The impact of corporate characteristics on capital structure: evidence from the Egyptian insurance companies

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Abstract

The capital structure of a firm is extremely important to its success and continuation as a going concern and can be seen as a key source of a firm's value. Therefore, the purpose of this paper is to identify, using a number of econometric techniques and hand-collected data over the period from 2006 to 2011, the driving forces that influence capital structure of Egyptian insurance companies. The paper demonstrates that firm size, tangibility of assets, profitability and firm age factors are positively related to the total leverage (LEV). On the other hand, growth opportunities, liquidity and non-debt tax shield appear to be the significant factors that adversely influence the total leverage (LEV) and capital structure.

Keywords: Capital Structure; Corporate Characteristics; Insurance Companies; Egypt.

JEL Classification: G32, C61, C23

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1 Introduction

The capital structure of a firm is vital to its success, not solely in its importance for competitive advantage, but in its relevance to the firm's survival: too much debt may contribute to the firm's failure, while too little may result in an uncompetitive state compared with other firms. Therefore it is vital for the firm to obtain the correct capital structure for their purposes. This however is very difficult, as there are a variety of factors to be considered that affect the capital structure of a firm and not all are easily measurable: tangibility, size, liquidity, non-debt tax shield, growth opportunities and volatility are some.

Capital structure was first considered by Modigliani and Miller (1958, 1963) in their M-M theorem, based on 10 unrealistic assumptions stating that in a perfect market the firm's value is irrelevant. Their work was essential in forming the basis upon which future researchers could extend their work, as in the real world, the market is not perfect. Further research relaxed the key assumptions, introducing factors such as taxes, asymmetric information, agency costs and bankruptcy costs. Much research (see *inter alia* Titman and Wessels, 1988; Barclay and Smith, 1995; Stohs and Mauer 1996; Guedes and Opler, 1996; Campbell and Hamao, 1995; Gatward and Sharpe, 1996) has gone into the study of a firm's capital structure and how decisions are made when choosing the mix of debt and equity.

Several theories have been developed to explain a firm's specific choice of the mix of debt and equity, examining the trade-off theory, the pecking order theory and the target adjustment theory. Myers (1984) and Myers and Majluf (1984) in their hypothesis of pecking order or asymmetric information, claim that firms prefer internal financing to debt to equity. Therefore, Abor and Biekpe(2009) find negative relationship between profitability and long term debt, Manos et al. (2007) ; Deesomsak et al. (2004), and Eriotis et al. (2007) indicate that liquidity ratio reflects firms' ability to pay creditors in the short term. It is expected that liquidity and leverage to have a negative relationship as firms tend to use the extra cash to finance their investment instead of incurring interest costs.

However, different theories of capital structure contributed different attributes which can lead the companies to make a decision on how they can choose for the debt financing. Tangible assets also play a vital role and act as collateral and provide security to lenders in the event of financial distress. Abor and Biekpe (2009) find a significantly positive relationship between

asset structure (as measured by fixed asset divided by total asset) and long term debt. Other studies also find a positive relationship between tangibility and long term debt, however negative relationship was found between tangibility and short term debt (Chittenden et al., 1996; Stohs and Mauer, 1996; Pindalo et al., 2006). Another set of firm-level variables that capture factors that are known to affect leverage and maturity structure were examined in the prior studies. These variables include profitability and firm size, and the market-to-book ratio (see Titman and Wessels, 1988; Guedes and Opler , 1996; Rajan and Zingales, 1995). Firm Size (SIZE): the costly external equity suggests that it is more difficult for smaller firms to issue equity in time of increasing of aggregate uncertainty and big catastrophe event; therefore, smaller insurance firms tend to keep a higher equity-liability ratio (Warner, 1977; Ang,Chua,and McConnel (1982) and Titman and Wessels (1988) provide evidence for non-financial firms that capital structure is related to firm size. Past Profitability (PROFIT): A positive cost of issuing equity, or a positive cost of distributing cash to shareholders implies a negative relationship between the capital structure and past profitability. This is because this positive cost of equity implies that the internally generated funds are low-cost source of equity capital for the insurance firm.

Most of past research on capital structure has been conducted in a variety of developed countries, with a minority considering developing markets. There are vital differences within the financial markets that may affect the determinants of the capital structure that should be considered, therefore a look at the differences will be shown within this study. Due to the very different institutional structures within the developed and developing countries, there could be significant differences on how a company may choose its capital structure.

Developing countries have specific characteristics relating to their financial markets which differentiate them from developed countries, although all these characteristics are not true of every developing country. It is usual for a developing country to have a system based primarily on banks and usually a concentrated structure; either owned by the government or privatised recently, these results in a lack of competitive mentality. Developing markets are associated with weak supervision systems which lead to problems with portfolios, as with the lack of supervision, they are not performing as efficiently as they could be with effective monitoring. Additionally, to assist the banking system when they are experiencing difficulties, one solution used in developing countries to rectify the problem is to use large spreads: the bid and ask prices are far apart.

Equipped with the previous analysis, this paper aims to investigate the relationship between corporate characteristic determinants (firm size, growth opportunities, liquidity, and tangibility of assets, profitability, and non-debt tax shield) and leverage (debt ratio) in emerging insurance markets. Here, we selected Egyptian insurance market to represent emerging markets for a number of reason concluded from Table I: (i) the Egyptian Insurance Companies accept premiums from policyholders, which are less than the total amount paid for claims. Therefore, the Egyptian insurance companies are required to pay for the claims from the capital of the Insurance companies, which in turn makes the shareholders concerned about the return on their investment and even the of protecting their investments; (ii), Egyptian insurance companies hold more money than they actually predict to payout in claims because they can predict on average how much insurance companies should hold to pay all claims.

Given the significant financial scale of capital structure in developed and emerging markets, what determines capital structure in insurance companies is clearly and empirical question of some importance.

Table I: Egyptian Insurance Companies (in thousands)

Year / Item	2006	2007	2008	2009	2010	2011
Net Claims	2008831	2330573	3072195	4057946	4468692	4802426
Net Premiums	2955319	3788493	5362282	5595813	6581734	7213279

Source (Egyptian Financial Supervisory Authority EFSA, 2011)

The analysis in this paper is innovative in several ways. It is, to our knowledge, the first attempt to analyse, using a number of econometric techniques, a set of different firm characteristic determinants and their relationship to capital structure in emerging markets. Furthermore, this is one of the first papers that use a dataset of Egyptian insurers to investigate the effect of these factors on the capital structure of the Egyptian Insurance Companies at an international level.

The remainder of the paper is set out as follows. Section 2 is a brief literature review on the main corporate characteristic determinants of the financing behaviour of insurance

companies. Section 3 provides details of the models, methodology and hypotheses. Section 4 presents the data and empirical results and section 5 concludes.

2 Literatures Review

Indeed, there is a large literature that documents the relationship between capital structure and firm characteristics. In what follows we critically analyse the prior studies that emphasised on the relationship between firm characteristics and capital structure.

Michaelas et al. (1999) examine small and medium sized businesses in the U.K, attempting to apply the capital structure theory to establish hypotheses to examine their determinants, considering the three different theories of capital structure: tax-based theories; agency cost theories; and asymmetric information and signalling theories. They found that both the agency and asymmetric information costs affect the level of both the short and long term debt of those companies. While the tax effects do not appear to significantly influence the total leverage. They also indicate that small firm's capital structure is dependent on time and industry, influencing the total debt level and maturity structure.

In the same vein Rajan and Zingales (1995) investigate the determinants of capital structure in different countries, such as Thailand, China and Europe. Wiwattanakantang (1999) investigates the determinants of Thai firms based on the optimal capital structure theories considered by Michaelas et al (1999). The study found that taxes, bankruptcy costs, agency costs and information costs are important to Thai firms when making their financing decisions: the non-debt tax shields and profitability have negative effects on the debt-equity ratio, while firm size and tangibility are positively related to the firms leverage ratio. Interestingly, they found that single-family owned firms have higher debt than the other firms including state-owned companies.

Huang and Song (2002, 2006) investigate the determinants of capital structure in China. They found that the factors that affect firms' leverage in other countries also affect Chinese companies in a similar way. Specifically, the long-term debt ratio, total debt ratio and total liabilities ratio all decrease with profitability, non-debt tax shield and managerial shareholdings. On the other side, tangibility and tax rate found to have a positive effect on the long-term ratio and total debt ratio. In comparison to other economies, they found that

Chinese firms have lower leverage, most prominently in their long-term debt; however, as the year's progress it is increasing.

Bancel and Mittoo (2004) examine the impact of corporate characteristics on capital structure in 16 European countries, including Austria, Belgium, Greece and the U.K.. They found similarities between U.S and European countries, both using similar factors, however they found differences on several dimensions between Scandinavian and non-Scandinavian countries. Also, clear evidence on the impact of country's legal system and other country-specific factors such as costs of capital has explained cross-country variations in the rankings of several major factors.

There has been much support from researchers (*inter alia* Kraus and Litzenberger, 1973; Scott, 1977; Lee and Barker, 1977; Kim, 1978; Turnbull, 1978; Ang et. al., 1982) in determining at what point that marginal present value of tax shields equals the present value of bankruptcy costs, confirming the trade-off theory. Altman (1984) found that bankruptcy costs affect the capital structure of a firm, combining direct and indirect bankruptcy costs and the probability of bankruptcy.

In the same line Pham and Chow (1989) investigate the impact of bankruptcy costs on capital structure. They established that bankruptcy costs, especially indirect costs are sizeable, while the expected present value of bankruptcy costs exceeds the tax benefits from leverage for 13 out of the 14 firms. However, results found the direct costs insignificant, totalling only a small percentage of the total firm value.

Another strand of studies (theoretical and empirical studies) aimed to identify and measure the effect of capital structure on the product market strategy decisions of non-financial firms (*see inter alia* Chevalier and Scharfstein, 1995; Kovenock and Phyllips, 1997; Zingales, 1998; Khanna and Tice, 2000; Campello, 2003 and 2006). Manos et al. (2007) indicate that liquidity ratio reflects firm's ability to pay creditors in the short term, while Deesomsak et al. (2004) find a negative relationship between liquidity and leverage as firms tend to use the extra cash to finance their investment instead of incurring interest costs. Eriotis et al. (2007) reveal that additional debt would deteriorate the current ratio further and makes the firm's financial standing weak. However, different theories of capital structure contributed different attributes which can lead the companies to make a decision on how they can choose for the debt financing. Tangible assets also play a vital role and act as collateral and provide security

to lenders in the event of financial distress. Also, Jensen and Meckling (1976) found that collaterality is very important and act as the protection to lenders from moral hazard problem when there is a conflict between shareholder and lenders.

Anotehr stream of previous studies found a significantly positive relationship between tangibility of assets and long term debt. However, a significantly negative relationship between tangibility of assets and short term debt (see Chittenden et al., 1996; Stohs and Mauer, 1996; Pindalo et al., 2006) was found.

Rees and Kessner (1999), Chiesa (2001) and Frame (2007) provide some empirical evidence that tighter solvency regulation allows the survival of high cost firms, and, as a result, worsens the welfare of insurance buyers. Cummins and Grace (1994) found that insurance companies are subject to the costs of moral hazard and adverse selection in their claims and underwriting cycles, and capital invested in insurance company is subject to double taxation, and other market defections can make holding capital costly. Although various forms of agency costs may affect capital holding costs for insurance companies on account of market attritions among policyholders, owners, and directors. For example, Cagle and Harrington (1995) and Cummins and Danzon (1997) respect the equilibrium of benefits and costs of holding capital that insurance companies have an optimal capital structure.

Additionally, Mayers and Smith (1992, 2005) and Mayers et al. (1997) investigate the directors and shareholders conflict may affect the capital structure of mutual insurance companies. On the other hand, Harrington and Niehaus (2002) suggest that mutual insurance companies have less access to capital markets, making increasing capital more difficult and costly, which in turn lead the company to increase the level of leverage.

Kim et al. (1998) examine the impact of growth opportunities, volatility, debt ratio, cash flow, and bankruptcy risk on capital structure of US industrial companies. The capital structure was proxied by the liquidity measured by the ratio of cash and marketable securities to the book value of assets. They demonstrate a significant positive relationship between growth opportunities and liquidity and a significant negative relationship between leverage and liquidity.

Opler et al. (1999) test liquid assets using a sample of U.S. non-financial firms. They found a positive relationship between leverage and growth opportunities and a positive relationship

between leverage and cash flow. On the other hand, Kim et al. (1998) found a negative relationship between debt and cash flow and Smith and Watts (1992) found a significant negative relationship between leverage and growth opportunities.

Kim and Stulz (1996) indicate that external sources such as common equity are valuable for firm with strong investment opportunities. However, Jensen (1986) and Stulz (1990) found that the firms without strong investment opportunities for debt serve to limit the agency costs of managerial discretion. Similarly, Berger et al. (1997) suggest that a firm's growth opportunities lead to increase the agency costs of debt and decrease the agency costs of managerial discretion.

Indeed, the equity capital for insurers represents inconsequential in financing the firm's tangible assets, and work as a tool to protect the claims. Hence, the policyholders are the lenders of insurers (Merton et al.,1993). Although, the trade-off theory of capital structure argues that a value-maximizing firm will balance the value of interest tax shields and other benefits of debt against the costs of bankruptcy and other costs of debt to determine an optimal level of leverage for the corporate. For example, Fama and French (2002) demonstrate that with the trade-off theory a corporate will incline to shift behind by its optimal leverage to the extent that it departs from its optimum. While pecking order theory argues that corporate will generally prefer not to issue equity due to asymmetric information costs which leads to a strong short-term response of leverage to short-term variations in earnings and investment. Also, the pecking order theory implies that debt increase for companies when investment increase internally-generated funds and debt will decrease when investment is less than internally- generated funds (see Myers 1984).

Recently, Graham and Harvey (2001) examine the implications of different capital structure theories by using a survey on U.S. directors. They found some supportive evidence for pecking-order theory and the firms value financial flexibility, but its importance is not related to information asymmetry or growth options. However, other studies (Pagano et al., 2002; Doukas and Pantzalis, 2003) indicate that the increased accessibility to global capital markets, within foreign listed firms, will impacts negatively on capital structure.

3. Models, Methodology and Hypotheses

3.1 Models

In the following section, the research methodology is set up to examine different corporate characteristic determinants that affect company's level debt. Based on the above analysis, the following model is employed:

$$\text{LEV}=\int(GO, FS, LQ, TANG, PROF, NDTS, AG)$$

where Leverage (LEV) is measured by ratio of total liabilities to total assets; Growth opportunities (GO) is measured by the yearly net insurance premium growth; Firm size (FS) is measured by ln(total assets); Liquidity (LQ) is measured by ratio of current assets to total liabilities; Tangibility of assets (TANG) is measured by ratio of fixed assets to total assets; Profitability (PROF) is measured by net income to total assets; Non-debt tax shield (NDTS) is the ratio of depreciation expense to total assets and Firm age (AG).

3.2 Methodology

Fixed Effects Model versus Random Effects Model

A panel data technique helps researchers to substantially minimize the problems that arise when there is an omitted variables problems such as time and individual-specific variables and provide robust parameter estimates than time series and/or cross-sectional data.

Hsiao (1986) in his book 'Analysis of panel data' highlighted the significant advantages from using panel data over cross-sectional and time-series data sets. First, panel data provides a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables. Secondly, longitudinal data allows certain questions to be addressed that cannot be done through using cross-sectional or time-series data sets. Finally, panel data while capable of testing more complicated behavioural models, can also resolve or reduce the problem of the certain effects that occur due to omitted or mismeasured variables

which are correlated with the explanatory variables. However, panel data is able to control better these effects (Hsiao, 1986). Panel data, is an extension of pooled data which allows studies to provide accurate results where problems would have been created when certain variables were omitted, such as time and individual specific variables (Gujarati, 2003). Upon these findings, the study has tested the data again based on the panel data analysis technique using both the fixed and random effects to find the most appropriate empirical model.

Within this study Breusch and Pagan (1980) Lagrange Multiplier (LM) test is used to test the random effects model against the pooled model under the null hypothesis, that the independent variables do not have a significant effect on leverage, H0 = 0. As the Lagrange Multiplier test rejects the null hypothesis, the estimated coefficients from the pooled model are found not to be consistent and the individual effect is not equal to zero.

Among static panel data models, fixed effect and random effect models are the most commonly used. The fixed effect model allows control for unobserved heterogeneity which describes individual specific effects not capturing by observed variables. The term "fixed effects" is attributed to the idea that although the intercept may differ across individuals (firms), each individual's intercept does not vary over time; that is, it is time invariant. The random effects model will be estimated by the Generalized Least Squares (GLS) technique. This is because the GLS technique takes into account the different correlation structure of the error term in the random effects model (Gujarati, 2003).

Hausman (1978) created a test that distinguishes between fixed effects estimators and random effects estimators through comparing the differences of the estimated coefficient under the null hypothesis. Depending on these results the null hypothesis is accepted or rejected. If accepted, the random effects model is better than the fixed effects model, this means that the coefficients are not significantly different. While rejection of the null hypothesis favours the

fixed effects model over the random effects model. The difference in the estimated coefficients should therefore be close to zero (Johnston and DiNardo, 1997).

The fixed effect model was found through testing to be the most appropriate for this study. The main advantage that studies have found, (inter alia Gujarati, 2003; and Spanos, 2008) that the fixed effects model incorporates the problem of unobserved individual heterogeneity: this is the effects not captured by the observed variables which are specific effects to the individual.

Generalized Method of Moment (GMM)

As static panel models assume that all independent variables are exogenous, we also estimated dynamic panel data models. More specifically, we performed the two-step difference GMM model drawn up for dynamic panel data models by Arellano and Bond (1991). The GMM estimator uses internal instruments; specifically, instruments that are based on lagged values of the explanatory variables that may present problems of endogeneity (firm growth, leverage, and size and firm age are considered as exogenous). To be exact, we used all the endogenous right-hand-side variables in the model lagged from (t – 1) to (t – 2). To check the validity of the model specification when using GMM, we used the Hansen statistic of over-identifying restrictions to test for the absence of correlation between the instruments and the error term.

3.3 Testing of the Null Hypothesis

The null hypothesis presented in this study to test how the determinants above effect the dependent variable, leverage are shown here:

H0 = independent variables do not have a significant effect on leverage.

While the alternative hypothesis is:

H1 = independent variables have a significant effect on leverage

The null hypothesis and the alternative hypothesis can be expressed as:

H0: IV = 0

H1: IV ≠ 0

4. Data and Empirical Results

The data adopted in this study are annual data on Egyptian insurance companies over the period from 2006 to 2011. Due to the importance of observing multiple companies over multiple time periods, we adopt panel data to examine a number of independent variables.

Hsiao (1986) in his book 'analysis of panel data' highlighted the significant advantages from using panel data over cross-sectional and time-series data sets. Firstly, panel data provide a large number of data points, increasing the degrees of freedom and reducing the collinearity among independent variables. Secondly, longitudinal data allows certain questions to be addressed that cannot be done through using cross-sectional or time-series data sets. Finally, panel data while capable of testing more complicated behavioral models, can also resolve or reduce the problem of the certain effects that occur due to omitted or mis-measured variables, which are correlated with the independent variables.

The data has been collected from various sources. Data on stock prices are obtained from DataStream and Egyptian disclosure book. The data for basic corporate characteristics are obtained from Osiris and Datastream. The variable of total assets is gathered from the annual report of insurance companies issued by the Egyptian Supervisory Authority (EFSA). For those missing value from the Osiris and Datastream, the data is collected manually from companies' annual financial reports and filings.

To examine the effect of corporate characteristics on capital structure, the variables of total assets and premiums are obtained from the annual report of insurance companies issued by the Egyptian Financial Supervisory Authority.

Dependent Variable

Prior studies indicate that an appropriate selection of capital structure measure is vital to the empirical analysis. For example, Shah and Hijazi (2004) believe that the majority of small firms have difficulties to access the capital market due to the either cost or technical crisis associated with the source of capital. Here, Booth et al. (2001), Rajan and Zingales (1995) and Beven and Danbolt (2002) use debt ratio (leverage) which is measured by total debt to total assets. Klenin et al. (2002) indicate that insurance leverage measures the insurer

capacity in the undertaking of pricing risks and the level of risks absorbable by owners' equity. A higher and broader risk exposure leads to higher pricing error and risks undertaken by owners' equity. Therefore, in our study adopts leverage (debt ratio) as dependent variable, which i is measured by total liabilities to total assets.

Independent Variables

The first independent variable adopted in our study is the firm size. Chung (1993) and Grinblatt and Titman (1998) listed the reasons why firm size would be related to the capital structure. Small firms find it relatively more costly to analyse informational asymmetries with lenders, which prevents them from using the outside finance. Additionally, Warner (1977), Ang *et al.*(1982), Pettit and Singer(1985) and Titman and Wessels (1988) indicate that relative costs and probability of insolvency for big companies have more diversified and less insolvency than small companies. Ozkan (1996) indicates that small companies are more likely to be liquidated when they are in financial crisis. Mayers and Smith (1990) report that a larger insurer obtains competitive benefits through efficient facilities and can adopt a high retention. Cummins and Sommer (1996) indicate that insurance companies reduce risk through greater portfolio diversification which afforded by large companies. Adiel (1996), Garven and Lamm-Tennant (2003) suggest that insurance companies to manage their risks through re-insurer, which effectively serves as a substitute for capital in reducing the insurer's probabilities of incurring the costs of insolvency. As a result of the importance of firm size in explaining the capital structure, we use the natural logarithm of total assets to measure firm size.

Following previous studies Myers (1977), Scott (1977), Harris and Raviv (1990) conclude that the degree to which the companies' assets are tangibility result in the firm having a major filtration value. While Long and Malitz(1992) suggest that a fixed charge is directly placed to particular tangibility of assets for the company and to minimize adverse selection and moral hazard which will in turn affect the capital structure. Also, Storey (1994) and Berger and Udell (1998), Hutchinson and Hunter (1995) and Balakrishnan and Fox (1993) believe that banking and other types of corporations can be protected by tangibility of assets. Therefore, in our study we measure tangibility of assets by fixed assets to total assets.

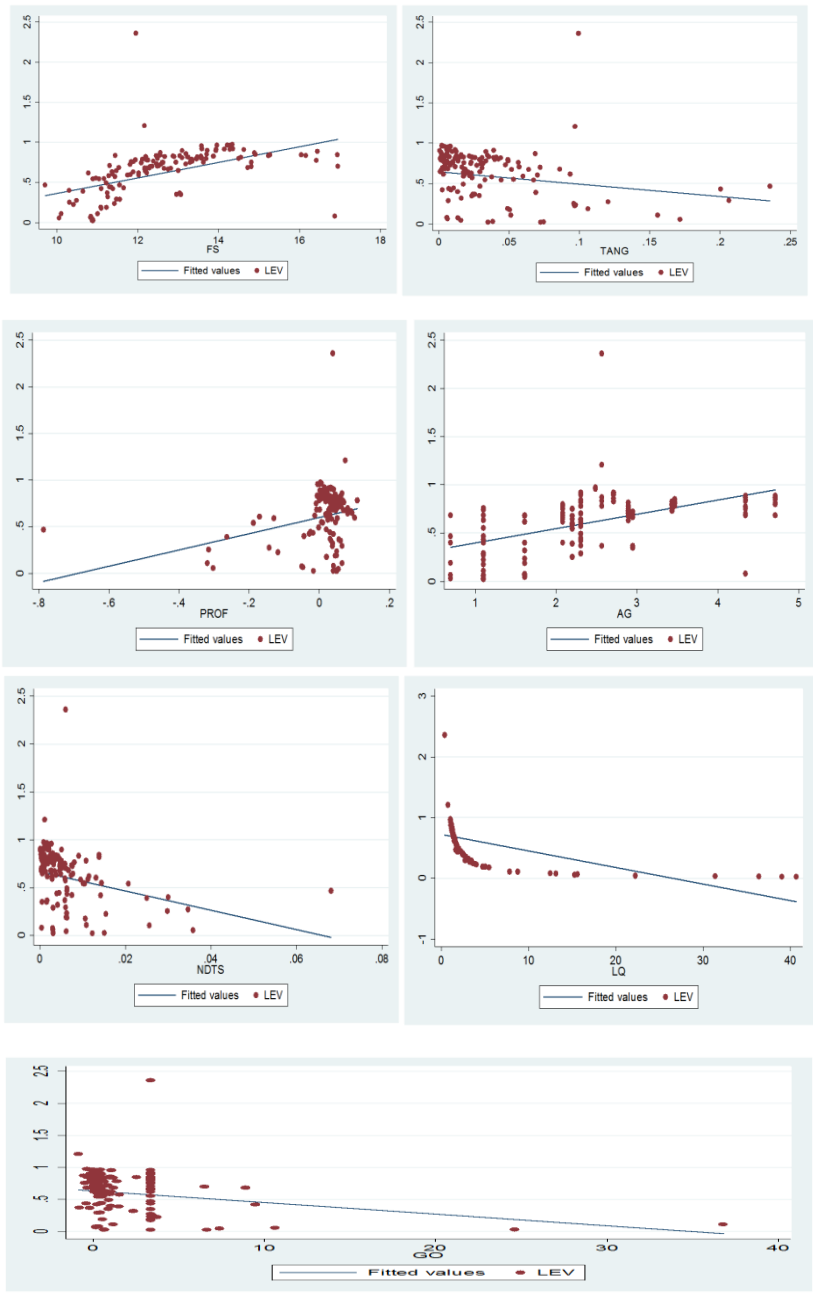

Figure 1 dependent vs. independent variables

Moving into the liquidity ratio as independent variable, Prowse (1990) indicates that a firm would be able to continue to pay its debts and to continue in the market depending on the liquidity ratio. Ozkan (2001) finds a negative relationship between liquidity and financial leverage. Chen and Wong (2004) define the Liquidity as the ability of insurers to meet the claims from policyholders and creditors. Furthermore, Financial and risk management studies indicate that a high liquidity means low probability in financial crisis. Due the importance of this ratio, it was selected by us as independent variable and measured by current assets to total assets.

Definitions of variables

Name of variable	Symbol	Calculation of variable
Leverage	Lev	Total liabilities/total assets
Growth opportunities	Go	The yearly net insurance premium growth
Firm Size	Fs	LN(total assets)
Liquidity	Lq	Current assets / total liabilities
Tangibility of assets	Tang	Fixed assets / total assets
Profitability	Prof	Net income / total assets
Non-debt tax shield	Ndts	Depreciation expenses / total assets
Firm age	Ag	Difference between observation year and establishment year

Also, Jensen (1986), found a positive relationship between profitability and debt ratio, as more profitability companies are exposed to minimum risks of insolvency and have better reward to take advantage of interest tax shields. Powell and Sommer (2007), Cole and Mccullough (2006) and Elango et al. (2008) indicate that profitability is the ability of insurer to use their assets to get their profits. Therefore, a higher profitability means better profits through the period and strong capacity to dealing with crisis. In our study we use profitability as well and this is measured by net income to total assets.

Growth opportunity was also used in the previous studies as a dependent variable. Here, Titman and Wessels (1988) indicate that following the trade-off and agency theories a negative relationship between growth opportunities and leverage is found. Black and Skipper (1994) believe that when there are growths opportunities, insurers may reduce the risks undertaken so as to avoid the loss of future growth due to raise risks. Therefore, they found a negative correlation between growth and insurer retentions. On the other side, Cummins and Nini (2002) believe that a higher business growth indicates more aggressive business strategies and in turn, a higher retentions. In our study we follow the previous studies by using this variable, which is measured by the percentage increase in net premiums.

Finally, DeAngelo and Masulis (1980) find Non-debt tax shield is similar to tax deduction for depreciation, and investment tax credits are replaces to the tax benefit of debt. The tax advantage of debt ratio reduces when other tax deduction rises. Our study employs non-debt tax shield s dependent variable and this is measured by depreciation expenses to total assets. Petersen and Rajan (1994) also indicate that young companies incline to be externally financed, while older companies are inclined to accumulate retained earnings followed by a

negative relationship between age and debt ratio i.e. age is another important variable and is measured by the natural logarithm of age.

We start our empirical analysis by reporting the descriptive statistics, Table II reports descriptive statistics (mean median, minimum, maximum, standard deviation, skewness, kurtosis, and jarque-bera. It is observed that variables show a large dispersion based on the mean and standard deviation over the period of study.

Table II: Descriptive analysis

Variable	Mean	Median	Max	Min	Std.Dev	Skewness	Kurtosis	Jarque-Bera
LEV	0.6032	0.6837	2.36	0.0237	0.3101	0.3585	7.37	152.00
GO	1.55	0.5162	36.78	-0.8622	3.59	6.78	60.14	267.08***
FS	12.49	12.19	16.95	9.72	1.70	0.8471	3.17	22.47***
LQ	4.30	1.45	40.66	0.3812	7.72	3.07	11.89	903.75***
TANG	0.0280	0.0131	0.2354	0.0004	0.0373	2.89	13.23	107.92***
PROF	0.0052	0.0238	0.1083	-0.7873	0.0865	-5.24	42.16	127.29*** (0.0000)
NDTS	0.0063	0.0030	0.0681	$6.36e^{-05}$	0.0094	2.90	13.78	116.40***
AG	2.38	2.30	4.71	0.6931	1.10	0.4528	2.37	9.48*** (0.0088)

Table II shows that GO, *FS, LQ, TANG, PROF, NDTS*, and *AG* all have positive means. On average corporate's revenue grew by approximately 155% annually over the six years under investigation. It worth noting that *TANG, PROF*, and *NDTS* have a mean exceeds those associated with *GO, FS, LQ*, and *AG*, indicating the effective utilization of capital structure. The mean debt ratio (leverage) ranges from 2.37% to 23.6%. Most variables are characterized by relative large kurtosis, which are clearly non-gaussian, as signalled by the rejections of the null of normality delivered by the Jarque-Bera test.

As a first attempt to identify the strength and direction of the relationship between the variables, the correlation matrix is computed with the results also shown in Table III and Figure 1. It is observed that all variables show the expected direction of relationship as hypothesized, with firm size (FS), profitability (PROF) and age (AG) are positively and significantly correlated with the financial leverage (LEV), but negatively significantly correlated with the growth opportunities (GO), liquidity (LQ), tangibility of assets (TANG) and non-debt tax shield (NDTS). In contrast, firm size (FS), profitability (PROF) and age (AG) are negatively and significantly correlated with the measure of growth opportunities (GO) and positively significantly correlated with liquidity (LQ), tangibility of assets (TANG) and non-debt tax shield (NDTS).

Table III: Spearman Correlation between selected variables

variable	LEV	GO	FS	LQ	TANG	PROF	NDTS	AG
LEV	1.00							
GO	-0.2352** (0.0012)	1.00						
FS	0.7651** (0.0000)	-0.2918** (0.0001)	1.00					
LQ	-0.9952** (0.0000)	0.2388** (0.0010)	-0.7626** (0.0000)	1.00				
TANG	-0.2876** (0.0001)	0.1386 (0.0593)	-0.3484** (0.0000)	0.2259** (0.0019)	1.00			
PROF	0.1604** (0.0288)	-0.0642 (0.3842)	0.3634** (0.0000)	-0.1652** (0.0242)	0.0798 (0.2787)	1.00		
NDTS	-0.4581** (0.0000)	0.2570** (0.0004)	-0.6915** (0.0000)	0.4272** (0.0000)	0.6400** (0.0000)	-0.1665** (0.0232)	1.00	
AG	0.6308** (0.0000)	-0.3444** (0.0000)	0.8436** (0.0000)	-0.6377** (0.0000)	-0.2169** (0.0029)	0.2734** (0.0002)	-0.4702** (0.0000)	1.00

** Indicates significant at the 5% level in the two-tailed test spearman correlation is used due to non-normal distribution of variables' data.

Additionally, profitability (PROF) and age (AG) are positively and significantly correlated with the firm size (FS) and negatively significantly correlated with liquidity (LQ), tangibility of assets (TANG) and non-debt tax shield (NDTS). Profitability (PROF) and age (AG) are negatively and significantly correlated with measure of that liquidity (LQ) and positively significantly correlated with tangibility of assets (TANG) and non-debt tax shield (NDTS). Also, non-debt tax shield (NDTS) is positively and significantly correlated with measure of that tangibility of assets (TANG) and negatively significantly correlated with age (AG). Non-debt tax shield (NDTS) is negatively and significantly correlated with measure of that profitability (PROF) but positively significantly correlated with measure of that age (AG). Non-debt tax shield (NDTS) is negatively and significantly correlated with measure of that firm age (AG).

Table IV: Fixed Versus Random Effects

LEV	Coefficient	Standard Error	P-value
Constant	0.2301	0.2472	0.352
GO	-0.0004	0.0039	0.914
FS	0.0324	0.0237	0.171
LQ	-0.0219	0.0021	0.000
TANG	0.4099	0.4527	0.365
PROF	0.2101	0.2506	0.402
NDTS	-3.74	2.38	0.116
AG	0.0312	0.0360	0.387
F-test	16.00(0.0000)		
Adjusted R^2	0.5768		
Hausman test	4.06(0.6685)		

Since the correlation matrix examines only one-to-one relationships, without detecting any significance level, we need a better estimation that would allow us to understand how various variables collectively and significantly influence the overall impact of the independent variables on leverage.

Since our study aimed to indicate how different methodologies affect our results. Starting with the static panel data analyses, the impact of independent variables on capital structure of Egyptian insurance companies has been examined by the fixed effect and random effect models. As before, the fixed effects model specification assumes that company-specific effects are fixed parameters to be estimated, whereas the random effects model assumes that companies constitute a random sample. To indicate which model was preferable, in our study uses the Hausman test. Table IV reports the regression estimates associated with fixed versus random effects. As seen from Table IV, there is insignificant negative coefficient/relationship (0.914) between growth opportunities (GO) and leverage (LEV), suggesting a higher growing insurance companies due to the flexibility with future investments. However, the coefficient of profitability (PROF) indicates a positive and insignificant relationship, implying the exposure of Egyptian insurance companies to utilize high percentage of leverage (LEV).

The adjusted R^2(0.5768) indicates that leverage is 59.28% dependant on independent variables (*GO, FS, LQ, TANG , PROF, NDTS and AG).* Further, leverage is mainly indicated by these independent variables of Egyptian insurance companies. Overall, the above results show a positive relationship between the leverage and firm size of Egyptian insurance companies, suggesting that large insurance companies prefer to issue more leverage in order to reduce insolvency costs and their relative risk. This reflects on the capital structure of Egyptian insurance companies, as they prefer high liquidity to finance their investments and reduce the external source of funding. These results are in agreement with Ozkan (1996) who indicates that small insurance companies are preferred to acquire low leverage in order to face the risk of liquidation at the time of financial crisis.

As static panel models assume that all independent variables are exogenous, we also estimated dynamic panel data models. More specifically, we performed the two-step difference GMM model drawn up for dynamic panel data models by Arellano and Bond (1991). The GMM estimator uses internal instruments; specifically, instruments that are based on lagged values of the explanatory variables that may present problems of endogeneity (firm growth, liquidity, tangibility of assets, non-deb tax shield and size and firm age are considered as exogenous). To be exact, we used all the endogenous right-hand-side variables in the model lagged from (t – 1) to (t – 2). To check the validity of the model specification when using GMM, we used the Hansen statistic of over-identifying restrictions to test for the absence of correlation between the instruments and the error term.

Turning our attention to the GMM estimations, Table V show that the coefficients of the independent variables (firm size, tangibility of assets, profitability and firm age) all positive but only firm size is a statistically significant (0.0566) at 10% level of significance.

Table V: GMM estimations of models

variable	Coefficient	Standard Error	P-value
GO	-0.0030	0.0032	0.358
FS	0.0566	0.0042	0.000
LQ	-0.0226	0.0022	0.000
TANG	0.5365	0.9125	0.557
PROF	0.2582	0.2983	0.387
NDTS	-3.20	1.13	0.005
AG	0.0008	0.0168	0.960

In contrast, the coefficient of growth opportunities, liquidity, and non-debt tax shield are negative, but only the liquidity and non-debt tax shield are statistically significant at 1% level of significance implying the adverse relationship between the leverage and those two variables. Further, Table V finds a negative relationship between firms age (*AG*) and leverage (*LEV*), indicating that the older Egyptian insurance companies use greater percentage of leverage in capital structure than young Egyptian insurance companies. These results are line with both Nivorozhkin (2005) and Al-Bahsh and Sentis (2008) who find a positive relationship between firm age and leverage.

5 Conclusions

The effect of firm characteristics on capital structure has recently become a significant issue due to the growing level of globalisation and deregulation of markets, aggressive competition and expectations of policyholders.

This study examines the effect of corporate characteristics on capital structure of Egyptian insurance companies over the period 2006 to 2011. In this study we aimed to show how the use of different methodologies may affect the empirical results that analyse the relationship between corporate characteristics and capital structure. We first estimate the model using the static panel data and then we adopted the dynamic panel method to check the robustness of our results.

In general, we find that liquidity is the only significant factor that negatively related to capital structure at 1% level of significance when using static method. The FS, TANG, PROF and AG are all positively correlated with capital structure, while GO and NDTS are negatively related to capital structure but all insignificant.

Using GMM methodology, we find that LQ and NDTS are negatively significantly correlated with capital structure, whereas FS is positively significantly related to level of leverage and capital structure. Except GO, TANG, PROF and AG are positively related to the capital structure of Egyptian insurance companies, but in significant.

The above empirical results suggest that the characteristics of Egyptian insurance companies have some impact on their leverage and capital structure. This is in fever of the Hypothesis: *H1 = independent variables have a significant effect on leverage.*

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