-Off Theory, Pecking Order Theory or the Agency Cost Theory. The empirical evidence obtained allows us to conclude that Trade-Off and Pecking Order Theories are the most theories to describe the financial behaviour of the Egyptian companies' choice of capital structure whereas there was little evidence to support the agency cost theory.

Keywords: Egypt, Capital Structure, Trade-off theory, Pecking Order Theory, country level, Industry Level, Emerging Markets.

Jel Classification:

1. Introduction

In this paper we investigate the industry level and country level determinants of capital structure in Egypt as one of the emerging markets during the period 2003:2016. Capital structure is very vital decision as the way a firm is financed is very relevant for investors, directors, stakeholders and all parties interested in the firm; financing decisions have a direct impact on the firm's value. The literature on corporate capital structure and its determinant is very famous with its three theories; its foundation goes back to the work of Modigliani and Miller (1958; 1963). It started Modigliani and Miller (1958) stating that in perfect markets, financing decisions using loans or equity funding are not relevant to the increase of the firm's market value. A series of theoretical and empirical investigations have been developed from this proposition, and resulting in a very well-grounded theory in financing a firm's assets.

The main three theories explaining the capital structure are: Trade-off Theory, Pecking Order Theory (Information Asymmetry), and Agency Cost Theory (Free Cash Flow). The Trade-off Theory

focuses on the trade-off between debt tax shields or tax saving and bankruptcy costs; based on which the existence of an optimal capital structure is assumed. On the other hand, the Pecking Order Theory assumes hierarchal financing decisions first the firms use internal sources of financing, and then seeks external financing from debt if the internal sources are less than the investments requirements, and at last use the equity as the last source. The Free Cash Flow Theory proposes that, debt represents a fixed obligation that must be met by the firm as the debt interest and principals have to be paid. It's assumed that these obligations prevent managers from over consuming the firm's financial resources, as it take over the firm's free cash flow if exists.

Traditionally, majority of researches focused on only the firm's attributes while analyzing the determinants of corporate capital structure such as Miller (1977), Qureshi (2009), Sheikh and Wang (2011), and Titman and Wessels (1988). Recently, researchers classified the determinants of capital structure into three attributes; firms' attribute, industry's attributes and country's attributes while explaining the corporate capital structure (Jong et al., 2008).

As developed countries have better economic, legal, and financial systems, they provide companies operating within a better, easier and cheaper access to external finances sources. Therefore, it is essential to study the capital structure in Egypt in order to examine whether there are differences or similarities between capital structure decisions in Egypt as an emerging market and the capital structure decisions of both developed and developing countries.

The importance of this study is that, financing decisions have a direct influence on the firm's value therefore; the way a firm is financed is very relevant for investors, directors, stakeholders and all parties interested in the firm. Also, there are a few researches and studies that have been conducted on capital structure in developing countries, thus this research will enrich the subject. The study tries to improve understanding about the capital structure behaviour of the firms in developing countries by taking Egypt as a sample case. For this purpose, we developed a panel data set (2003-2016) of 58 listed non-financial firms resulting in 812 observations.

Confirming earlier studies in emerging countries specially Middle East countries (Omet and Mashharawe, 2004; Qureshi, 2009; Sheikh and Qureshi, 2014; Abdulla, 2017; Kumar, Colombage & Rao, 2017), we find that these firms prefer retained earnings to finance their projects and debt is easily available for experienced firms preferring the use of short-term debt over long-term debt. Further, these firms follow a mix of two basic capital structure theories, i.e. trade-off theory and pecking order theory while little evidence support the agency cost theory. Moreover, this study also contributes to the literature in general and specifically in Egyptian context.

2. Literature Review and Hypotheses Development

Starting with the famous paper of Modigliani and Miller (1958); assuming that capital markets are perfect where insiders and outsiders have free access to information, no transaction cost, bankruptcy cost and no taxation exist; equity and debt choice become irrelevant and internal and external funds can be perfectly substituted. They brought up the direction that such theories followed on revealing under what conditions capital structure is irrelevant. They also provided evidence that in perfect capital markets, the choice between debt and equity financing has no significant effect on the firms' value. Thus, financial managers should not be concerned about the proportion of debt and equity; as any combination of debt and equity is very similar to another.

Several studies have examined the empirical validity of the theories of capital structure, there's no universal well accepted theory within the developed economies context. Three main conflicting theories have been developed named: trade-off, pecking order and agency cost. This is may be due the fact that the orientation of each theory is different. Therefore, there is no universal theory of debt-equity choice and no reason to expect one (Myers, 2001). These theories of capital structure have been explained by three main approaches: Trade-off Theory, Pecking Order Theory, and Agency Cost Theory (Free Cash Flow Theory); they are famous as traditional theories of capital structure. Each of these theories offers different explanation of corporate financing than the other two theories.

The trade-off theory (Modigliani and Miller, 1963, Schwarz and Aronson, 1967, and Gupta, 1969) is one of the most three influential theory of capital structure, it focuses on the trade-off between debt tax shields or tax saving and bankruptcy costs; based on which the existence of an optimal capital structure is assumed. It emerged from ceasing the assumption of absence of bankruptcy costs in the MM theory by some studies, stating that when the net tax advantage of debt financing balances off leverage related costs such as bankruptcy, optimal capital structure exists. The pecking order theory introduced by Donaldson 1961 is based on two main prominent assumptions. First the managers are better informed about their own firm's prospects than outside investors. Second, managers acts in the best interest of existing shareholders. So, the pecking order theory assumes hierarchal financing decisions (Myers, 1984); first the firms use internal sources of financing, and then seek external financing from debt if the internal sources are less than the investments requirements, and at last use the equity as the last source. On the other hands, the Agency Cost Theory is concerning the relationship between the principal (shareholders) and the agent of the principal (managers); it states the relationship and conflicts between the shareholders and the firm's manager that arise from financing with risky debt; an optimal capital structure is determined by minimising costs arising from such conflicts. This theory (Jensen and Meckling, 1976) proposes that, debt represents a fixed obligation that must be met by the firm as the debt interest and principals have to be paid. It's assumed that these obligations prevent managers from over consuming the firm's financial resources, as it take over the firm's free cash flow if exists.

Recent Debates on capital structure have included industry effect as a determinant of capital structure (Jordan et al., 1998; Hall et al., 2000). Bolton (1971) argues that industry classifications are more likely to affect the capital structure; it is also argued that industry effect is associated with an expected linkage between the existence of tangible assets and levels of debt. This suggests that sectors with strong tangible asset holdings are expected to have higher average debt levels than is evident in sectors associated with intangible or risky assets. However, there has been some controversy and debate concerning the association between industry and capital structure ranging from comments suggesting differences across industries but consistency within industries to claims that industry is not as important as firm specific aspects (Gibson, 2002).

Hams and Raviv (1991) state that it's essential that empirical studies concentrate on testing particular models or classes of models in an attempt to discover the most important determinants of capital structure in given environments. As majority of capital structure theories are based on data from developed countries mainly from the United States, while there are few studies that provide evidence from developing countries. It is essential to identify the factors affecting those decisions since capital structure is very crucial to back up a firm's financial and operating decisions. In order to identify the factors that affect the capital structure decisions, those factors are categorized into three main groups based on the implicit effects of these variables; these categories are firm specific factors, industry specific factors, and country specific factors. This paper focuses mainly on both the industry specific and country specific determinants of capital structure; because the financial structure of a company also depends on the industry in which it operates; As industry effects also play an important role in making capital structure decisions in small and medium-sized firms (Abor, 2007), the type of industry is an influential aspect of the determinants of capital structure of the firm.

Also, Harkbarth et al. (2006) have noted that, despite the development of literature on the determinants of capital structure, little attention has been paid to effects of macroeconomic conditions on the credit risk and financing decisions of firms. Moreover, literature of the relationship between macroeconomic conditions and capital structure decisions in the other well-developed have been analysed through the credit channel (Levine, 2004). According to Booth et al. (2001), the capital structure is a function of economic development that includes mainly the economic growth rate, the development of capital markets, inflation, Gross Domestic Product (GDP) growth rate, as well as the taxation system. Many studies reveal diverse results, thereby providing mixed yet confusing evidence about capital structure decisions.

According to Booth et al. (2001), the capital structure is a function of economic development that includes mainly the economic growth rate, the development of capital markets, inflation, Gross Domestic Product (GDP) growth rate, as well as the taxation system. The concept of capital structure studies have been studied first in the USA and the UK which are countries with a very advanced capital markets. Then, it was gradually investigated on other developed countries, and finally has been applied to a wide variety on both developed and developing countries across the world. However, studies are still being more intensely conducted in developed economies as compared to those in emerging economies.

Recently, there is a shift in the work done on this topic toward emerging economies, with a view to exploring the caveats between the financial practices of developed and developing nations. Due to the institutional and cultural differences, corporate financing decisions are not similar between developed and developing countries (Booth et al., 2001; Chen, 2004; Foster and Young, 2013).

After examining the traditional determinants of capital structure the empirical work has shown that a number of macro-economic factors (Cook and Tang, 2010; Chipeta and Mbululu, 2013), as well as country-specific factors (De Jong et al., 2008) are very influential in choosing the level of leverage of a firm. Therefore, these factors should be included in capital structure studies as they play a significant role in explaining variations in leverage (De Jong et al., 2008). The classifications based on level of economic development helps in appreciating the fact that economic development has initiated studies on capital structure. With regard to macroeconomic variables, we focus on the most common variables GDP growth rate, inflation, and state ownership.

Industry-specific factors include several factors, while the most common factors that have been used are: average industry leverage, average industry profitability, and industry classification, while the country-specific factors included in this research are: GDP growth rate, inflation rate and state ownership.

Egypt is one of the most diversified economies in the Middle East, and one of the top haven for emerging market, this motivates the investigation of capital structure to examine the effect of firm level determinants of capital structure. Conforming to the results of Eldomiaty (2007) in his study in Egypt, he shows the relevance of both the trade-off and pecking-order theories. These results are opposed with Omet and Mashharawe"s (2004) study, who investigate the determinants of capital structure in Saudi Arabia, Jordan, Kuwait and Oman for the period 1996-2001. They indicate the relevance of the pecking-order model even in Middle East countries, such as Jordan, which had the lowest level of long-term debt among the other Gulf countries, implying that the trade-off theory does not hold.

To sum up, few papers have investigated the capital structure of Egyptian firms from different angles; what was overlooked and what our paper aims to accomplish is a comprehensive view of the whole picture of capital structure of Egypt non-financial firms.

The development of the hypotheses was based on two arguments. First, we expect to find similar results as studies conducted in Middle East countries, which have similar institutional characteristics. Second, taking into considerations the results of research conducted by Eldomiaty, (2007); we investigate the three theories although we predict the dominance of both the trade-off theory and the pecking order theory.

For the industry leverage; Mackay and Phillips (2003) believe that industry leverage is important since firms in the same industry are exposed to the same technology and therefore are likely to have a similar optimal financial structure; also Castanias (1983) argues that firms strive to maintain leverage close to the average leverage level of other firms in the same industry. With respect to the trade-off theory, it predicts that the higher the industry leverage should result in more leverage for firms operating within this industry, considering that firms are regulated with stable cash flows and lower expected costs of financial distress (Frank et al, 2009). Therefore, trade-off theory proposes a positive relationship between industry leverage and firm leverage. On the other hands, the pecking order theory propose that the industry leverage should only matter to the extent that it serves as a proxy for the firm's financing deficit; which a rather indirect link.

H1: There is a significant relationship between leverage and industry leverage.

The trade-off theory predicts that higher industry profitability should result in less debt, under the same previous assumption discussed in industry leverage of regulated firms with stable cash flows and lower expected costs of financial distress. On the other hands, there's now proposed direct link based on the pecking order theory (frank et al, 2009). To sum up, the trade-off theory proposes an inverse relationship between industry profitability and leverage of firms operating within the industry.

H2: There is a negative relationship between leverage and industry profitability.
With regards to industry classification, some capital structure scientists have examined the implications of industry classification for the study of capital structure. Shuetrim et al. (1993) argue that industry classifications are strongly correlated with cash flow volatility; and firms in the same industry often face common product and/or factor markets and are likely to have similar capital requirements and lumpiness of investment opportunities. Baskin (1989) reveals that firms operating in the higher growth industries tend to be more financially leveraged than those operating in lower growth industries. It is also possible that corporate managers may prefer to take the cause of conformity and as such adopt the follow the leader approach, even in major decisions such as financing and investment (Morck, 2008; Hirshleifer et al., 2001; Filbeck et al., 1996). Titman and Wessels (1988) report a negative relationship between debt ratios and the industry effects on firm's capital structure that control for and refer to the firms that produce specialized products (such as machines and equipment). Contrary to Titman's (1984) prediction, Graham and Harvey (2001) find that high-tech firms, which are assumed to produce specialized products, are less likely than other firms to limit debt for not giving their customers and suppliers an impression that the firm may go out of business. Previous studies show that the industry classification and the type of industry have an effect mostly on the low-risk firms (Eldomiaty, 2007).

H3: There is a negative relationship between leverage and industry classification.
For GDP growth rate, Norvaisiene and Stankeviciene (2007) have noted that existing theoretical models cannot fully explain the selection of capital structure of every company. Moreover, existing theories and evidences indicate that better developed financial systems or growth in economy ease external financing constraints of firms (Levine, 2004). Frank and Goyal (2003) have concluded that roughly 30 per cent of differences in the capital structure inside the country could be explained by internal determinants. This presumes that there are other factors affecting capital structure decisions not accounted for by internal determinants.

H4: There is a negative relationship between leverage and GDP growth rate.
Inflation rate is one of the main factors that affect the economic development (Booth et al., 2001). In Baltic countries and other developed countries; Norvaisiene (2012) and Colombage (2007) found that, inflation rate found that have an indirect influence on firm-specific factors, and they also help in explaining how a firm's capital structure is designed. According to Frank and Goyal, (2009), when inflation is expected to be high, firms tend to have high leverage. Taggart (1985) suggests that the real value of tax deductions on debt is higher when inflation is expected to be high. Thus, the trade-off theory predicts leverage to be positively related to expected inflation. Moreover, Myers et al. (1977) argue that if firms are not certain about future inflation rates, they tend to rely on short-term interest rate debt. According to Bokpin (2009), firms will resort to internal sources in periods of high inflationary pressures as this will increase the cost of obtaining external sources whether long-term or short term debt.

H5: There is a positive relationship between leverage and inflation rate.
State ownership is one of the factors that help in relaxing agency costs and influencing capital structure, Leland and Pyle (1977), and Jensen (1986) are of the first scholars to address such issue. There are also some empirical evidences on the relationship between state ownership and firm's capital structure. Chaganti and Damanpour (1991), Jensen et al. (1992), Grier and Zychowicz (1994), Moh'd

et al. (1998) and Brailsford et al. (2002) are among those who recognize such a relationship between capital structure and firm's ownership structure. This relationship has been ignored in some of the empirical studies in the emerging markets. Al-Najjar and Taylor (2008) examined such relationship in their research and they have mentioned that the relationship between capital structure and ownership structure have been totally neglected in researches in Jordan.

Agency cost theory suggests that an optimal capital structure and ownership structure can minimise agency costs (Jensen and Meckling, 1976; Jensen, 1986). Thus, based on the agency cost theory, there is a negative relationship between State ownership and leverage. Chaganti and Damanpour (1991) and Grier and Zychowicz (1994) both find an inverse relationship between the level of state ownership and debt. However, contrary findings are presented by Casey and Anderson (1997) who examine capital structure in the petroleum industry and conclude that ''higher levels of state ownership are significantly related to higher levels of debt''. This results matches the fact that the trade-off theory assumptions that there is a positive relation between state ownership and the leverage level. In this study, state ownership is measured by the state ownership (defined as the percentage of state ownership in a firm).

Results from Leland and Pyle (1977), Berger et al. (1997) and Chen and Steiner (1999) show that state ownership and leverage are positively related. In addition, Tong and Ning (2004) claim that firms with high leverage ratios provide a negative signal that the firm faces a future of financial difficulties. The results of Al-Najjar and Taylor (2008) indicate that there is strong evidence of a negative significant relationship between leverage of the firm and the state ownership. This means that state ownership have a significant effects as regards monitoring the firm's managers and hence reducing the agency problems. Chaganti and Damanpour (1991), Grier and Zychowicz (1994), Bathala et al. (1994) and Crutchley and Jensen (1996) found the same result; these results are consistent with agency theory. However, Tong and Ning (2004) find only limited evidence that state ownership is negatively related to capital structure in the USA; proposing that the existence of the positive relationship between the state ownership level and a firm's leverage.

H6: There is a significant relationship between leverage and state ownership.

3. Description of Data and Methodology
3.1 Data

The study uses annual data of non-financial listed companies in the Egyptian Stock Exchange during the period 2003:2016 through 3 stages; first we take the whole 14 years, then we measure from 2003 till 2008 and from 2009 till 2016 as a way to investigate the effect of the financial crisis as well as the effect of the revolution and the subsequent political and economic crisis in Egypt. We exclude the financial companies and the banking sector because of their unique capital structure and rigid legal requirements for their financing choices (Gaud et al., 2005) in line with most previous literature. The Egyptian Stock Exchange has 251 listed companies in 2016 representing 17 different sectors. The majority of companies are in the food and beverage and the industrial goods and services sectors. Our final sample consists of 58 Egyptian companies was obtained for a period of 14 years resulting in 812 observations and covering 11 industries, the Table I summarises the classification of our firms across the various industries.

The main source for the data used is the Egyptian Stock Exchange (EGX) and the Egyptian Financial Regulatory Authority (EFRA) as they contain the authorized information for listed companies as well as the different Industries. For the Industry-Specific data, we use mainly Egyptian Stock Exchange (EGX) and the Egyptian Financial Regulatory Authority (EFRA) as our main databases as they contain the authorized information for listed companies as well as the different Industries. While macro-economic data comes from the Central Bank of Egypt (CBE) and the World Bank where we found data are identical on both.

Table I: Classification of the Used Sample of Listed Companies

Sector	No. of Firms in the Sector
Basic Resources	2
Chemicals	3
Oil and Gas	2
Food and Beverage	16
Healthcare	8
Media	1
Industrial Goods and Services	12
Personal and Household products	8
Technology	1
Travel and Leisure	1
Real Estate and Housing	4
Total	**58**
Note: This table presents the industrial classification of the firms listed in Egypt Stock Exchange and included in the sample	

The research is separated into two models mainly due to investigate the effect of each group of the independent variable separately; in order to avoid the indirect effect problem that might exist among, the industry-specific and the country-specific variables, a separate model was constructed for each set of variables in this research.

3.2 Empirical Models

The first model will be to investigate the impact of industry level determinants of capital structure is as follow:

$$L_{i.t} = \beta_{0\,i,t} + \beta_1 ILEV_{\cdot i,t} + \beta_2 IPROF_{\cdot i,t} + \beta_3 ICLASS_{\cdot i,t} + \varepsilon_{i.t}$$

While the second model will be to investigate the impact of industry level determinants of capital structure is as follow:

$$L_{i.t} = \beta_{0\,i,t} + \beta_1 GDPGRO_{\cdot i,t} + \beta_2 CINF_{\cdot i,t} + \beta_3 STATE_{i,t} + \varepsilon_{i.t}$$

Where $L_{i.t}$: is a measure of leverage taken as TD/TA (Rajan and Zingales, 1995; Titman and Wessel, 1988); and SD/TA (Chung, 1993; Booth, Aivazian & Demirguc-Kunt 2001; Shumway, 2001; Fama and French, 2002; Colombo, 2001; Bevan and Danbolt 2002) for firm (i) at time (t); $\varepsilon_{i.t}$ is the random error.

In this research, three key industry level determinants of capital structure are used as in previous studies: average industry leverage, average industry profitability, and industry classification; and another three key country level determinants of capital structure: GDP growth rate, inflation rate and state ownership. The measure of each of these variables are summarized in Table II which summarises the industry level and country level capital structure determinants examined in this study, the ratio or proxy for each determinant.

Table II: Measures of the industry Level and Country Level Determinants of Capital Structure

Category	Independent Variable	Measure	Empirical Evidence / Support
Industry-Specific Factors	Industry Leverage ILEV.	Change in Average Industry Leverage ΔIDRAVG	Modigliani and Miller (1963); Gupta (1969); Schmidt (1976); Schwarz and Aronson (1967); White and Turnbull (1974); Warner (1977); Smith and Warner (1979); Ferri and Jones (1979); DeAngelo and Masulis (1980); Marsh (1982); Castanias (1983); Bradley et al. (1984); Auerbach (1985); Moore (1986)
	Industry Profitability IPROF.	Change in Average Industry Profitability ΔIEBTTAAVG	Taggart (1986); Abor (2007); Frank and Goyal (2009); Fan et al. (2012); Serrasqueiro (2011)
	Industry Classification ICLASS.	The Industry Classification IC_t	Scott, (1972); Scott and Martin (1975); Schmidt (1976); Ferri and Jones (1979); Titman and Wessels, (1988); Graham and Harvey (2001).
Country-Specific Factors	GDP Growth Rate GDP GRO.	Annual per Capita GDP Growth Rate ΔGDP	Bokpin (2009); Amidu (2007); Colombage (2007); Arvanitis et al. (2012)
	Inflation Rate CINF.	Annual Inflation Rate In_ft	Frank and Goyal (2009); Bokpin (2009); Norvaisiene (2012) and Colombage (2007); Rajan and Zingales (1995); Frank and Goyal, (2009)
	State Ownership STATE.	State Ownership SOP_t	Al-Ajmi et al. (2009); Casey et al. (2006), Shliefer and Vishny (1986); Demsetz (1983); Brickley et al. (1988) and McIntyre and Rao (1993)

4. Results

In this section, we first present our descriptive statistics and correlation matrix; then we discuss our main results; and then in the following two sub-sections, we compare them with the results found in Middle East and emerging countries.

4.1 Descriptive Results

Table III presents the descriptive statistics over the three ranges of time; from these results, we can conclude the following:

- For the period 2003:2016; it can be seen that Egyptian companies have an average total debt to total assets of 45%, short-term debt to total assets 37%, long-term debt to total assets of only 7%, while the average industry profitability is 0.10, and the average industry leverage 0.5. The average inflation rate is 9.8% whereas the average GDP growth rate is 4.9%.
- For the period from 2003:2008; the average industry profitability is still low compared to the average industry leverage; their results are 0.49 for the average industry leverage and 0.09 for the average industry profitability. The average inflation rate declined to be 6.8% whereas the average GDP growth rate increased to be 5.5%.

- For the period 2009:2016; the average industry profitability is 0.10, and the average industry leverage and 0.43. The average inflation rate increased to be 12% whereas the average GDP growth rate declined to be 3%.

Table III: Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Min.	Max	Skewness	Kurtosis
Period 2003:2016							
Total Debt to Total Assets	0.45	0.44	0.27	0.002	1.05	-0.03	-0.45
Long-Term Debt to Total Assets	0.07	0.02	0.16	0.001	0.98	5.65	19.23
Short-Term Debt to Total Assets	0.37	0.35	0.21	0	0.99	0.09	0.84
Industry Leverage	0.5	0.46	0.12	0.09	0.86	0.24	1.02
Industry profitability	0.10	0.08	0.04	0.001	0.21	0.77	1.10
Industry Classification	0.40	0	0.48	0	1	0.52	-1.74
GDP Growth Rate	0.041	0.044	0.023	-0.014	0.072	-0.77	1.29
Inflation Rate	0.098	0.099	0.048	0.032	0.233	1.51	4.30
State Ownership	0.30	0.13	0.27	0	0.96	0.57	-1.06
Period 2003:2008							
Total Debt to Total Assets	0.48	0.48	0.28	0.002	1.003	-0.03	-0.45
Long-Term Debt to Total Assets	0.08	0.02	0.18	.011	0.98	5.99	14.13
Short-Term Debt to Total Assets	0.40	0.39	0.21	0	0.99	-0.02	-0.62
Industry Leverage	0.49	0.48	0.12	0.12	0.86	-0.09	1.67
Industry profitability	0.09	0.07	0.03	0.001	0.17	0.55	0.95
Industry Classification	0.38	0	0.49	0	1	0.52	-1.74
GDP Growth Rate	0.055	0.057	0.018	0.032	0.07	-0.22	-2.53
Inflation Rate	0.068	0.065	0.031	0.032	0.113	0.36	-1.36
State Ownership	0.25	0.1	0.27	0	0.96	0.58	-1.04
For the Period 2009:2016							
Total Debt to Total Assets	0.43	0.39	0.27	0.02	1.05	0.33	-0.82
Long-Term Debt to Total Assets	0.08	0.02	0.15	0.001	0.07	5.18	38.76
Short-Term Debt to Total Assets	0.35	0.33	0.21	0.001	0.84	0.71	0.76
Industry Leverage	0.43	0.40	0.12	0.09	0.83	0.53	1.33
Industry profitability	0.10	0.09	0.04	0.02	0.21	0.85	0.94
Industry Classification	0.38	0	0.49	0	1	0.82	-1.74
GDP Growth Rate	0.030	0.036	0.022	-0.014	0.051	-1.32	1.73
Inflation Rate	0.12	0.11	0.048	0.069	0.233	2.14	5.65
State Ownership	0.25	0.15	0.27	0	0.92	0.57	-1.06

Notes: This table reports the descriptive statistics, i.e. mean, median and standard deviation for our dependent and independent variables; the dependent variable is leverage measured as total debt over total assets and short-term debt over total assets; industry leverage is measured as change in average industry leverage; industry profitability is measured as change in average industry earnings before tax to total assets; state ownership is measured as percentage of public or government ownership.

In this sample, the percentage of capital structure shown in the sample is relatively low around 44.65% for total debt to total assets, 37.12% for the short-term debt to total assets, and 7.02% for long-term debt to total assets. These percentages indicate that the financial managers in Egypt prefer to choose equity over debt as their first source of finance, then short-term loans over long-term ones, and the use of long-term debt comes as the last financing choice. Therefore, our focus will still be on total debt to total assets and short-term debt to total assets only as measures of capital structure.

The results of the descriptive statistics reflect that, over the fourteen-year time period, and after the division of this period into the three mentioned ranges of time, the financing behaviour of the managers in Egypt doesn't seem to change under crisis period from normal conditions. Under the three ranges of time, the financial managers in Egypt prefer the internal source as their first financing option, then the use of external funds preferring the use of short-term debt over the long-term debt.

In the descriptive analysis, it is apparent that few variables show a high level of both skewness and kurtosis. A skewness value of ±1.96 and a kurtosis value of ±2 are required for data to be considered normal (Abdul Rahman & Ali, 2006). The descriptive results show that dependent variables (total debt to total assets and short-term debt to total assets) are normally distributed. On the other hands, almost all of the independent variables are normally distributed. Therefore, the important assumption of normality is not well satisfied. This is, however, expected in such types of studies as this one (Abdul Rahman & Ali, 2006).

Table IV and V report the correlation matrix whereas table VI presents the VIF results using the total debt to total assets a dependent variable and the short-term debt to total assets as a dependent variable respectively. The pairwise correlation seems to be low between the explanatory variables so the possible problem of multicollinearity is eliminated. Leahy (2000) argues that a possible

multicollinearity problem is initiated from a correlation coefficient of 0.8. None of these correlations were significant; since the correlations are lower than 0.70. As recommended by Hair et al. (1995) and Gujarati (2003), 0.70 is considered the threshold at which multicollinearity concerns might be threatening for the regression analysis.

Table IV: Pearson Correlation Coefficients for TD/TA

Variables	TD/TA	ILEV.	IPROF.	IClass.	CInf.	GDP GRO.	STATE
			Period 2003:2016				
TD/TA	1	0.49	-0.11	-0.07	-0.05	0.02	0.12
ILEV.		1	-0.21	-0.22	-0.06	0.09	-0.19
IPROF.			1	0.37	0.11	-0.10	0.06
ICLASS.				1	0.001	0.001	-0.14
CInf.					1	0.35	0.003
GDP GRO.						1	-0.001
STATE							1
			Period 2003:2008				
TD/TA	1	0.49	-0.04	-0.09	-0.09	0.15	0.16
ILEV.		1	-0.07	-0.30	-0.11	-0.23	-0.11
IPROF.			1	0.37	0.17	0.22	-0.02
ICLASS.				1	0	0	-0.16
CInf.					1	0.56	0.01
GDP GRO.						1	0.01
STATE							1
			Period 2009:2016				
TD/TA	1	0.47	-0.11	-0.06	-0.05	0.02	0.08
ILEV.		1	-0.22	-0.16	0.15	0.07	-0.26
IPROF.			1	0.39	-0.07	-0.06	0.11
ICLASS.				1	0.003	0.002	-0.12
CInf.					1	0.71	-0.01
GDP GRO.						1	-0.01
STATE							1

Note: the constant here is total debt to total assets. The table represents the pairwise correlation between the dependent and the independent variables.

Industry-specific factors results showed that industry leverage is related to capital structure measures (both total debt and short-term debt), while industry profitability is negatively related to capital structure measures; and the industry classification is negatively related to capital structure measure. This implies that firms that are operating in industries with higher leverage tend to borrow more, while those operating in more profitable industries tend to borrow more. Finally, with regards to the country-specific factors; the results showed that both the GDP growth and the state ownership variables are related to capital structure measures while the inflation variable is negatively related to the capital structure. This implies that companies with higher percentage of public and governmental ownership tend to use more debt; while the higher level of inflation may restrain companies from using the debt whereas the higher GPD growth rate may induce companies to use more debt.

Table V: Pearson Correlation Coefficients for STD/TA

Variables	STD/TA	ILEV.	IPROF.	IClass.	CInf.	GDP GRO.	STATE
			Period 2003:2016				
STD/TA	1	0.34	-0.12	-0.06	-0.07	0.02	0.23
ILEV.		1	-0.21	-0.22	-0.06	0.09	-0.19
IPROF.			1	0.37	0.11	-0.10	0.06
ICLASS.				1	0.001	0.001	-0.14
CInf.					1	0.35	0.003
GDP GRO.						1	-0.001

STATE						1
Period 2003:2008						
STD/TA	1	0.33	-0.06	-0.11	-0.11	0.12	0.25
ILEV.		1	-0.07	-0.30	-0.11	-0.23	-0.11
IPROF.			1	0.37	0.17	0.22	-0.02
ICLASS.				1	0	0	-0.16
CInf.					1	0.56	0.01
GDP GRO.						1	0.01
STATE							1
Period 2009:2016						
STD/TA	1	0.32	-0.12	-0.03	-0.03	0.01	0.22
ILEV.		1	-0.22	-0.16	0.15	0.07	-0.26
IPROF.			1	0.39	-0.07	-0.06	0.11
ICLASS.				1	0.003	0.002	-0.12
CInf.					1	0.71	-0.01
GDP GRO.						1	-0.01
STATE							1
Note: the constant here is short-term debt to total assets. The table represents the pairwise correlation between the dependent and the independent variables.							

Also, the VIF results presented in table VI indicate that the regression equation is free of multicollinearity under all the three ranges of time as VIF is less than 5.

Table VI: VIF Test Results

VIF Test Results							
First Model				**Second Model**			
Variable	**VIF**			**Variable**	**VIF**		
	2003:2016	**2003:2008**	**2009:2016**		**2003:2016**	**2003:2008**	**2009:2016**
Industry Leverage	1.11	1.11	1.06	Inflation Rate	1.14	1.46	1.99
Industry Profitability	1.15	1.16	1.21	GDP Growth Rate	1.14	1.46	1.99
Industry Classification	1.17	1.28	1.19	State Ownership	1	1	1
Mean VIF	1.14	1.18	1.15	Mean VIF	1.09	1.31	1.66
Note: the regression equation is free of multicollinearity under all the three ranges of time as VIF <5.							

4.2 Main Results

Table VII reports the main regression results for the first model, and table VIII reports the regression results for the second model. According to the OLS regression results for the first and second models; industry leverage, industry profitability, industry classification, GDP growth rate, inflation rate, and state ownership all found to be statistically significant when using either the total debt to total assets or the short term debt to total assets as a dependent variable.

Table VII: OLS Regression Results of the First Empirical Model

Variables		**Equation 1** **TD/TA**	**Equation2** **STD/TA**	**Equation 3** **TD/TA**	**Equation4** **STD/TA**	**Equation 5** **TD/TA**	**Equation 6** **STD/TA**
		2003:2016		**2003:2008**		**2009:2016**	
Constant	Expected Sign						
	Coefficient	0.02	0.151	0.03	0.151	0.02	0.155
	T	0.76	4.469	0.54	3.042	0.44	3.336
	Sig.	0.01	0	0.05	0.03	0.06	0.01
ILEV.	Expected Sign	+	+	+	+	+	+
	Coefficient	0.94	0.552	0.94	0.546	0.96	0.541
	T	16.28	10.137	10.98	6.498	11.74	7.192

	Sig.	0	0	0	0	0	0
	Expected Sign	-	-	-	-	-	-
IPROF.	Coefficient	-0.13	-0.379	-0.24	-0.271	-0.10	-0.420
	T	-0.62	-1.915	-0.74	-0.859	-0.34	-1.541
	Sig.	0.04	0.06	0.06	0.03	0.03	0.02
	Expected Sign	-	-	-	-	-	-
ICLASS.	Coefficient	0.02	0.015	0.04	0.004	0.01	0.021
	T	1.43	1.020	1.60	0.186	0.64	1.064
	Sig.	0.10	0.08	0.10	0.05	0.10	0.02
Number of Observations		812	812	348	348	464	464
Adjusted R Square		0.436	0.317	0.441	0.311	0.518	0.306
Chi Square		39.114	39.311	41.482	15.785	48.505	20.00
Chi-Square test for independence P-value		0.00	0.00	0.00	0.00	0.00	0.00
Durbin Watson		2.229	2.038	1.978	1.924	2.413	2.143
Note: Regression Method used is (Enter); dependent variables are total debt to total assets and short-term debt to total assets. D-W test significant at 2 per cent. Significance level is at 10%							

According to the developed hypothesis, there's a significant relationship between average industry leverage and firm's leverage, the trade-off theory proposes a positive relationship between industry leverage and total debt, whereas a negative relationship between debt and industry leverage is consistent with the pecking order theory. The results show that a positive relationship between industry leverage and firm's leverage (both total debt to total assets and short-term debt to total assets); the results are consistent the trade-off theory and with findings reported by the findings of Mackay and Phillips (2003), and also the finding of Leary and Roberts (2014).

The average industry profitability is hypothesized to have a negative influence on leverage. The results show that there's a negative relationship between industry profitability and leverage under both measures total debt to total assets and short-term debt to total assets. The results provide support for the trade-off theory. This result supports the finding of Welch (2004), MacKay and Phillips (2005), and Frank and Goyal (2009).

The industry classification is hypothesized to have a negative influence on leverage; inconsistently the results show a positive relationship. Although this result is not consistent with any of the capital structure theories, some empirical studies found a significant relationship between industry classification and leverage. Abor (2007), found a significant negative relationship between industry classification and leverage (total debt, short-term debt, and long-term debt).

Table VIII: OLS Regression Results of the Second Empirical Model

Variables		Equation 1 TD/TA	Equation 2 STD/TA	Equation 3 TD/TA	Equation4 STD/TA	Equation 5 TD/TA	Equation 6 STD/TA
		2003:2016		2003:2008		2009:2016	
Constant	Expected Sign						
	Coefficient	0.46	0.366	0.52	0.412	0.32	0.239
	T	18.41	17.143	18.04	16.148	4.15	3.675
	Sig.	0	0	0	0	0	0
GDPGRO.	Expected Sign	-	-	-	-	-	-
	Coefficient	-0.01	-0.005	-0.02	-0.011	-0.01	-0.008
	T	-1.11	-1.369	-2.40	-1.539	-0.57	-0.849
	Sig.	0.07	0.10	0.02	0.10	0.05	0.10
CINF.	Expected Sign	+	+	+	+	+	+
	Coefficient	-0.45	-0.515	-0.06	-0.252	-0.93	-0.760
	T	-1.88	-2.508	-0.23	-1.043	-1.14	-1.111
	Sig.	0.06	0.09	0.02	0.08	0.05	0.07
STATE.	Expected Sign	+	+	+	+	+	+
	Coefficient	0.09	0.174	0.12	0.176	0.07	0.174
	T	3.27	7.146	3.15	5.105	1.83	5.175

	Sig.	0.001	0	0.002	0	0.07	0
Number of Observations		812	812	348	348	464	464
Adjusted R Square		0.313	0.313	0.357	0.340	0.374	0.303
Chi Square		4.80	19.174	6.353	11.143	1.573	9.313
Chi-Square test for independence P-value		0.00	0.00	0.00	0.00	0.00	0.00
Durbin Watson		2.229	2.038	1.978	1.924	2.413	2.143
Note: Regression Method used is (Enter); dependent variables are total debt to total assets and short-term debt to total assets. D-W test significant at 2 per cent. Significance level is at 10%							

Consistent with the developed hypothesis, the results show that there's a negative relationship between GDP growth rate and leverage (both total debt to total assets, and short-term debt to total debt to total assets). Although none of the three theories seems to suggest a relationship between GDP growth rate and leverage, this result supports the findings of Frank and Goyal (2009) and also Bokpin (2009).

With regards to inflation rate, the hypothesis suggests a positive relationship between inflation rate and leverage according to the trade-off theory, the results show that there's a negative relationship. Although the results contradict with the hypothesis proposed by the trade-off-theory suggesting a positive relationship between inflation rate and leverage, this result supports the finding of O'Connell (1990) and Myers (1990) and also Gertler and Gilchrist (1993).

For the state ownership, the hypothesis suggests a significant relationship between state ownership and leverage; as the trade-off theory proposes a positive relationship between state ownership and leverage, while the agency cost theory proposes a negative relationship between leverage and state ownership. The results show that there's a positive relationship between state ownership and leverage (both total debt to total assets and short-term debt to total assets). The result is consistent with the trade-off theory and also supports the findings of Jensen, Michael, and William Meckling, 1976.

From the regression results represented in tables VII and VIII, it's very obvious that neither the direction nor the significance have changed over the three ranges of times. Therefore, the results indicate that the financing behaviour of the financial managers in Egypt has been the same over the studying period of time. However, the division of the 14 years into three ranges of time; the results show a significant relationship between the dependent variables and the independent variables. This may indicate that the neither the financial crisis (2008), nor the political and economic issues (2011-2014) have an effect on the financial managers behaviour in Egypt.

4.3 Comparison between Results from Egypt and Emerging Countries

Although the results of studies about determinants of capital structure in Middle East countries are considered to be relatively old compared to this research, dividing the time period into three ranges allows us to compare at least the period prior to financial crisis (2003:2008) to results found from Middle East. The most comparable debt level to our results is in Oman and Jordan at 46.3 per cent and 37.7 per cent respectively (Omet and Mashharawe, 2004).

The average leverage in Egypt seems to be similar to emerging countries such as Pakistan, Iran, Brazil and Turkey as well as Gulf countries such as Jordan and Oman. Profitability and size are also significant in India, Malaysia and Thailand (Booth and Aivazian, 2001). However, a significant negative relationship between tangibility and leverage is observed in Malaysia, Brazil and India (Booth and Aivazian, 2001).

To summarize, the determinants of capital structure and the debt level in the Egypt are closely comparable to the emerging countries, with similar institutional factors, indicating that these factors play a role in determining the capital structure; even though they might not directly affect the capital structure as explanatory variables, they influence firm-level factors and hence financing decisions (Rajan and Zingales, 1995; Booth and Aivazian, 2001).

5. Conclusion

In this paper, we examine the industry level and the country level determinants of capital structure of non-financial firms in Egypt for the period 2003-2016. The period has been divided into additional two ranges one prior to the financial crisis (2003-2008) and the other post the financial crisis and during the political and economic issues that took place is Egypt (2009-2016); in order to trace whether there has been any change in the preferences or the borrowing behaviour in Egypt.

The findings reveal that industry leverage, industry profitability, industry classification, GDP growth rate, inflation rate and state ownership are significant determinants of capital structure in Egypt. The sign of industry leverage, industry profitability, and state ownership supports the trade-off theory; whereas there have been no evidence for the rest of variables in the traditional theories of capital structure. However, the results founded on this research are consistent with the findings of other previous peers. This confirms that capital structure theories are conditional. The results are in line with those of other developing countries although there are some slight differences. Our results suggest that neither the financial crisis happened in 2008 nor the political and economic issues that took place in Egypt 2011-2014 influenced the behaviour of the financial managers in Egypt whether positively or negatively.

Our results provide a comprehensive overview of the capital structure in Egypt; this information will be of use to managers, shareholders and lenders. Future research can build on our study and extend it in several dimensions. Our empirical analysis can be extended using generalised methods of moments (GMM) model which we did not use because of data limitations. Further research is needed on the capital structure of unlisted Egyptian companies, as the focus has been mainly on listed companies.

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