CAPITAL STRUCTURE DETERMINANTS OF PUBLICLY LISTED COMPANIES IN SAUDI ARABIA.

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ABSTRACT

This paper investigates the capital structure of listed firms in Saudi Arabia, using firm specific data to study the determinants of leverage. The study is based on an analysis of the capital structure of 93 Saudi listed companies, Covering the period from year 2000 to year 2010 and employing cross-sectional pool data methodology. The results of the study suggest that there are a positive relationship between size, growth of the firm and leverage. On the other hand, the study shows that there are negative relationships between tangibility of assets, profitability, risk and leverage.

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KEYWORDS: Capital structure determinants, Leverage, Saudi Arabia, tradeoff theory, Pecking order theory

INTRODUCTION

Capital structure decision is one of the most controversial subjects in corporate finance and it has been receiving suitable consideration of researchers since the seminal paper of Modigliani and Miller (1958)**.** Since then a huge body of financial literature exists relaxing many of the assumptions of Modigliani and Miller paper. From that several competing theories of capital structure choice were formed such as trade-off theory, agency theory, and pecking order theory. Nonetheless, the capital structure decision is an empirical concern as well. Thus, numerous scholarly papers examine the financing decision of public companies theoretically and empirically. In the early stage, the majority of the empirical papers examined the case of US companies (Warner 1977, Castanias 1983, Altman 1984, Bradley et al., 1984, Titman and Wessels 1988, Crutchley and Hansen 1989, Harris and Rivav 1991). Rajan and Zingales (1995) extend the analysis of capital structure to the G-7 countries focusing on four factors as determinants of leverage: tangibility of assets, the market to book ratio, profitability, and size. Moreover, Booth *et al.* (2001) extend the analysis of capital structure decision across 10 developing countries. The paper finds that the determinants of capital structure in the developed countries also significant in these 10 developing countries. Since then many financial researchers attempt to investigate the capital structure decision in individual countries around the world among them (Shah and Hijazi 2004, Gaud et al. 2005, Correa *et al.*2007, Gajural 2005, Waliullah and Nishat 2008).

This paper attempts to explain the capital structure decision and its determinants in listed companies of Saudi Arabia. One of the main characteristics of the Saudi financial market environment is the absence of corporate tax, a vague and general bankruptcy law, and very undersize and illiquid bond market. Thus, our focus will be trying to determine the factors that affect capital structure decision in a unique institutional environment such as the Saudi Arabia case and observe if it is the same factors that affect the capital structure decision for companies in the developed and developing countries around the world. We assume that the macroeconomic variables such as inflation and economic growth play minimal role in capital structure decision for Saudi Companies. Thus, for our analysis we will consider only specific company factors such as size, growth, tangibility, profitability and risk.

Our results indicate that these factors affecting capital structure decision in developed and developing countries prevail for the Saudi public companies. Size and growth opportunities are found to be positively related to leverage while risk, profitability and tangibility are found to be negatively related to leverage. Moreover, profitability and risk were the most important independent variables as determinants of the leverage ratio.

This paper proceeds as follows. Section 2 briefly reviews the relevant theoretical and empirical capital structure literatures. Section 3 is a brief discussion of the Saud Capital Markets and Institutional factors. Section 4 discusses the dataset and the hypotheses. Section 5 briefly explains the methodology. The results will be discussed in section 6. Section 7 discusses briefly the decomposition of leverage ratio. Section 8 summary and conclusions.

LITERATURE REVIEW:

A) Theoretical Literature Review

M-M irrelevancy theory: As it is known, the publication of Modigliani and Miller (1958) is considered to be the most important development in financial economics dealing with capital structure. Modigliani and Miller(henceforth referred to as M&M) assume the following assumptions: Capital markets perfectly competitive and frictionless, firms and individuals can borrow and lend at the risk free rate (implying that there is no bankruptcy cost), investors are with homogenous expectations, all cash flow streams are perpetuities (no growth), all firms are assumed to be in the same risk classes, firms issue only risk free debt and risky equity, no agency cost (managers always maximize shareholders wealth) and no signaling opportunity (insiders and outsiders have the same information. Under these specific set of assumptions, M&M argued that in the absence of taxes, the capital structure of the firm is irrelevant to its value. In

their 1963 paper, M&M extend the basic propositions in their original article by allowing for a corporate profit tax under which interest payments are deductible. They conclude that the value of the firm is a function of leverage and the tax rate. There are two extreme conclusions of the above theories-on the one hand; M&M (1958) suggest that capital structure is irrelevant while, on the other hand, they (1963) theorize that optimal structure is all debt.

Miller (1977) extends the M&M model to consider the effects of personal taxes. Miller argues that the M&M model with corporate taxes overstates the advantages of corporate debt financing. In effect, personal taxes offset, to some extent, the benefits from the tax deductibility of corporate interest payments. Therefore, in the equilibrium, the value of the firm will still be independent of its capital structure. Following we will discuss briefly the four main theories of Capital Structure.

Trade-off theory: Modigliani and Miller (1958) assumed implicitly that there are no bankruptcy costs. With relaxing this assumption, many researches argue that with the existence of bankruptcy costs an optimal debt-equity ratio will exist. The optimal ratio of debt to equity is determined by increasing the amount of debt until the marginal tax gain from leverage is equal to marginal expected loss from bankruptcy costs.

Agency theory: In providing the capital structure irrelevancy theorem, M&M implicitly assume no agency cost and mangers will act in the best interest of the firm's shareholders. Jensen and Meckling (1976), however, furnish an agency cost-based rationalization for optimal capital structure determination. Separation of ownership and control as well as conflict of interest between corporate managers, shareholders, and bondholders give rise to agency cost. Thus, the optimal capital structure mix of the firm is established through the efforts of all parties involved (agents, and investors) to minimize total agency-related costs. Therefore, it is possible to establish an optimal financial mix in a world without taxes or bankruptcy cost. Myers (1977) also provides an agency type of argument for the determination of a firm's capital structure. In Myer's model, a firm capital structure decision is influenced by the value of its underlying real options (in the form of growth opportunities). The greater is this value; it is less likely that a firm will take on risky debt. This is because, as the proportion of risky debt rises, there is an incentive for managers to take on suboptimal investment strategies, because good investments will tend to benefit bondholders, rather than shareholders.

Asymmetric information (signaling) theory: The M&M approach to capital structure irrelevance also assume that the market possesses full information about the activities of a firm. Ross (1977), however, proposes an alternative formulation for the firm's capital structure determination that is based on the reality of symmetric information between the firm's insiders and outsiders. Ross argues that if managers

possess inside information, the managerial decisions about the financial structures signal information to the market. Thus, managerial decisions to alter financial structure will alter the market's perception of the firm. Consequently, the value of the firm will rise with leverage.

Pecking order theory: Myers (1984) noted that if we relax the homogenous expectation assumption, Asymmetric information by different groups of market participants is admitted; Myers' work resulted in the symmetric information theory of capital structure. In world with Asymmetric information, corporations should issue new shares only if they have extraordinary profitable investments that cannot be postponed or financed by debt, or if the management thinks the shares are overvalued. Moreover, investors recognize this tend to make down the firm's share price when it announces plan to is new shares (signaling bad news). Finally, Myers suggests a pecking order theory of capital structure. Firms are said to prefer retained earnings as their main source of funds for investment, next in order of preference is debt, and last comes external equity financing.

B) Empirical Literature Review

Warner (1977) discussed the role of bankruptcy costs in capital structure decisions and presents evidence of the direct costs of bankruptcy for a number of US railroad firms. Warner collects data for 11 railroad bankruptcies that occurred from 1933 to 1955.The study shows that direct bankruptcy costs may not be significantly large enough to be a determinant factor in capital structure decision. Castanias (1983) and Altman (1984) follow Warner's research of bankruptcy costs. Castanias analyzes the relation between failure and leverage in small firms. The study finds that firms with high rates of failure tend to have low debt-equity ratios. Although Castanias' results indicate the possibility of optimal capital structure, the study focuses on industry data and does not account for indirect bankruptcy costs. Altman, in contrast, provides evidence of indirect costs. Altman compares expected profits with actual profits and shows that indirect costs are 8.1% of the value of the firm three years prior to bankruptcy and 10.5% the year of bankruptcy. The study indicates that total bankruptcy costs are not trivial. Bradley, Jarrell and Kim (1984) use cross-sectional, firm specific data to test for the existence of an optimal capital structure. BJK analyze three firm specific factors that influence the optimal capital structure: the variability of firm value, the level of non-tax shields and the magnitude of the cost of financial distress. Bradley et.al. find that firm leverage ratios are related inversely to earnings volatility provided there are significant cost of financial distress. However, BJK’s results indicate a strong positive relationship between leverage and non-tax shields. Titman and Wessels (1988) analyze the explanatory power of various factors that have been proposed by a number of capital structure theories as attributes that influence the choice of optimal capital structure.

Crutchley and Hansen (1989) present an empirical test of Agency theory. They focus on equity agency costs that result from the conflict of interest between managers and stockholders. C&H identify five proxies for agency costs; i.e., earning volatility, discretionary investment (advertising expenses and R&D), flotation costs, diversification loss to managers from holding firm's common stock, and firm size. The results of the study are consistent with the agency theory. An increase in earnings volatility will have a significant negative impact on leverage. Also, if discretionary expense increased, the firm will use less debt. Moreover, the authors find that the large firms tended to rely on more debt. Thies and Klock (1993) provide some support for Pecking Order theory. They suggest that the pecking order theory provides one explanation for the inverse relationship found in their study between profitability and all forms of leverage.

Rajan and Zingales (1995) examines the capital structure of the G-7 countries (US, UK, Japan, Germany, France, Italy, and Canada). The authors focus on four factors as determinants of leverage: tangibility of assets, the market to book ratio, profitability, and size. The results of the study indicate that tangibility of assets is positively correlated with leverage in all countries. The results also indicate that leverage increase with size in all countries except for Germany. On the other hand, the market to book ratio is negatively correlate with leverage in all countries except Italy where it is positively correlated. Furthermore, profitability is negatively correlated with leverage in all countries except Germany. However, Bevan and Danbolt (2002), based on analysis of capital structure of 822 UK firms, examine the sensitivity of Rajan and Zingales' results to variation in leverage measures. They find that Rajan and Zingales' results are highly dependent upon the precise definition of leverage being examined. Thus, the authors argue that the determinant of leverage vary significantly depending on the nature of the debt sub-component being studied.

Booth *et al.* (2001) analyzed capital structure decision of firm across 10 developing countries (Brazil, Mexico, Jordan, Indi, Pakistan, Turkey, Zimbabwe, Korea, Thailand, and Malaysia) for the period 1980-1990, utilizing both firm specific and institutional factors. The authors find that the related factors for explaining capital structure in developed countries are also relevant in developing countries. In general, the results show that for developing countries profitability was the most successful independent variable and negatively related to leverage. Size and tangibility of assets are positively related to leverage ratio.

Shah and Hijazi (2004) analyze the determinants of capital structure in listed firms in Pakistan for the period 1997 to 2001. They follow Rajan and Zingales (1995) of selecting only four independent variables which are: size, tangibility of assets, growth, and profitability. The results of the study show that asset

tangibility and size are positively correlated with leverage. In contrast, growth and profitability are negatively correlated with leverage.

Gaud et al. (2005) analyses the determinants of the capital structure for 104 Swiss listed companies for the period 1991-2000, employing a dynamic panel framework. The results show that size and the tangibility of assets are positively related to leverage, whereas profitability and growth are negatively related to leverage. Following the same methodology of dynamic panel framework, Correa *et al.* (2007) examines the determinants of capital structure decision of the largest 500 Brazilian companies for the period 1999-2004. The results show that profitability and tangibility of assets are negatively related to leverage, while business risk is positively related to leverage. Gajural (2005) investigates the pattern and the determinants of capital structure of Non-financial Nepalese firms for the period 1992-2004. The analysis shows that assets structure and size are positively related to leverage ratio. While liquidity, growth opportunities, profitability, and non-debt tax shield are negatively related to the leverage ratio.

Frank and Goyal (2009) investigates the relative importance of several factors in the capital structure decision of listed US companies for the period of 1950-2003. Among these factors they found a core of six reliable factors that correlated with cross-sectional differences in leverage. The results of the study indicate that leverage is positively related to firm size, tangible assets, median industry leverage, and expected inflation. On the other side, leverage is negatively related to profits and market-to-book ratio. According to the authors all above six factors, except profit, have the sign predicted by the static tradeoff theory in which the tax saving of debt are traded-off against deadweight bankruptcy costs.

Waliullah and Nishat (2008) examines the determinants of capital structure choices of 533 non- financial Firms publicly listed on Karachi Stock Exchange (KSE) for the period from 1988 to 2005. Employing autoregressive distributed lag (ARDL) methodology, the paper divided the determinants of financiering behaviors into firm's specific characteristics, reforms and industry characteristics. The results of the paper indicate that size of the firm and growth opportunities are positively related to the debt ratio. On the other hand, the results suggest that profitability and liquidity are negatively correlated with debt financing. Furthermore, the results show that firms with high risk and more tangible assets will rely more on equity financing and will use less debt.

SAUD CAPITAL MARKETS AND INSTITUTIONAL FACTORS:

A. Equity Market:

As of the end of 2010 there are 146 listed companies in Saudi Arabia with a market capitalization of about 80 percent of GDP. Market Capitalization is dominated by petrochemical companies (36.6 percent),

financial companies (27.6 percent) and telecoms (10 percent). In April 2008, the Capital Market Authority restructured the Saudi stock market sectors based on the nature of business of each listed company, its income, and earnings structure. After the new market structure, the Saudi stock market consists of 15 sectors instead of its previous eight sectors. Since the new industry coding established only at the end of period of our study, we will not include the average leverage of the industry as an explanatory variable in the study. The following table shows some of the Saudi capital market indicators over the period 2000-2010.

Table 1: Saudi Equity Market Indictors

End of Period	Listed Companies		Market Capitalization of issued shares (Billion RLs)		Market Capitalization to GDP (%)	Share Price Index (1985= 1000)	
Year	No.	Annual % Change	Value	Annual % Change		Index	Annual % Change
2000	75	9	255	11.3	32.2	2258.29	65
2001	76	1	275	7.8	40.5	2430.11	8
2002	68	-11	281	2.5	40.2	2518.08	4
2003	70	3	590	100.1	74	4437.58	76
2004	73	4	1149	94.7	123	8206.23	85
2005	77	5	2439	100.12	208	16712.64	104
2006	86	12	1226	-49.7	92.5	7933.29	-53
2007	111	29	1946	58.8	136	11038.66	39
2008	127	14	924.5	-52.5	52.2	4802.99	-56
2009	135	6	1195	29.3	82.8	6121.76	27
2010	146	8	1325	11	79.6	6620.75	8

This table shows some of the indicators of the Saudi equity market for the period under the study (2000-2010). These indicators include: number of listed companies, market capitalization of issued shares, market capitalization to GDP, and share price index. The number of listed companies increases from 75 companies in year 2000 to 146 companies in year 2010. The ratio of market capitalization to GDP was only 32 percent at the end of the year 2000, and then it reaches its peak of 208% at the end of the year 2005, and then landed at 79.6 percent at the end of year 2010. The main index (TASI) was only 2258 point at the end of 2000, and then it reaches its peak of 20,635 point in February 25, 2006. During the world financial crises of 2008 the Saudi index reaches its bottom at the end of the year 2008 of 4803 points. The Sources of the data are: Saudi Stock exchange Company (Tadawul) and Saudi Arabian Monetary Agency (SAMA).

Table (1) above illustrates some important characteristics of the Saudi Equity market during the period of the study. For instance, the number of listed company increased from 75 companies at the end of year 2000 to 111 companies at the end of year 2007 and reached 146 at the end of year 2010. Furthermore, table (1) indicates how importance the equity market in the Saudi economy which can be approximated by market capitalization of listed companies to the GDP. The ratio of market capitalization to GDP was only 32 percent at the end of the year 2000, and then it reaches its peak of 208% at the end of the year2005, and then landed at 79.6 percent at the end of year 2010. Still the main characteristic of the stock market during the period of the study 2000-2010 is the high volatility of the market, the main index, the Tadawul All Share Index (TASI) was only 2,258 point at the end of 2000, and then from the year 2003 on

it started to accelerate rapidly till reaching its peak of 20,635 point in February 25, 2006. Thus, between 2003 and its peak the index gained a staggering 700 percent. From that peak the correction started and the market collapsed at the end of year of 2006 with 7933 point. Another collapse occurs during the world financial crises of 2008 when the Saudi index reach its bottom at the end of the year 2008 of 4803 points. For the years 2009-2010 the index swings between 6000-7000 points. In general, even with this very obvious fluctuation, the equity market becomes an important financing tool for Saudi companies during the period of the study.

B. Bond Market:

The development of Bond market in Saudi Arabia traces its roots back to the mid-1988, when government securities have been issued in the domestic market to fund government fiscal deficits. Nonetheless, the market still stagnant until 2009 when the Capital Market Authority (CMA) approved the trading of Sukuk (Islamic bond) and traditional bonds for the first time in Saudi Arabia. This considered to be an important step towards launching a second regulated market. However, the Saudi bond market is still thought of as illiquid and very thin. The total amount of issued Sukuks and Bonds since the foundation of the market up to end of year 2010 stood only at SRs 35.7 billion with 7 issuances by 3 companies. Thus, with such undersized bond and Sukuk market companies will continue rely heavily on short term banking loan as a the main debt instrument.

C. Bank Lending:

Historically commercial bank loans have been the main source of financing corporations in Saudi Arabia. According to the Saudi Arabian Monetary Agency (SAMA), at the end of year 2010, there are 21 commercial banks operating in Saudi Arabia including branches for 5 foreign banks. During the 1980s and 1990s, bank financing and lines of credit dominated financing channels for corporate. Nonetheless, Bank credit continues to be the most popular financing channel, catering to more than 80% of the total funding needed. The main characteristic of the banking loan is the short term nature. For example, 59% of the total loans to companies were a short term loans with less than 1 year maturity. This is in a line with Booth et al. (2001) findings that for ten developing countries the amount of long term debt is much lower in comparison with the developed countries in general.

Alternatively, during the 1970's the Saudi Government created five major lending institutions namely; Public Investment Fund, Saudi Credit Bank, Saudi Industrial Development Fund, Saudi Agricultural Bank, and the Real Estate Fund. These government institutions provided direct credit programs to the major businesses sectors in Saudi Arabia. Two main characteristics of these credit programs, First that

they are Medium and long-terms credit programs, second these programs are with very minimal fees. The total loans distributed by these institutions since their inception up to the end of year 2010 arrived to SRs 414.3billion.

D. Tax system:

Saudi Public companies are not subject to income tax. Instead, they are subject to an Islamic Tax called 'Zakat', which is a religious tax based on Islamic law (the Sharia) and is assessed on earnings and holdings. Zakat is levied at a flat rate of 2.5% and is chargeable on the total of the company's capital resources and income that are not invested in fixed assets. These include the company's capital, net profits, retained earnings and reserves not created for specific liabilities. Moreover, loans used to finance acquisition of capital assets, investments, and inventory are added to Zakat bases. Only resources (including income) which have been held for at least 12 months are subject to Zakat. Thus, we can presume that there are no obvious tax advantages for debt financing for Saudi Companies and therefore tax will not be considered as a factor of determining capital structure decision for Saudi companies.

DATA AND HYPOTHESES:

Data**:**

The sample consists of non-financial Public Saudi Firms over the years 2000-2010. The data are annual and the source for entire data is Gulf Base (Zughaibi and Kabbani Financial Consultants (ZKFC)). The database contains balance sheet, profit and loss, and cash flow statement information for all Saudi public companies. The exclusion of the financial firms was motivated by the reason that these firms have to comply with very strict legal requirements pertaining to their financing (Gaud et al., 2005). There were 146 listed companies in the Saudi market by the end of the year 2010. However, after excluding the financial firms (11 banks and 31 insurance companies) the number of companies in the study turns out to be 104 companies. Moreover, we omitted any company with less than 3 years availability of data, as a result we exclude all listed IPOs companies in the years 2009 and 2010 (11 companies). These procedures resulted in smaller number of about 93 companies in our sample, with a total of 967 observations available for the analysis. Following is a table of basic statistics of selected financial statement items of Saudi companies for the period under the study.

Table 2: Statistics of Selected Financial statement Items

Variable	Observations (N)	Median (SR Million)	Mean (SR Million)	Standard Deviation	Percentile .10	.90

Total Assets	967	1,122,984	6,897,762	26,195,388	183,157	9,641,749
Current Liabilities	967	173,286	1,284,519	4,910,702	19,750	1,418,089
Long Term Debt	625	19,202	1,347,604	7,001,614	0	1,337,799
Book Equity	967	659,070	3,150,109	10,241,793	117,073	5,177,969
Book Liabilities	967	272,080	3,747,312	16,374,737	28,269	3,327,414
Profit	967	61,117	374,113	2,218,699	-13,492	538,288

This table shows the number of observations, the median, mean, standard deviation, the .10 percentile and the .90 percentile of some key financial statement items for Saudi listed companies (excluding the financial institutions) covering the period 2000-2010. The number of companies under the study is 93 companies. From the total of 967 observations, only 625 of them have some form of long term debt.

One important notice from table (2) above is that almost 36% of the total observations have no any form of long term debt, and the value long term debt to total assets is around 20%. This assures the notion that Saudi companies depend heavily on short term bank loans as a main source of leverage. The low long term debt ratio come in alliances with Booth et al. (2001) findings that companies in the developing countries have substantially lower amount of long term debt in comparison with companies in the developed countries.

VARIABLE DEFINITIONS:

In accordance with previous studies concerning capital structure decision, proxies of the variables covered were used for analysis of the leverage determinants.

Measure of Leverage: Quite few alternative definition of leverage has been suggested in the literature. In this study, the leverage ratio will be defined as the ratio of book value of total debt divided by book value of total assets. We consider the book leverage rather than market leverage since we think that the Saudi stock market was very volatile during the period of the study. Thus, using market leverage will be unreliable since there will be stock mispricing cross the stock market over the period of the study. Furthermore, many empirical studies use the long term debt only in calculating the leverage ratio. However, as mentioned before looking carefully to the data we notice that many Saudi companies have zero level of long term debt which can be attributed to the new and illiquid bond market in Saudi Arabia. Thus, many of those companies depend mainly on short commercial banking loans as the only source of debt. Therefore, our analysis will consider the total debt (short + long term debt) in the measurement of the leverage ratio. In this study we will define the dependent variable (leverage ratio) as follow:

$$\text{Leverage Ratio} = \frac{Total\ Liablities}{Total\ Assets}$$

Explanatory Variables: For the independent variables we extend Rajan and Zingales' model (1995) to include business risk. Thus, our independent variables will include: size, growth opportunities, tangibility of the assets, profitability, and business risk.

Size: large firms usually are more diversified and have more stable cash flow, therefore they are less risky. This will result in lower cost of debt as well as easier access to the external debt markets. Accordingly, we predict that there will be a positive relationship between size and leverage. In this study, firm size is measured by the natural log of sales.

$$\text{Size} = \ln(\text{Sales})$$

Hypothesis 1: Firm size will have a positive relationship with leverage.

Growth opportunities: Due to the agency cost of debt firms with high growth opportunities are expected to rely more on retained earnings and stakeholders co-investment than debt financing. Thus, we expect a negative relationship between growth opportunities and leverage. While the majority of empirical studies employ the market-to-book value as a proxy for growth opportunities, we measured it by the change in log of sales. Even though many studies employ log assets as a proxy of the firm growth, we employ log of sales as a proxy of growth. This is will not affect the analysis since there are a high correlation between change in assets and change in sales.

The main reason of not using the market-to –book value is that, as mentioned before, the Saudi Stock market witnessed great volatility during the period under study. Thus using any market value will be unreliable. Therefore, following Titman and Wessels (1988) the growth rate of sales will be used as a proxy for growth opportunities.

$$Growth = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$$

Hypothesis 2: The percentage change of sales will have a negative relationship with leverage.

Tangibility of Assets: Since tangible assets can be used as collateral and are less subject to information asymmetries. As a result, tangible assets will minimize the agency cost of debt. Therefore, according to the agency cost and information asymmetry theories firms with high tangible assets tend to depend more on debt financing. Tangibility of assets will be defined as the ratio of fixed assets to total assets and we expect a positive relationship between tangibility of assets and leverage.

$$Tangibility\ of\ Assets = \frac{Fixed\ Assets}{Total\ Assets}$$

Hypothesis 3: The greater the proportion of tangible assets the higher the leverage.

Profitability: The relationship between profitability and leverage still one of the unresolved issues in capital structure theories. In one hand, according to pecking order theory, firms prefer retained earnings as their main source of funds. Next in order of preference is debt, and last comes external equity financing. On the other hand, trade-off theory suggests that profitable firms prefer debt financing to benefit from the tax shield. However, in a case of Saudi Arabia where there is no tax advantage of debt and most of the profitable companies usually maintain large retained earnings, we believe that Saudi companies will exploit retained earnings as the first source of fund before turning to raise debt. Profitability will be measured by return on assets and we anticipate a negative relationship between profitability and leverage.

$$Profitablity = \frac{Net\ Profit}{Total\ Assets}$$

Hypothesis 4: Profitability of the firm will have a negative relationship with leverage.

Risk: Firms with high volatility of earning might find some difficulty of honoring the payment of debt obligations, which will result in high probability of bankruptcy. Thus, firms with high volatility of cash flow can lower their risk by reducing the level of debt. We measure risk by variability of the return on assets (standard deviation of return on assets) and we anticipate a negative relationship between risk and leverage.

$$Risk = Standard\ deviation\ of\ the\ return\ on\ assets$$

$$= \sigma(ROA)$$

Hypothesis 5: The variability of the return on assets will have a negative relationship with leverage.

Table 3: Descriptive Statistics for leverage measure and explanatory factors

Variable	Observations (N)	Median	Mean	Standard Deviation	Percentile	
					.10	.90
Leverage Ratio	967	0.292	0.336	0.205	0.094	0.632
Firm Size	967	12.726	12.281	3.073	9.714	14.815
Firm Growth	967	0.069	0.441	3.827	-0.172	0.474
Tangibility of Assets	967	0.681	0.651	0.211	0.330	0.896
Profitability	967	0.055	0.066	0.103	-0.025	0.185
Risk	967	0.0455	0.055	0.047	0.017	0.097

This table presents a descriptive statistics of the leverage ratio and the five independent variables which are: firm size, firm growth, tangibility of assets, profitability, and risk. The sample contains 93 companies listed in Saudi stock exchange (TASI). The data cover the period of 2000-2010.We define the leverage ratio as total liabilities divided by total assets. We measure size as the natural logarithm of sales. We define growth as a parentage change of sales. We measure asset tangibility by fixed assets divided by total assets. Profitability is net profit divided by total assets. Risk is defined as standard deviation of return on assets. Leverage ratio for Saudi Companies, with the mean of 33.6 percent, is considered to be low in comparison to the leverage ratio of most of developed and developing countries as well.

Table (3) above shows that there is a large difference for the leverage ratio for the Saudi companies which range from only 9.4% for the 10^{th} percentile to 63.2% for the 90^{th} percentile. The average debt ratio is 33.6% for Saudi public companies which is comparable to the debt ratio of some of developing countries (*Booth et al*, 2001) such as Brazil 30.3%, Mexico 34.7%. However, the debt ratio is much lower in comparison to the debt ratios of other developing countries included in *Booth et al* study. Such as the debt ratio for South Korea 73.4%, India 67.1%, Pakistan 65.5%, and Turkey59.1%. Furthermore, debt ratio of the Saudi Companies still much lower than the debt ratio of developed countries. According to Rajan and Zingales (1995) the debt ratio for listed companies in Germany 73%, France 71%, Italy 70%, Japan 69%, US 58%, Canada 56%, and UK 54%.

For the independent variables the table shows that the size of Saudi companies generally rang between mid-size companies to large-size companies, ranging from 9.7 to 14.8. The growth opportunities demonstrate significant variability ranging from negative 17.2% to positive 47.4%. The value of the mean of the growth opportunities is about 44.1% which is much higher than the value of the median 6.9%. The table also shows high mean and median of tangibility of assets (65.1% and 68.1%), in which reflect the intense use of fixed assets for the Saudi's public companies.

Following are the correlation coefficients between and among leverage ratio and each of the expletory variables, as well as the correlation among the independent variables.

Table 4: Correlations between individual variable and VIF coefficients

		Leverage Ratio	Size	Growth	Tangibility	Profitability	Risk	VIF
Leverage Ratio	Pearson Correlation	1	0.302***	0.083**	-0.152***	-0.117***	-0.116***	
Size	Pearson Correlation		1	-0.034	0.256***	0.279***	-0.002	1.134
Growth	Pearson Correlation			1	0.047	0.001	-0.001	1.004
Tangibility	Pearson Correlation				1	-0.246***	0.027	1.113
Profitability	Pearson Correlation					1	-0.134***	1.145
Risk	Pearson Correlation						1	1.020

This table presents the Pearson correlation coefficients for the variables used in the analysis and VIF (variance inflation factor) tests between independent variables. The sample contains 93 companies listed in Saudi stock exchange (TASI). The data cover the period of 2000-2010. Leverage ratio defined as total liabilities divided by total assets. Size is defined as the natural logarithm of sales. We define growth as a parentage change of sales. We measure asset tangibility by fixed assets divided by total assets. Profitability is net profit divided by total assets. Risk is defined as standard deviation of return on assets. ***, **, and * indicate significant at the 1, 5 and 10 percent level respectively.

Table (4) above shows that leverage ratio has a positive and significant correlation with size and growth. Conversely, leverage ratio has a negative and significant correlation with tangibility, profitability and risk. The correlations among independent variables show that growth has non-significant correlations with any one of the explanatory variables. Size has a positive significant correlation with tangibility and negative but non-significant correlation with risk. Moreover, we perform variance inflation factor (VIF) to evaluate the presence of multicolinearity among the independent variables. The VIF statistics are substantially lower than 10 indicating that there is no multicolinearity between the independent variables, which means we do not need to eliminate any independent variable for the reason of multicolinearity.

METHODOLOGY:

We follow the literature by using cross-sectional pooled data model to study the determinants factors on capital structure decision of the Saudi Companies. Mainly the firm's debt ratio will be regressed against the natural log of its sales, the change in log of total sales, the tangibility of its assets, its return on assets, and the standard deviation of its return on assets. The coefficients are estimated using the ordinary least square (OLS) model. For the outliers in our data sample we follow Bevan and Danbolt (2002), eliminate

them by winsorising the dependent variable and all independent variables at one percent level. The regression equation will be as follows:

$$Leverage = f\begin{pmatrix} size, growth\ opportunities, tangiblity\ of\ assets, \\ profitablity, business\ risk \end{pmatrix} \quad (3.1)$$

$$\begin{aligned} Leverage(firm_{i,t}) &= \alpha + \beta_1 \ln sales_{i,t} + \beta_2 \Delta \ln sales_{i,t} + \beta_3 tangiblity\ of\ assets_{i,t} \\ &+ \beta_4 return\ on\ total\ assets_{i,t} + \beta_5 \sigma\ return\ on\ total\ assets_{i,t} \\ &+ \varepsilon_{i,t} \end{aligned} \quad (3.2)$$

Where *i* denote firm and *t* denotes the time, α is the intercept and $\varepsilon_{i,t}$ is error term.

Empirical results:

From the result of our analysis we can construct our regression model as follow:

$$\begin{aligned} Leverage &= 0.207 + 0.023 \ln sales + 0.004 \Delta \ln sales \\ &- 0.125 tangiblity\ of\ assets - 0.521 return\ on\ total\ assets \\ &- 0.638\ \sigma return\ on\ total\ assets + \varepsilon_{i,t} \end{aligned}$$

Tables 5 below shows the regression model summery as well as the output of the regression analysis.

Table 5: The model summary and the cross sectional regression results

Coefficients				95.0% Confidence Interval for B	
	B	Std. Error	t-value	Lower Bound	Upper Bound
(Constant)	0.207***	0.036	5.718	0.136	0.278
Size	0.023***	0.002	10.885	0.019	0.027
Growth	0.004***	0.002	2.640	0.001	0.007
Tangibility	-0.125***	0.030	-4.174	-0.184	-0.066

Profitability	-0.521***	0.062	-8.399	-0.643	-0.399
Risk	-0.638***	0.128	-4.975	-0.889	-0.386

R-Square	0.176	MSE	0.035
Adjusted R- Square	0.172	Durbin-Watson	0.535
F	41.140	AIC	-3243.835
Prob (F Statistic)	0.0001		

This table shows a summary of the results of the estimates from the Ordinary Least Square (OLS) Model. The sample contains 93 Saudi Firms listed in the Saudi Stock Exchange for which there is a minimum of 3 consecutive years of data for the period 2000-2010. The leverage ratio was regressed against the five independent variables: size, growth, tangibility, profitability, and risk. The estimated model is: $\mathbf{Leverage}(\mathbf{firm_{i,t}}) = \alpha + \beta_1 \ln \mathbf{sales_{i,t}} + \beta_2 \Delta \ln \mathbf{sales_{i,t}} + \beta_3 \mathbf{tangiblity\ of\ assets_{i,t}} + \beta_4 \mathbf{return\ on\ total\ assets_{i,t}} + \beta_5 \sigma \mathbf{return\ on\ total\ assets_{i,t}} + \varepsilon_{i,t}$. We define the leverage ratio as total liabilities divided by total assets. Size is defined as the natural logarithm of sales. We define growth as a parentage change of sales. We measure asset tangibility by fixed assets divided by total assets. Profitability is net profit divided by total assets. Risk is defined as standard deviation of return on assets. ***, **, and * indicate significant at the 1, 5 and 10 percent level respectively.

For our model in general, the value of adjusted R^2 is 17.2% which means that these five independent variables account for only 17.2% of the variation in leverage ratio for listed Saudi companies. This value is very close to value of R^2 of Frank and Goyel (2003) which was 17.5%. The F-statistics shows the validity of the model with a value of 41.140 which is significant at level of .01 meaning that the model is capable of determining the variation of the total debt ratio of Saudi listed companies.

The results of the study show that size has a positive and significant relationship with leverage, though the size of the coefficient tends to be small. This suggests that size of the company seems to have limited impact of the capital structure of Saudi Companies. Growth has a significant and positive relationship with leverage, contrary to our expectation, though the size of the coefficient tends to be very small. This finding is consistent with the pecking order theory where the theory predicts that growth companies are expected to accumulate more debt over time. One the other hand, this finding is contradictory to the agency theory prediction where firms with greater value of growth opportunities are expected to use less risky debt. In total, slimier to size, since the coefficient of growth is very small it seems that growth has very little effect of the capital structure of Saudi Companies.

Tangibility has a negative and significant relationship with leverage, opposite from what we anticipated. This negative relationship is in accordance with pecking order theory which asserts that because of low asymmetric information, large tangible assets makes equity issuance less costly. Another explanation for this unanticipated relationship between tangibility and leverage is that, as Beger and Udell (1994) argue,

firms with close relationships with creditors need to provide less collateral because the relationship substitutes for physical collateral. With only 11 commercial banks in Saudi Arabia, at the time of the study, the close relationship between banks and listed companies in SA is very obvious. Furthermore, this outcome confirms the results of Booth et al. (2001) that across ten developing countries total debt ratios decrease with the tangibility of assets.

Profitability has a significant and strong negative relationship with leverage, with a size of a coefficient of -0.521. This result is consistent with pecking order theory where profitable firms are predicted to use less debt. Booth *et al.* (2001) argue that the strong negative relationship can be related to agency and information asymmetry problems as well as to underdeveloped nature of the long-term bond market, which we believe is the case in Saudi Arabia.

Risk has a significant and strong negative relationship with leverage. This means firms with more volatile cash flow will use less debt. This result is consistent with the agency theory which predicts that an increase in earnings volatility will have a significant negative impact on leverage. In summary, it seems that risk and profitability are the strongest explanatory powers of the determinants of capital structure for Saudi companies.

DECOMPOSITION OF LEVERAGE RATIO:

As Bevan and Danbolt (2002) suggest that the determinants of leverage is significantly sensitive upon which components of debt is being analyzed. In addition to that, since we found that almost 36% of the study observations has no any form of long term debt, we think it will more accurate if we divide the debt ratio to long term debt ratio and short term debt ratio. Thus, we will decompose the leverage ratio into its sub-component as long and short term debt ratios, and then estimate the extent to which each of these ratios might be related to our five explanatory variables. The long-term debt ratio will be defined as total liabilities minus current liabilities divided by total assets. Short term debt ratio will be defined as current liabilities divided by total assets. Nevertheless, this section should be treated as an independent part from the main body of the paper. Thus, the results of this section will not be included in the conclusion section.

Table 6: cross-sectional results of Decomposed Leverage ratio (3 models):

Model	Coefficient	St. Error	t-Value
1. Total Debt Ratio Model			
Constant	.207***	.036	7.718
Size	.023***	.002	10.885
Growth	.004**	.002	2.640
Tangibility	-.125***	.030	-4.174

Profitability		-.521***	.062	-8.399
Risk		-.638***	.128	-4.975
Adjusted R^2	0.172			
F-statistic	41.140			
Prob. of (F-Stat.)	0.0001			
2. Long Term Debt Ratio Model				
Constant		.108**	.035	3.115
Size		-.006**	.002	-3.087
Growth		.003*	.001	2.498
Tangibility		.194***	.028	6.960
Profitability		-.158**	.051	-3.064
Risk		-.467***	.095	-4.921
Adjusted R^2	0.165			
F-statistic	23.932			
Prob. of (F-Stat.)	0.0001			
3. Short Term Debt Ratio Model				
Constant		.263**	.024	10.781
Size		.013***	.001	9.344
Growth		.000**	.001	0.314
Tangibility		-.306***	.020	-15.174
Profitability		-.227***	.042	-5.434
Risk		-.112***	.086	-1.304
Adjusted R^2	0.287			
F-statistic	78.678			
Prob. of (F-Stat.)	0.0001			

This table shows a summary of the results of the estimates from the Ordinary Least Square (OLS) Models. The sample contains 93 Saudi Firms listed in the Saudi Stock Exchange for which there is a minimum of 3 consecutive years of data for the period 2000-2010. Model 1 defines the total debt ratio as total liabilities divided by total assets. Model 2 defines the long-term debt ratio as total liabilities minus current liabilities divided by total assets. Model 3 defines short term debt ratio as current liabilities divided by total assets. In each model the leverage ratio was regressed against the five independent variables: size, growth, tangibility, profitability, and risk. For each model the estimated model is: $\mathbf{Leverage}(\mathbf{firm}_{i,t}) = \alpha + \beta_1 \ln \mathbf{sales}_{i,t} + \beta_2 \Delta \ln \mathbf{sales}_{i,t} + \beta_3 \mathbf{tangiblity\ of\ assets}_{i,t} + \beta_4 \mathbf{return\ on\ total\ assets}_{i,t} + \beta_5 \sigma\ \mathbf{return\ on\ total\ assets}_{i,t} + \varepsilon_{i,t}$. ***, **, and * indicate significant at the 1, 5 and 10 percent level respectively.

As discussed in the main body of the paper all five explanatory variables have significant relations with the total debt ratio. Though, growth opportunities and tangibility of assets appeared with contrary sings from our expectations. As it is mentioned before, for total debt ratio risk and profitability, both negatively related to leverage, are the major factors of determining the capital structure for Saudi companies. However, when decompose the total debt ratio into long term ratio and short term ratio we get different results for some of these coefficients.

For long term debt ratio model, size appears to be negatively related to leverage instead of positively related to leverage with total debt model, still for both models size have very small effect on the capital

structure of Saudi companies. A growth is positively related to long term leverage but still with small effect. Tangibility of assets becomes positively related of long term leverage instead of negatively related to total leverage ratio. Both profitability and risk have same sign as before but become with less effect with long term debt than when it was with total debt ratio. Adjusted R^2 and F-statistic become a little lower with long term debt ratio with values of 0.165 and 23.932 respectively.

For short term debt model, all coefficients are significant and have the same signs of total debt model. However, tangibility becomes the most important factor of explaining the capital structure then profitability and then risk. Thus, the order of the importance of these 3 factors reverses. Additionally, the short term model comes with the best explaining power in comparison with the other two models. The value of adjusted R^2 increased to 28.7 which mean that these five independent variables account for 28.7% of the variation in short term leverage ratio for listed Saudi companies. Also, the F-statistics shows better validity of the model with a value of 78.678 in comparison of 41.140 for total debt ratio and only 23.932 for the long term debt model. It seems that the short term model is the best model to fit the data set of listed companies in Saudi Arabia. These results assure the claim of Bevan and Danbolt (2002) that the determinants of leverage are significantly sensitive upon which components of debt is being analyzed.

VII. CONCLUSION:

This paper presents a study of the determinants of the capital structure for 93 listed companies in Saudi Arabia for the period 1999-2010. The analysis is conducted using cross-sectional pooled model. The study suggests that size and growth opportunities are positively related to leverage where as tangibility, profitability and risk are negatively related with leverage. Moreover, the results of study indicate that risk and profitability are the major factors in determining the capital structure decision for listed companies in Saudi Arabia. Our results provide some unexpected signs of the some of the coefficients namely growth opportunities and tangibility of assets. In general, most of the empirical results of the study are inclined to support the pecking order theory. This study can be extended by considering ownership structure and median industry leverage as another explanatory variables of the determinates of capital structure decision for the Saudi companies.

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