AN EMPIRICAL TEST OF THE TAX MODEL OF CAPITAL STRUCTURE: EVIDENCE FROM COUNTRIES THAT DO NOT HAVE A TAX REGIME IN PLACE

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Abstract

The purpose of this paper is to examine the tax models of capital structure theory in the Arab world, an economy that is different from that where the theory was born i.e. Western economies. A sample from the 12 Arab countries (Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates) that have stock markets is used. Arab countries are divided into tax countries and non-tax countries (Gulf States usually have no tax regime in place). The results support the tax models of capital structure in all respects. Tax countries are found to use more debt than non-tax countries. MTR is found to have a significant positive effect on leverage. NDTS is a positive and significant determinant of capital structure in non-tax countries and in companies that have a low MTR, while it is negative and significant in tax countries. Personal taxes are found to have a significantly negative effect on the firm's level of leverage.

Introduction:

Formal development of capital structure theory began with the celebrated paper of Miller and Modigliani (1958). Their work triggered intense scrutiny and often bitter controversy as observed by Miller (1988). After forty five years and hundreds of theoretical and empirical papers in the US, developed, and developing countries it is still safe to ask what Myers asked in his (1984) seminal paper, "How do firms choose their capital structure?" The answer remains, "We don't know". He added: "In general, we have inadequate understanding of corporate financing behavior and of how that behavior affects security returns".

Theories have tried to explain firms' financing behavior through the Static Tradeoff (STO) and the Pecking Order Hypothesis (POH). These frameworks take into account numerous factors in their explanations of the debt/equity choice of financing. Whether it is STO or POH, the determinants of corporate capital borrowing are summarized in the debt tax shield benefits, agency and bankruptcy costs, asymmetry of information, corporate control factors, input/product market factors and control variables like size, tangible assets, and interest rates among others. Some of these control variables are empirical and have no theoretical foundation to support them.

Myers (1984) suggested that capital structure was a puzzle then. Since then, numerous empirical tests have been conducted and various new theories have been developed; nonetheless, no one has been able to conclusively explain why and how capital structure

decisions are made. This would lead us to believe that capital structure is still a puzzle now as it was then. Beside problems with empirical tests and the use of different estimation techniques, the apparent reason for this puzzle is that the potential factors that significantly affect firms' choice of capital structure are numerous. Some of these factors have been accounted for in some models, but no single model has been able to include all of them.

The main goal of this paper is to empirically test the tax models of capital structure theory in the Arab world. These tests will take into account the effect of Arab country traditions and institutional factors. Hypotheses based on STO and its applicability in the Arab world are developed and tested. To test these hypotheses, three to six year panel data from 461 listed companies (1115 company years) in 12 Arab countries are used. Due to the nature of the data, TOBIT model is used to regress six leverage ratios (short term, long term, and total book values of debt over both book and market values of equity) on empirical and theory-suggested determinants of capital structure.

This paper is unique in many respects: it is the first work that empirically tests CS theory in Arab countries. It is also one of the few studies to tackle these issues outside the US, much less in developing countries. It utilizes a unique database assembled by the authors from several data sources. It tests capital structure theory and its applicability in environments different from those in Western economies. Finally, and of most significance, is the fact that this paper is the first work to test capital structure theory in countries that do not have tax regimes in place.

Of the 22 Arab countries, only the 12 countries that have stock markets will be studied: Saudi Arabia, Kuwait, Bahrain, Qatar, the Untied Arab Emirates, Oman, Morocco, Tunisia, Egypt, Jordan, Palestine and Lebanon. These countries are divided into two main groups, the oil states (the first five) that do not levy taxes (non-tax countries, hereafter) and the remaining tax levying countries (tax countries, hereafter).

This paper finds for tax models of capital structure; thus, tax models of capital structure are robust and portable across countries regardless of country specific factors. The only requirement for tax models to work as theorized is the existence of a tax regime. Specifically:

1- Companies operating in tax countries use more debt than those in non-tax countries.

2- MTR is a significantly positive determinant of capital structure.

3- NDTS is positive and significant in non-tax countries and in companies that have a low or no MTR; hence supporting the proxy for collateral argument. On the other hand it is negative and significant in companies that have a significant MTR; this supports the substitution argument.

4- Personal taxes have a significantly negative effect on the firm's level of leverage.

This paper also discusses the significance of Arab factors on the tax models of capital structure; theses factors are: absence of debt markets, strong and well developed banking system, state sponsored stock markets, cultural and regional factors like the prohibition of interest rates in Islam, (the dominant religion in the Arab world), the dominance of family ownership, absence of corporate or personal taxes in oil rich countries and the urge to follow on the lead of western economies.

The rest of the paper is organized as follows. Section II contains a review of literature relevant to the topic. Section III analyzes the Arab country traditions and institutional factors that are expected to affect capital structure decisions. Section IV presents the measures of capital structure, its determinants, and develops the hypotheses. Section V describes both the data and the methodology used. Section VI enumerates empirical results. Section VII provides a brief summary and the contributions of this study.

Literature Review:

In their efforts to understand the incentives for a firm to use debt, finance scholars put forward different theories and models. Each explains one or more of the determinants of capital structure. These theories cover the various aspects of the firm that can explain the use of debt. We have yet to see a comprehensive theory that covers all of these factors in one interconnected analysis. The most commonly found theories in capital structure are the following:

Tax Based Theories: Assume that an optimal capital structure involves balancing the tax advantage of debt against the present value of its costs, i.e. a Static Tradeoff framework. Leverage-related costs include bankruptcy costs, agency costs of debt, loss of non-debt tax shield and the personal tax disadvantage of debt. Due to the rare availability of data from countries that do not have a tax regime in place, tax-based theories are the topic of this paper.

The Agency Approach: Assumes that capital structure is determined as a result of the conflicts of interest among the various groups that have claims on the firm's resources. These groups include managers and equity and debt holders.

Asymmetric Information Approach: Explains the level of debt in a firm by the differences in the information available to the managers of the firm and to the capital markets. Debt level is chosen to mitigate the adverse effects of external equity and capitalize on the advantages of internal financing, i.e. the Pecking Order Hypothesis framework.

Corporate Control Considerations: Use the fact that equity carries voting rights while debt does not; thus capital structure affects the outcome of takeover contests through its effect on the distribution of votes.

Product / Input Market: Exploits the relationship between a firm's capital structure and its strategy when competing in the product market and the relationship between the firm's capital structure and the characteristics of its products or inputs. Harris and Raviv (1991) state that these models are new in the western economies and very little empirical work has been done to test them.

Neutral Mutation: Miller (1977) and Myers (1984) state that capital structure choice is arbitrary and has no economic reasoning to it. In other words, it is just a financing pattern or a habit, which has no material effect on the value of the firm. This position can be considered a hypothesis of no theory of capital structure.

When reviewing the theoretical literature related to capital structure, one must always start with the celebrated paper of Miller and Modigliani (MM) (1958). Since then, many scholars have followed their path. MM's proposition I states that the cost of capital and hence the value of the firm are unaffected by the firm's CS. This with their second proposition, which states that the rate of return on a stock increases as more debt is used, shows an inverse

relationship between the value of the firm's equity and the utilized level of debt. In other words, any gains from using more of what seems to be cheaper debt capital would be offset by the correspondingly higher cost of the now riskier equity capital. MM explained this inverse relationship between debt and equity by the increase in risk due to the increase in the use of debt.

MM (1958) propose the irrelevance of capital structure under the assumptions of perfect capital markets. Subsequent theoretical works focus on relaxing these assumptions and their effects on the relevance of capital structure.

The static trade-off theory of capital structure (STO) states that the trade-off between the tax advantage of debt and its costs is expected to yield the optimal level of leverage that maximizes the value of the firm. The first paper to extensively demonstrate this relationship was the Miller and Modigliani tax correction article (1963). By including taxes, MM demonstrated that the value of the firm increases by an amount equivalent to the debt tax shield (the corporate tax rate * interest paid on debt). This gives us the first factor to consider in our effort to find the driving factors of the firm's level of leverage.

Modigliani (1988) summarizes the MM (1963) finding as the dollar of debt that will increase the value of the firm by T_c*100 cents. He also states that this result rests on the assumption that the tax savings stream T_c*D is constant, perpetual, and absolutely certain, like the coupon of a government bond. MM (1963) mentioned some limitations to the validity of the assumption, such as the possibility of changes in the tax code and of profits falling below contractual interest. However, the assumption that the choice of capital structure is permanently fixed seems untenable in a world in which the movement of expected profit and size of the firm is supposed to follow a random walk (or a martingale). MM ended their (1963) piece by noting that other factors -beside taxes- affect CS decisions. This note opened the way for other scholars to contribute to CS theory as we now know it.

Farrar and Selwyn (1967) introduced personal taxes to CS policy. They calculated the net after tax (both corporate and personal) earnings to the individual investor who uses personal debt to finance the purchase of the firm's equity. They find that corporate debt is cheaper than personal debt --regardless of the personal tax rate-- by a factor of (1- T_c). By including the personal income tax on capital gains, they found: first, since personal tax on regular income is greater than that on capital gains, it is optimal for firms to use earnings to repurchase stock rather than pay cash dividends. They should use at least retained earnings to finance investments rather than paying cash dividends and using external financing. Second, since corporate debt dominates personal debt for investors, then, in a dividend-paying firm, it is optimal to use leverage. Third, in a non dividend-paying firm, corporate debt dominates personal debt for low-tax-bracket investors. The opposite is true for high-tax-bracket investors. The company's use of debt depends on its investors' tax bracket.

Brennan (1970) criticized Farrar and Selwyn's work for two reasons. First, they assume that CS is chosen to maximize the investor's after-tax income instead of maximizing the market value of the firm. Second, their results are built on a comparative static model, which does not take into account the dynamic impact on the firm's value of issuing debt. Brennan concludes that the value of the firm increases as the firm takes on more debt; the value of the levered firm equals the value of the unlevered firm plus the value of the tax shield. In the same manner, he also concludes that if debt proceeds are to be used for dividends rather than stock repurchase, then the advantage of issuing debt is reduced.

Miller (1977) addresses taxes by assuming that the marginal tax rate (MTR) is equal to the statutory tax rate (STR) and concludes that whatever tax gains accrue from issuing debt at the corporate level will be exhausted at the personal tax level and that the value of the firm, in equilibrium, is still independent on its capital structure.

In the contrasting extreme case in which (a) the capital gains provisions or other special relief has effectively eliminated the personal tax on equity income, (b) full loss offsets are available at the corporate level and (c) the marginal personal tax rate on interest income just equals the marginal corporate rate, the purely tax gains from corporate leverage vanish entirely, as in Miller (1988). The gains from interest deductibility at the corporate level are exactly offset by the added burden of interest includability under the personal tax. These findings support the MM proposition I (the irrelevance of capital structure). When the marginal tax rate is lower than the statutory tax rate (which is usually the case because of the non debt tax shield (NDTS), NDTS is the amount of tax savings from depreciation, losses, and investment tax credit) then the corporate tax benefits will overwhelm the personal tax disadvantage, which is the essence of DeAngelo and Masulis (1980) proposition: the borrower will add debt so long as no tax shield (DTS or NDTS) is lost. They emphasized the trade-off between DTS and NDTS and the positive relationship between T_c (not MTR) and the use of debt. They concluded that each firm will have a unique interior optimum leverage which equates the present value of marginal net tax advantage of debt to the present value of expected marginal default costs. This had grown to be called the static trade off tradeoff between the costs [financial distress = agency cost plus bankruptcy cost] and the benefits [DTS] of borrowing.

Empirical Evidence

Empirical tests of the tax model of capital structure theory tested three distinct issues; the effects of the marginal tax rate, non-debt tax shields and personal taxes. Nevertheless, thus far, no empirical work had been able to introduce a direct test of the net effect of taxes on the firm's leverage. This paper will provide the first opportunity to do so.

It is logical to start with the fathers of capital structure theory: MM (1958) regressed the Weighted Average Cost of Capital (WACC) on the firm's leverage for electric utility (43 firms for the years 1947-1948) and oil companies (42 companies for the year 1953). They found that WACC is not affected by capital structure; hence, there is no gain to leverage. Weston (1963) carried a similar test on electric utilities (1949-1959); he found that when growth and size are added to the cross-section regression, there is a gain to leverage, i.e., the tax shield on debt has value. MM (1966) found (based on a sample of 63 electric utility companies for the years 1954, 1956 and 1957) that there is a gain (debt tax shield) from leverage. The gain from leverage contributes about 23% to the value of the firm.

Givoly, et al. (1992) tested the effect of the Tax Reform Act (TRA) of 1986 shock on change in leverage in US firms. They tested leverage around the enactment of the TRA (1984-1987) and found support for tax-based theories of CS. Specifically, the propensity of firms to decrease leverage as a result of a drop in the statutory tax rate is greater with a higher effective tax rate.

Graham (1996) used MTR (the present value of current and future taxes paid on an additional dollar of income earned today) instead of just the average of past paid taxes as mistakenly used in Givoly, et al. (1992). He uses data on US firms to regress changes in debt on MTR, σMTR, STR (the statutory tax rate) – MTR plus a host of control variables. He found that the coefficient for MTR confirms a positive relationship between debt use and tax rates. A firm

with STR > (<) MTR will issue more (less) debt and firms with large σMTR will have a large expected tax bill and therefore will issue more debt.

Singh and Hamid (1992) used data from 9 developing countries from various locations around the world; they found that the differences in the magnitudes and signs of the determinants of capital structure among countries are due to differences in tax, legal, and other institutional factors (accounting practices, degree of development of financial markets, etc.). This, though indirectly, renders some support to the tax model of capital structure theory.

Booth, et al. (2001) assess whether capital structure theory is portable across countries with different institutional structures. They found that -across countries- debt ratios are negatively related to tax rates. Antoniou, et al. (2002) used panel data from Britain, France, and Germany. They find mixed results (amongst countries) on MTR and other factors. These mixed results show that institutional arrangements and country traditions contribute to capital structure decisions.

Most empirical tests of NDTS are divided. A first group (e.g. Givoly, et al. 1992, Graham 1996) found a negative relationship between the firm's level of debt and the amount of NDTS. They explained this finding by the DeAngelo and Masulis (1980) substitutability between debt tax shields and non-debt tax shields. Another group (e.g. Bradley, et al. 1984 and Bathala, et al. 1994) found a positive relationship between the firm's level of debt and the amount of NDTS. The finding contradicts the traditional substitutability argument between DTS and NDTS; they explained it by assuming that NDTS is an instrumental variable for debt collateral. Nonetheless, Titman and Wessels (1988) used factor analysis to mitigate the measurement problems encountered when working with proxy variables and to avoid linear regression problems. They found NDTS to have no effect on the firm's level of leverage.

In regards of the effect of personal taxes, a limited number of studies was encountered in the literature review. Givoly, et al. (1992) found that personal taxes have a negative effect on the firm's leverage and Graham (1994) that relative taxation of debt and equity at the personal level has no effect on debt. These two tests are susceptible to criticism on the basis of the used proxy for personal taxes. This criticism and the solution are illustrated in the methodology.

In conclusion, we find that empirical studies, though numerous, have concentrated mostly on testing the determinants of capital structure within the various theory models and frameworks. The tests above found mixed results. Some support the theory while others negate it, leading us back to Myers' (1984) question: "How do firms choose their capital structure?" The answer remains, "We don't know."

This paper will empirically examine whether the tax models of capital structure work according to theory in an environment that is different from the one where the theory born. The initial motivation of this paper was the fact that capital structure theory has not been tested in the Arab world due to the scarcity of data. The relentless effort to build a reliable database for this purpose enhanced this motivation, especially due to the availability of data in countries that have no tax system (no personal and/or corporate income taxes). This paper is not merely another attempt to find whether STO works; it is a real and unique opportunity to lend support to the theory or just reject it depending on how the determinants of capital borrowing react to country factors. Another motivation came from the increased use of leverage in the Arab world despite religious and cultural barriers that make debt and interest

(usury) a taboo. The sporadic literature about banking, ownership structure, and tax and bankruptcy laws suggest the following. First, the use of debt protects family ownership from dilution. Family owned enterprises are very popular in the Arab world. Second, Islamic banking practices blur the distinction between debt and equity returns. Third, tax laws can give incentives to borrow through the deductibility of interest (i.e. DTS) in some Arab countries. Fourth, most corporate debt is private debt.

A brief discussion of the tax systems in the Arab world and the sources of debt are in order here. Other factors will be presented as the paper progresses and as needed to point out the expected determinants to affect capital structure.

Tax Regimes in Arab Countries

Tax laws in Arab countries were retrieved from the laws of the respective colonizing countries (Jordan, Egypt, Palestine, Saudi Arabia and the rest of the Gulf states were colonized by England, while Tunisia, Morocco and Lebanon were colonized by France) (Alsafarini 1988). These laws are usually well written, comprehensive and updated quite often. The most comprehensive is that of Jordan which was updated in 2000 (The Official Gazette 2000). Table 1 shows both corporate and personal tax rates for the Arab countries considered in this paper.

Table 1
Corporate and Personal Taxes in the Arab World

Country	Corporate Tax rate	Foreign corp. Tax rate	Personal Tax Rates on div.	Personal tax rates On Interest	Capital gains tax
Morocco	35%	35%	0%	At the personal tax bracket (13-44%)	0%
Tunis	35%	35%	0%	At the personal tax bracket (0-35%)	0%
UAE	0%	20-55%	0%	0%	0%
Qatar	10-35%	5-35%	0%	0%	0%
Oman	0-7.5%	0-25%, 10-50% if 100% foreign	0%	0%	0%
Lebanon	10%	10%	5%	At the personal tax bracket (2-28%)	0%
Kuwait	0%	5-55%	0%	0%	0%
Jordan	15-35%	15-35%	10%	at the personal tax bracket (5-30%)	0%
Saudi	2.5%	25-45%	2.5%	2.5%	0%
Egypt	32-40%	32-40%	0%	At the personal tax bracket (10-48%)	0%
Bahrain	45% oil only	0%	0%	0%	0%
Palestine	20%	20%	0%	At the personal tax bracket (5-35%)	0%

Source: InfoProd research (1999).

Arab countries are divided into two groups: those, which have taxes (tax countries) and those that do not levy taxes (non-tax countries, usually Gulf States or oil-rich states). This division of the Arab world into two parts is very important because of its implication for the determinants and level of leverage; other factors being equal (like risk, bankruptcy, maturity, etc.). According to capital structure theory, non-tax country corporations and investors perceive the use of debt as not different from the use of equity. The payout on both is treated the same in the absence of the tax advantages of debt to the corporation and the absence of the tax advantage of equity for the investor. However, for tax countries the story is much different; it is similar to that in Western economies. However, unlike in western economies, dividends are either not taxed or taxed at a lower level than interest. For this reason, investors will require a comparatively higher return on debt to compensate them for the personal tax disadvantage; this in turns will eat up the corporate tax advantage of debt. To make matters worse, it is known in the Arab world that investors in corporate securities are the rich, or those in high tax brackets. The personal tax disadvantage, when combined with the higher return on equity to the investor (higher capital gains), will make debt more expensive to firms than equity. On the corporate level, unlike firms in non-tax countries, firms in tax countries enjoy the advantage of deducting paid interest from their taxable income (i.e. DTS). Consequently, tax countries are expected to use more debt than non-tax countries, *ceteris paribus*. Finally, all tax Arab countries share the fact that there are no loss carry backs and capital gains are tax-exempt. The above discussion has shown that one cannot easily dismiss the possibility that taxes influence aggregate corporate leverage in a country.

Sources of Debt Capital in the Arab World

Due to the Islamic code of ethics, there has been a strong resistance to interest-based finance. This resentment stems from the prohibition of interest rates in Islam. The holly Quran states: *Those who devour usury will not stand except as stands one whom the devil by his touch has driven to madness. That is because they say: Trade is like usury: but Allah has permitted trade and forbidden usury.... Allah will deprive usury of all blessing, but will give increase for deeds of charity, for He loves not any ungrateful sinner.... O you who believe, fear Allah and give up what remains of your demand for usury, if you are indeed believers. If you do it not, take notice of war from Allah and His messenger, but if you repent you shall have your capital sums; deal not unjustly, and you shall not be dealt with unjustly. And if the debtor is in difficulty, grant him time till it is easy for him to repay. But if you remit it by way of charity, that is best for you if you only knew*. [Surah al Baqarah, verse 275-280]. For this reason and to fill the no-interest gap, there is a need for an alternative to a conventional interest-based economy in general and to conventional banking and financial instruments in particular. No-interest Islamic finance and Islamic banking is the alternative.

The underlying principle of Islamic banks and other Islamic financial institutions can be summarized as follows: there can be no *riba* (interest) charged on any transaction or service, as interest is considered usury and is condemned by the Quran. Interest is replaced by a share-out key determined beforehand for a share of risks and profits among the borrower, the bank, and the productive capital. Islamic banks submit all new types of transactions to a "*Sharia* (Islamic law) committee" in order to check their conformity with Islamic principles. *Riba* is prohibited on the principle of no pain no gain. Islamic banking is very similar to venture capital finance or ordinary equity investment. The investor takes a share of the profits, if any, of the venture and is liable to lose his capital. Nevertheless, 95 per cent of Islamic banking as practiced involves some form of pre-determination of profit or "mark-up" which is acceptable to *Sharia* since it is regarded as capital gains (Edwards 2000).

Most of the Islamic banking transactions take place in non-tax countries. And most of these transactions are at the individual level. Al Ahli bank of Saudi Arabia reported in 2002 that 95% of their business was done with individuals to buy durable goods. The remaining 5% was in the form of long and short-term loans to small businesses. The companies in this paper's sample are the largest in the respective countries. This means that these companies' debt is interest bearing and should not be affected by the Islamic banking no-interest debt. Finally, even for those firms that may have Islamic debt, Edwards' argument above shows that the predetermined mark-up is in lieu of interest and the loan can be considered a form of interest bearing debt. As mentioned elsewhere in this paper, the reader finds out that Islamic banking, as being conducted in the Islamic world, is just another form of interest lending that is wrapped in the form of capital gains. Again, this is in no way a claim that the Islamic system does not work; it is, on the other hand, a claim that Islamic banks do not conform to Islamic teachings in this regard. Moreover, they promote the use of debt in the Arab world.

To establish the link between capital structure decisions and Islamic banking, the following is a brief description of the main Islamic financial instruments:

1- Mudaraba:

The capital provider (e.g. Islamic bank) or *rabbulmal* may invest through an entrepreneur borrower or *Mudarib*. Profits are shared on a previously agreed-on basis but losses, if any, are wholly suffered by *rabbulmal*. This financing structure is called Mudaraba and looks like no recourse project finance. Mudaraba is also called *Shirka*.

2- Musharaka:

Financing through equity participation is called Musharaka. Here the partners or shareholders use their capital through a joint venture, Limited Partnership to generate a profit. Profits or losses are split between the shareholders according to some agreed-on a pre-formula depending on the investment ratio.

3- Murabaha

In a Murabaha transaction, *rabbulmal* finances the purchase of an asset by buying it on behalf of its client. *Rabbulmal* then adds a mark-up in its sale price to its client who pays for it on a deferred basis. The 'cost-plus' nature of Murabaha sounds very much like the interest into capital gains manipulations of tax-avoiders.

4- Baimuajjal

It is deemed acceptable to charge higher prices for deferred payments. Such transactions are regarded as trades and not loans. Property financing on such a deferred payment basis is called Baimuajjal.

5- Ijara

An Islamic form of leasing is called Ijara. Here *Rabbulmal* buys machinery or other equipment and leases it out under installment plans to end-users. As in Western leasing, there may be an option to buy the goods built into the contracts. The installments consist of rental for use and part-payment.

6- Baisalam

A manufacturer seeks Baisalam when he/she seeks to finance the production of goods he is financing. This involves the *Rabbulmal* paying for the producer's goods at a discount before they are delivered or even produced. It is thus similar to the Bankers' Acceptance financing in the West.

The discussion of this issue has been lengthy; nevertheless, it has been necessary to serve the purposes of this paper. One can sum up the above discussion as follows. First, Islamic banking as conducted is just another form of interest-based banking. Second, for the purposes of capital structure, all Islamic lending is considered as debt. Third, the analyses above do not claim any weakness in the Islamic system. Finally, Islamic banking enhances the use of debt by providing an alternative to the tabooed interest based lending.

The conventional banking system in the Arab world is quite advanced and capable of assuming its role in furnishing the loans needed to fulfill the debt requirements of Arab public enterprises (Arab bank publications 2002).

Arab banks' ability to both underwrite corporate securities and to own equity adds to their importance in corporate financing decisions. Another measure of the importance of the banking sector in financing firms is the ratio of private sector bank loans to gross domestic product (GDP). The banking sector is more important than corporate bond markets in all Arab countries and more important than stock markets in 7 of the 12 sample countries (Alimari 2003).

Among all interest-bearing instruments, bond lending and borrowing is resented most in the Arab world. The interest is more obvious in bonds than in conventional banking and much more than that in Islamic banking. Bond income is taxable at the personal level while dividends are either not taxable or taxed at a much lower rate. Bonds are not liquid due to the nonexistence of secondary bond markets while stocks are liquid. Unlike stocks, bonds are not known to appreciate in price; most bonds are held until maturity and have no known market value (AMF 2001). For the reasons mentioned earlier, firms prefer bank debt.

Bond financing in the Arab world is minimal compared to stock financing (US$5 billion compared with $86 billion). Bond markets are thin in the primary and nonexistent in the secondary market. This makes bank loans the main debt-financing instrument. Moreover, Table 2 shows that debt financing covers 21% of the total growth in Arab firms for the years 1996-2001 (i.e. $17 billion, of which only $5 billion is in bonds) (ALimari 2003).

In light of this evidence, the Arab economies prefer informed debt to arm's length debt. Essentially, the reasons are: first, that banks are usually holders of the borrowing firm's stock and give loans with better terms and conditions. Second, the long-term relationship between banks (unlike the short term and myopic relationship with shareholders) enhances the performance of the firms and lowers bankruptcy costs and risks; due to this relationship, banks are willing to renegotiate loans and would be less strict in suing the firm (Antoniou, et al. 2002). A third reason is the benefit of informed debt over uninformed debt in preventing bankruptcy. Finally, the bank's presence on boards of directors, combined with both equity and debt holding minimizes both manager-shareholder and bondholder-shareholder agency conflicts and costs.

Measures of Capital Structure

Six debt ratios will be used as dependent variables to test the determinants of capital structure in Arab firms. These ratios are: total debt (TD), long-term debt (LTD), and short-term debt (STD) to both book and market values of equity. Book values of debt will be used for the following reasons:

1- Taking into account the scarcity of data, only book values of debt data are usually available.

2- Bowman (1980) shows that the cross sectional correlation between the book value and market value of debt is very high. While this may not hold for Arab economies, there is no reason to expect otherwise. Consequently, minimal misspecification error is expected because of the use of the book value of debt. Thus no differences in the correlations between debt and its determinants should result from using book vs. market values of debt.

3- Due to the weakness of the primary bond markets and the virtual nonexistence of secondary bond markets in the Arab world, bank loans are the dominant form of debt. These are never tradable in secondary markets, meaning that no market value of debt exists.

For the above reasons, the correlation between the explanatory variables and debt-to-market ratios is expected to be spurious. Conversely, debt-to-book is expected to exhibit a level of significance that would reflect the relationship between leverage and its determinants. Consequently, the analysis will emphasize book debt ratios.

The Explanatory Variables

The determinants and their previously estimated signs and levels of significance in both developed and developing countries will be presented. Moreover, the effect of Arab country factors on these determinants will be analyzed and expectations for the significance and direction of these determinants will be presented.

Collateral

Myers and Majluf (1984) demonstrated that firms should use the least risky financing source first (retained earnings) then, if needed, riskless external debt, then secured debt, and so on until reaching the riskiest of all, equity. Risk refers to the probability of revealing favorable information the management has that the market does not. For this reason, collateralized debt would be in order if internal financing sources were exhausted. Thus, in most empirical studies, debt was found to be positively related to tangible assets/total assets (TAN/TA) and negatively related to intangible assets/ total assets (INTAN/TA).

Non-Debt Tax Shield (NDTS)

DeAngelo and Masulis (1980) incorporate the effect of corporate taxes, personal taxes and non-debt tax shields in their model of optimal capital structure. Their argument is that tax deductions for depreciation, losses, and investment tax credits are substitutes for the tax benefits of debt financing. This suggests an inverse relationship between debt and non-debt

tax shields. NDTS is calculated as he sum of annual depreciation charges and investment tax credits divided by the sum of annual earnings before depreciation, interest, and taxes.

Growth

Myers (1977) shows that highly leveraged firms are more likely to pass up profitable investment opportunities; therefore, firms with higher future growth should use less debt and more equity finance to mitigate this agency problem. He uses the market-to-debt ratio of equity as a proxy for growth.

Size

Warner (1977) suggested that leverage ratios might be related to firm size. He provided evidence that relative bankruptcy costs are negatively correlated with firm size for railroad companies. It is also known that relatively large firms tend to be more diversified and less prone to bankruptcy, suggesting that large firms should be highly leveraged. The natural log of sales LN (S) is used as a proxy for size here. Previous studies show that size usually exhibits a positive relationship with long-term debt and a negative relationship with short-term debt; these were the findings of Titman and Wessels (1988) among others.

Volatility

Bradley, et al. (1984) presented the most comprehensive theoretical and empirical analysis of volatility and its relation to the optimal debt ratio. They use comparative static models and empirical evidence to study the relationship between optimal debt level and volatility. Volatility is defined as the standard deviation of the first difference in annual earnings, scaled by the average value of the firm's total assets over the period. Their empirical results conform to their theoretical hypotheses; volatility is significant and negatively related to firm leverage ratios.

Profitability

Myers and Majluf (1984) state that firms use retained earnings as the first and safest source of financing to avoid signaling and transaction costs. However, this choice is predicated upon the existence of free cash flows after dividend payments are met. This argument suggests that a firm's profitability should be negatively correlated with leverage. As in most studies, EBIT/TA will be used to capture profitability's relation to debt.

Taxes

As the interest on loans is tax-deductible, firms with higher tax liability have an incentive to use more debt. This argument holds only if firms have sufficient taxable income. In calculating the tax deductibility of debt, the effective tax rate is what counts, not the statutory tax rate; the reason is that interest is deducted from earnings before tax and after deducting all non-debt tax benefits (i.e. investment tax credit, operating losses, and depreciation). As in most studies, MTR is calculated as paid taxes divided by earnings before interest and taxes (TAX/EBIT) to show the taxes paid on each additional dollar of operating income after accounting for all deductions (but interest itself). MTR can be seen as a proxy for debt tax shield, the higher the MTR the higher the benefit from debt and the more debt to be used. Of course, in the countries that have no taxes, this variable will always equal zero. Consequently,

the way to test the effect of taxes is to test whether MTR is a significant determinant of capital structure.

Dividends

According to the POH of Myers and Majluf (1984), a firm that pays high dividends will need to use external financing, i.e. debt. La Porta, et al. (2000) shows that in weak law countries (most Arab countries) firms pay dividends to build the reputation of being shareholder oriented to market future stock issues. This means that dividends are paid for future external equity financing not debt financing, which implies a negative relationship between debt and dividends. Paid dividends divided by net income (DIV/NI) -or the firm's payout ratio- will be used as a proxy for dividends.

Table 2 summarizes these determinants and shows their expected signs.

Hypotheses Development

The purpose of this section is to develop the hypotheses to answer the following question: Are the tax models of capital structure valid in environments that are different from those in Western economies?

The Arab world provides us with a rare opportunity to test the tax model of capital structure. It is the only collection of countries with homogeneous characteristics in many respects, with the exception that some of the countries do not have taxes. This is similar to an ideal hypothetical situation where some of the US companies pay taxes while others do not. Such a situation will give us a clean-cut answer to whether taxes do affect the level of firms' leverage. If firms in the tax Arab countries use more debt than those in the non-tax Arab countries, then taxes do affect the choice of capital structure and we will have found rare and clear evidence that support the tax model of capital structure. Since the tax laws in the Arab world are similar to those described in the tax models of capital structure, then one would expect to find supporting evidence for this theory in the Arab world. This leads us to the first testable hypothesis of this paper.

H1: *Firms in Arab countries with a corporate tax regime are expected to have higher leverage than those in countries with no corporate taxes.*

Knowing that the firms in the sample operate in a different environment from the environment of the theory, it is safe to assume that the hypothesized positive differential in the use of debts between the two groups of countries may be due to other factors that the theory failed to consider. To test the robustness of the tax model in different environments, we will follow in the footsteps of Graham (1996) when he tested the relationship between the firm's level of leverage and its marginal tax rate. The test states that if the tax model of capital structure theory is valid, the level of leverage should be positively correlated with the firm's MTR because MTR measures the size of the tax break the firm will get when it pays interest. This leads us to the second testable hypothesis of this paper:

H2: *In Arab countries operating in a corporate tax regime, leverage is expected to be positively related to the marginal tax rate*.

Testing the tax models of capital structure will not be complete without considering the DeAngelo and Masulis (1980) non-debt tax shield. As illustrated in the literature review,

NDTS is considered either as a substitute for DTS or as a proxy for collateral. If the tax model of capital structure is valid and robust in different environments, as the theory expects, then Arab firms that operate in a tax regime will have a positive (sign of collateral argument) or negative (a substitution effect) NDTS coefficient. On the other hand, in non-tax Arab countries, NDTS will be positive (sign of collateral argument) or not significant since no taxes exist. This leads to the third hypothesis of this paper:

H3: *Non-debt tax shields are expected to be positively related to leverage in non-tax Arab countries and undecided in tax Arab countries.*

Due to the absence of taxes, non-tax Arab countries will not be considered in testing the personal tax model of capital structure. Tax Arab countries either do not tax dividends and capital gains or tax them at a lower level than interest income. Interest income is taxed at the investor's tax bracket. This tax preference to dividend income over interest income at the personal level should lower the level of leverage. Accordingly, leverage is expected to be negatively correlated with dividend yield. However, due to the Arab institutional factors, the above argument is not valid in the Arab world. Previous sections have shown that dividends carry other effects beyond personal taxes. These effects are valid in both tax and non-tax Arab countries. To capture the effect of personal taxes, and to isolate the other effects of dividends, an interaction term between dividend yield and the marginal tax rate is in order. Such interaction will capture the effect of personal taxes on debt in tax Arab countries only. This interaction will have a value of zero in non-tax Arab countries since the MTR there is zero. Since investors prefer more wealth than less we expect them to prefer dividend income (which is always taxed at a lower rate than interest income) over interest income unless they are compensated for this tax differential. However, this compensation makes debt financing more expensive to firms, and unless the corporate tax break overcomes this cost, then firms will prefer equity financing to debt financing. Accordingly, debt is expected to have a negative relationship with this interaction term. Hence, we can develop the fourth hypothesis of this paper:

H4: *In accordance with the personal tax model of capital structure, in tax Arab countries, firms with high dividend yields will use less leverage than firms with low dividend yields. Or, leverage is expected to have an inverse relationship with personal taxes in tax Arab countries.*

Data and Methodology

Collecting the data was one of the most challenging and time-consuming parts of this paper. There exists no set of ready data (as those of Compustat and CRSP) in the Arab world. No form of data bank is available and the Compustat Global Vantage had from 0 to 5 companies in each Arab country slot; moreover these companies were mostly empty of any usable data. The data is unique in many respects. First, it is the first database in the Arab world to include the data needed to test capital structure and other financial issues. Second, it is the first data set from economies that do not have a tax system in place. Third, though from less developed countries, it is reliable because of the reliability of its sources and because of the enforcement by the respective governments of international accounting standards for reporting and for tax purposes wherever tax apply. Finally, analyzing each financial statement individually, each observation was recorded, calculated, and filtered with great care and according to the required standards of data recording and filtering.

The Sample

The sample includes cross-section time series data on the various measures of leverage and the suggested determinants of capital structure for the Arab countries included in these tests. The criteria for inclusion in the sample is that the country must be an Arab country (a member of the Arab league, to insure homogeneity in country traditions and institutional factors), have a stock market, and be included in more than one data source to be able to verify the available data and to lengthen the time series as much as possible. The criteria for including a company in the data set are that it has the needed financial statements to extract the required observations, that it be non-financial, domestic (because foreign companies have special tax arrangements and have different sources of financing that will have a vast effect on their capital structure decisions) and listed in its country's stock market.

The data were extracted from financial statements found at companies websites; some were requested from companies themselves, and sometimes they were obtained through personal contacts, especially in Palestine and Jordan. However, most of the financial statements were acquired from private and state-sponsored sources like Shuaa' Capital, a private financial institution in UAE (a securities firm – brokerage and investment banking) and Alshabaca (an information-based institution that was established by the Union of Arab Stock Exchanges), the Arab Monetary Fund, and the International Finance corporation and other published works. Since these statements did not follow a consistent format, ratios and other pieces of information had to be calculated and extracted through a time consuming and repetitive process, one at the time, and with great care.

The data covers the period 1996-2001 for the listed non-financial companies in the stock markets of Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Tunisia and UAE. A total of 12 countries, 461 companies and 1115 company years (1 to 5 years per firm) worth of data were collected. Table 3 gives a description of the sample. Table 4 presents a summary statistics of the variables used in the models. Table 5 shows the pair-wise correlation matrix for all the variables. The correlation matrix does not suggest any serious concerns for multicollinearity problems. This is further confirmed in the results Tables; the Variance Inflation Factor (VIF) is always less than five.

The dependent variable –the level of debt- suffers from the limited dependent variable problem; since it can take only certain values, it is truncated. The dependent variable is defined as the book value of debt (total, long or short term) divided by the value (book or market) of equity. This definition limits the values that the dependent variable can take to be between zero and 1 and in extreme cases this value can be a little larger than 1. Greene (1997) shows that, by construction, the error term of the truncated model has a zero mean but it is heteroscedastic. Thus, using OLS will cause the loss of both efficiency and unbiasdness. Truncated dependent variables can be analyzed with truncated regression. Truncated regression will produce slopes and standard errors that are less biased and more efficient than those obtained from OLS regression.

As is the case in most data, some outliers were encountered. Outliers were detected by ordering data points in an ascending/descending manner, visually and by using the SAS MEANS and UNIVARIATE procedures. Most of the variables are normalized by factors like equity value or total assets. Usually, these ratios do not exceed unity; however, due to data problems, in very limited cases, they do. To avoid this problem the upper and lower 1% of the data was dropped.

Methodology

To deal with these problems and to retain all the desired regression properties, maximum likelihood with heteroscidastic TOBIT and random effects implemented through SAS PROC NLMIXED. Other estimation techniques were used (OLS, maximum likelihood with random and fixed effects and non heteroscedastic TOBIT); the results are found to be robust regardless of the estimation technique.

On the basis of the static tradeoff model in deciding the firm's capital structure, linear regressions that include the theory and empirical determinants of capital structure are the appropriate methodology. Cross-section time series models are used; the dependent variable is the debt ratio and the theory and empirically suggested determinants of capital structure are the explanatory variables. Accordingly, the empirical model is expressed as:

$$\frac{D_{i,t}}{V_{i,t}} = \beta_0 + \sum_{i=1}^{n} \beta_i X_{i,j,t} + \varepsilon_{i,t} \qquad (1)$$

Six equations, one for each of the six dependent variables, are proposed. The suggested determinants of capital structure are the regressors in these equations.

The first hypothesis suggests that firms operating in tax Arab countries will utilize more debt than those in non-tax Arab countries. Using DTAX -a dummy variable that has a value of one if the company is in a tax country and zero otherwise- captures the effect of taxes on corporate capital structure. The specification of the regression equation is given in equation 2.

$$\frac{D}{E} = \beta_0 + \beta_1 DTAX + \beta_2 MTR + \beta_3 NDTS + \beta_4 MB + \beta_5 DIVNI + \beta_6 MTRDIV + \beta_7 FAM + \beta_8 GOV + \beta_9 TANTA + \beta_{10} INTANTA + \beta_{11} LNS + \beta_{12} SDOE + \beta_{13} EBITTA + \varepsilon \qquad (2)$$

D/E represents the six debt ratios; the independent variables and the expected signs of their coefficients are presented in Tables 2.

The second hypothesis tests the effect of the marginal tax rate on the level of leverage in Arab countries. This regression controls for the effect of the country of origin on the level of debt. The empirical equation to test this hypothesis is given in equation 3.

$$\frac{D}{E} = \beta_0 + \beta_1 MTR + \beta_2 NDTS + \beta_3 MTRDIV + \beta_4 DIVNI + \beta_5 MB + \beta_6 GOV + \beta_7 FAM + \beta_8 TANTA + \beta_9 INTANTA + \beta_{10} LNS + \beta_{11} SDOE + \beta_{12} EBITTA + \varepsilon \qquad (3)$$

The NDTS variable in equation 2 captures the effect of NDTS on the firm's level of leverage for all Arab countries. To separate the effect of NDTS in tax countries from that in non-tax countries a DNTAX variable is introduced. DNTAX is non-tax dummy variable that has a value of one if the country is a non-tax Arab country and zero otherwise. Similarly, DTAX is a dummy variable equal o 1 if the Arab country is a tax country and 0 otherwise. NDTS*DTAX interaction term captures the effect of NDTS in tax Arab countries while the NDTS*NDTAX captures the effect of NDTS in non-tax Arab countries. The regression model to test this difference appears in equation 4.

$$\frac{D}{E} = \beta_0 + \beta_1 NDTS * DTAX + \beta_2 NDTS * NDTAX + \beta_3 MTR + \beta_4 DIVNI + \beta_5 MB + \beta_6 GOV + \beta_7 FAM + \beta_8 TANTA + \beta_9 INTANTA + \beta_{10} LNS + \beta_{11} SDOE + \beta_{12} EBITTA + \varepsilon \quad (4)$$

The interaction between the marginal tax rate and dividend payout ratio is used to capture the effect of personal taxes on capital structure in the countries that levy taxes. This methodology will enable us to isolate the other effects of dividends on capital structure, especially in non-tax Arab countries. The effects of dividends can be seen in any of the above models. However, we use equation 3 to discuss the fourth hypothesis by relating personal tax effects (proxied by the interaction between dividend yield and MTR) to leverage.

Empirical results

The tax models of capital structure theory claim that due to the tax subsidy, debt should correlate positively with corporate tax rates. However, there has been no means to test whether taxes have a direct role in determining the level of leverage. Givoly, et al. (1992) used the event of the 1986 TRA to test the effect of taxes on leverage and found evidence for the tax model of capital structure theory. Two scenarios can provide a stronger and more direct test of the effect of taxes on leverage. One is to test the change of the level of leverage surrounding the enactment and enforcement of a tax system in a country that did not have a tax system. An example would be the case of the country of Oman, which had no corporate or personal taxes until 1994. An increase in the general level of firms' leverage would lend support to the theory. Another scenario involves testing the difference in leverage between firms operating in countries that have a tax system in place and those in countries that do not have a tax system. This is, of course, after controlling for all the other foreseeable factors that affect the firm's level of leverage. This paper provides the first opportunity to conduct a direct test of the tax hypothesis. This test is possible because some of the sample countries have a tax system and others do not.

The first hypothesis test investigates whether the benefits of taxes encourage firms to use more leverage. A dummy variable is included in equation 2 that has a value of 1 for tax countries and zero otherwise. The results in Table 6 show that, when controlling for the other factors that may affect leverage, the tax dummy variable is positive and significant. This means that tax Arab countries use more debt than non-tax Arab countries. This result conforms to the predictions of the hypothesis and lends solid support to the tax theory, as we know it.

Due to the tax deductibility of interest, firms with a higher marginal tax rate are expected to use more debt. Therefore, a positive relationship is expected between the firm's effective tax rate and its level of leverage. This relationship is demonstrated in Arab countries that have a tax system and is of no consequence in non-tax Arab countries. However, Arab specificities such as no loss carry forward, firms reporting very low profits (low MTR), and high NDTS, reduce the observable effect of MTR on the level of leverage. As a result, the MTR coefficient is expected to be of low magnitude, positive, and significant.

Consistent with the hypothesis, MTR is found to be significantly positive in Table 7. This means that the lowest MTR does significantly give firms the incentive to use debt.

Titman and Wessels (1988) in the US and Antoniou, et al. (2002) in Europe did not find any significant effect of corporate tax on financial decisions. Givoly, et al. (1992) found the

effective tax rate to be positive and significant. Graham (1996) found that firms with higher MTR issue more debt than those with small MTR. Booth, et al. (2001) use the statutory tax rate instead of MTR and found it to have a positive relationship with the firm's level of leverage in developing countries. The conclusion here is that the MTR model is universal; debt has a positive relationship with MTR when MTR is greater than zero, regardless of the country of origin.

NDTS is positive and significant for the pooled Arab country data. The positive relationship between debt and NDTS may be due to the fact that NDTS is a proxy for collateral, as noted in several Western based studies. The substitute relationship between DTS and NDTS is weak in the Arab world. The fact that reported EBIT is low in tax Arab countries and because some Arab countries do not have a tax system, NDTS is not expected to provide a tangible tax break that may substitute for the tax break from paying debt interest. This last argument suggests that there may be a substitute relationship in tax Arab countries if EBIT is high and that NDTS is always a sign of collateral in non-tax Arab countries. Table 8 reports the results for NDTS in tax Arab countries through the interaction between the tax dummy and the NDTS and the results in non-tax Arab countries through the interaction between the non-tax country dummy and NDTS. For tax Arab countries, the relationship is negative and insignificant. This lends weak support to the substitutability effect of NDTS. On the other hand, the results for non-tax Arab countries show a positive and significant relationship, lending support to the collateral aspect of NDTS. In sum, the substitutability relationship is supported if a tax system exists and the MTR is high, and the collateral implication is supported if there are no taxes or the MTR is low. These esults are of significant importance because they gave a clear cut and differentiating answer to the mixed results (some studies found NDTS to have a positive effect on leverage and others to have a negative one). If MTR is 0 or low then NDTS is a proxy for collateral and if MTR is high then NDTS is a substitute for debt.

To avoid the implications of dividend payout, an interaction term is introduced to the regressions to isolate the effect of personal taxes on the use of debt. This interaction term is the product of dividend yield and the marginal tax rate (Discussed in methodology). Table 8 shows the results for personal taxes while controlling for tax countries and other variables. Whether significant or not, personal taxes are always negative, meaning that due to the tax preference of dividend income over interest income in the Arab world, investors prefer equity over debt unless compensated for the higher interest tax burden. This makes debt more expensive to the firm than equity (at the personal tax level). This is also in accordance with Farrar and Selwyn (1967), Brennan (1970), Miller (1977), and DeAngelo and Masulis (1980) in that personal tax consumes at least a portion of the gain from leverage that accrues at the corporate level. This finding also lends further support to the portability of the tax model of capital structure theory across countries.

Other results:

The dividend yield variable itself gives mixed results. It is negative and significant for the total and long-term debt ratios while positive and significant for the short-term debt ratios. The results for the total and long-term debt ratio provide indirect support for the dividend clientele theory (see Givoly, et al. 1992). The results also lend support to the La Porta, et al. (2000) argument that paying dividends in weak law countries is a sign of commitment to the shareholders, not to the debt holders. Moreover, it is consistent with the preference in Arab culture to equity returns over interest income. The negative relation can also be explained by the fact that banks (the primary source of debt in the Arab world) prefer firms that pay low

dividends. Finally, the weaker protection to debt holders makes them require more stringent debt covenants, one of which is a control over paying dividends. The results for short-term debt ratios are positive and significant. This can be explained by the fact that dividend-paying firms need immediate cash, especially when their profits are limited as is the case in most Arab firms. The best and fastest source for short-term cash is short-term bank loans. This is further supported by the fact that most Arab firms' debt is in the form of short-term bank loans.

The results in Table 6-8 show that coefficient of family ownership as a factor explaining leverage is positive and significant while government ownership is positive but not significant. Since owning and controlling the company is part of the owning family's honor, the family is expected to try to keep that honor. Issuing equity to finance growth means diluting ownership and losing control over the firm. Thus, family owned firms have the incentive not to use equity as a source of finance; such firms are expected to use more debt. On the other hand, as far as debt holders are concerned, government ownership provides assurance that the firm will not fail. This will add to the firm's debt capacity. The insignificance of the government ownership coefficient can be explained by the fact that governments are privatizing their companies and the government's assurances either no longer exist or are expected to seize to exist at some point in the future. These facts have more effect in Arab countries because most debt is in the form of bank loans; banks are more informed than bondholders. Bond markets are a more fertile ground for emotions and emotional reactions than banks because they include smaller and less informed or uninformed investors.

The results show a positive and significant relationship between debt-to-book value of equity ratios and growth and a negative and significant relationship between debt-to-market value of equity ratios and growth. The positive and significant coefficients of the market-to-book ratio in the debt-to-book value of equity equations are due to the fact that most debt in the Arab world is in the form of bank loans. Banks have strong ties with borrowing firms because they have a long-term relationship with the firm, are major partners in the firm, serve as members of the firms' boards, Bank officials are on their advising committees, they grant loans to these firms after they have shown the profitability of their capital budgets through professional feasibility studies, and they are partially owned by these firms. Therefore, one expects debt agency costs to be negligible. Furthermore, there is no need for the market of corporate control to exist for the purpose of taming such conflict. Consequently, growth is not expected to cause any agency conflicts. On the contrary, growth may portend promising future for the firm, encouraging banks to provide them with loans. The results show just that. On the other hand, the negative relationship between the debt-to-market value of equity and market-to-book ratio is due to Arab factors, not the prediction in the theory that market-to-book ratio is a proxy for agency cost-of-debt. First, the increase in stock prices in the late nineties made the market value of equity higher than its book value (stocks are overvalued), which provided firms with the incentive to issue equity rather than debt. Second, the marginal borrowing power on a dollar of market value is less than that on a dollar of book value (Scott 1977). Third, high stock returns are associated with improved growth opportunities and thus, lower optimal leverage ratios (Hovakimian 2001). These results show that the agency model of capital structure theory is not supported in the Arab economic environment.

Collateral is positive and significant at the 1% level for both long term and total debt ratios. This is consistent with the theory in that the availability of collateral increases the debt capacity of the firm. This is especially true in Arab economies since they are considered bank

based. Harris and Raviv (1990a) and Stulz (1990) demonstrate that leverage is positively correlated with liquidation and aggregate value of the firm. Intangible assets are positive and significant. Though this contradicts the conventional wisdom, it conforms to the traditions in the Arab world. The reason is that intangible assets (as shown in Arab company balance sheets and explained in their footnotes) usually represent reputation, copyrights, patents or some form of goodwill. These are signs of monopolistic features that indicate the higher future earnings that are desired by banks.

The coefficient of the size variable is positive and significant at the 1% level for all debt ratios, with higher magnitude for long-term debt and total debt than for short-term debt ratios. This implies that firms use less short- term debt than long-term debt. Ragan and Zingales (1995) state that size can be considered a proxy for the inverse probability of default and should not be significant in countries where the costs of financial distress are low. Knowing that in Arab countries it is easy to liquidate a distressed company and that the possibility of a stay on liquidation is very low, it is expected that size will show a high significance. This is exactly the case in the results, where size shows the highest level of significance of all the variables estimates and for all the debt ratios.

The coefficient for earnings volatility is negative and significant. The level of significance is low due to fact that 70% of the per-firm data was available for three years only.

The explanation is that volatility is a proxy for the cost of financial distress. Hence, higher costs of financial distress lead to lower borrowing capacity. This is especially true in the Arab world because Arab banks, the major source of debt for Arab firms, are advanced and take volatility into account when they study the credit-worthiness of the borrowing firm. Another line of reasoning suggests that volatility may exhibit low significance because banks have close relations with their customers, i.e. the borrowing firms.

The results show that the relationship between the level of debt and profitability is significantly negative for all debt ratios. Other studies found similar results and blamed them on consistency with the POH. Further investigation of this issue is needed. It is expected that a regression of equity on profitability would produce stronger results than that for debt on profitability in the Arab world. This stronger relationship is due to the fact that Arab firms follow a reverse POH. The conclusion here is that profitability means less reliance on external financing in general.

Conclusions

The main finding of this paper is that Tax models of capital structure are supported by empirical evidence from economies that are different from Western economies. More specifically:

a- Firms operating in countries that have a tax system in place utilize more debt than those operating in countries that do not have a tax system.

b- The marginal tax rate is positive and significant. To benefit from debt tax shields, firms with higher MTR utilize more debt than those with lower MTR.

c- Non-debt tax shield is a positive and significant determinant of capital structure for firms operating in countries that do not have a tax system. This is inconsistent with the tax hypothesis but may be due to NDTS proxying for collateral. However, for firms operating

in countries that have a tax system and firms with high MTR, NDTS is negative but not significant. This implies that NDTS may be a substitute for DTS in tax countries as expected.

d- Personal taxes have a significant negative effect on the firm's level of leverage, implying that firms do take personal taxes into account when they make capital structure decisions. This is especially true in economies where the tax differential between interest income and dividend and capital gains income is substantial.

Dividend payout is negative and significant. Among the many implications of dividends, they are a sign of commitment to shareholders, not to debt holders. Consistent with the weak law country argument, this is especially true in the Arab world and supports the fact that dividends play an important role in the capital structure decision and that dividend clienteles exist. Collateral is especially important in the Arab world because most debt is in the form of bank loans. Intangible assets are not a sign of lack of collateral; they are rather a sign of reputation and promising future prospects. The perception that size is a sign of strength and a proxy for decreased bankruptcy risk applies to Arab economies too. Volatility is negative but not always significance. This is due to the short time series that is used to calculate firms' volatilities. The negative sign is due to the fact that debt is mostly in the form of bank loans and the fact that banks choose the more stable firms. Profitable firms use less external financing. However, it is expected that equity financing may have a stronger negative relationship with profitability since it is the second highest source of Arab firms' financing.

This paper triggered many topics for future research, referred to in the various sections. The following is a summary of the more important issues that warrant future research:

1- Tax theories can be further tested through the use of event studies. For example, Oman passed its tax law in 1994; investigating the change in the level of leverage around that year should lend some insight to the tax model of capital structure. Also the change in magnitude, sign, and level of significance of NDTS and payout ratio would shed light on the effect of taxes on capital structure.

2- Further investigation of the total tax benefit/burden of corporate and personal taxes at the various corporate and personal tax brackets will be of great benefit to arrive at the optimal level of leverage for each combination of these tax brackets.

Finally, this paper is a genuine attempt to expand the theory of capital structure and to research new methods and approaches to equip it with the needed rigor to cope with new and dynamic environments. The findings are unique and helpful for future research.

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Table 2

Summary of the Determinants of Capital Structure, Their Interpretations, and Their Expected Signs.

Explanatory Variable	Interpretation	Indication	All Arab Countries	Tax Countries	Non-tax Countries
MTR	Marginal tax rate	Effect of corporate taxes	+	+	0
NDTS	Non debt tax shield	Substitute to tax shield	+/-	+/-	0
DIVNI	Payout ratio	Character	-	-	-
MTRDIV	Interaction between the marginal tax rate and the payout ratio	Effect of personal taxes	+	+	+
MB	Market-to-book ratio	Growth, financial distress	+	+	+
GOV	Government ownership	Ownership structure	+	+	+
FAM	Family ownership	Ownership structure/Agency	+	+	+
TANTA	Tangible assets divided by total assets	Collateral	+	+	+
INTANTA	Intangible assets divided by total assets	Collateral, cost of financial distress, reputation	+	+	+
LNS	Natural log of sales	Size	0/-	0/-	0/-
SDOE	Standard deviation of earnings	Volatility, business risk	-	-	-
EBITTA	Earnings before interest and taxes divided by total assets	Profitability	-	-	-

Table 3

Country-Company Data Summary

Country	Company-years in sample	Companies in sample	Total listed companies	Financial companies
Jordan	401	141	161	78
Bahrain	56	19	41	21
Tunis	13	9	44	35
Saudi	176	62	75	14
Oman	69	52	131	44
Kuwait	133	65	86	32
Lebanon	12	5	13	7
Egypt	158	69	1071	372
Morocco	3	1	55	14
Palestine	12	6	23	10
Qatar	19	9	22	12
UAE	63	23	35	17
Total	115	461	1757	656

Table 4

Summary Statistics for Consolidated Arab Countries Data

Variable	N	B	STDV	MIN	MAX
Independent Variables					
GOV	564	0.16	0.22	0.00	0.75
FAM	570	0.44	0.21	0.00	0.66
TANTA	1094	0.41	0.26	0.00	0.96
INTANTA	1109	0.04	0.14	0.00	1.01
NDTS	1059	0.04	0.09	0.00	0.92
LNS	1073	16.70	2.17	6.90	22.75
SDOE	624	0.44	0.43	0.00	1.98
EBITTA	1053	0.10	0.14	0.00	1.76
MTR	1105	0.07	0.20	0.00	1.67
MB	1087	1.40	1.42	0.00	11.67
DIVNI	1065	0.28	0.42	0.00	2.82
MTRDIV	1011	0.02	0.05	0.00	0.56
Dtax	1115	0.47	0.50	0.00	1.00
Dependent Variables					
TDBV	1078	0.32	0.56	0.00	2.98
TDMV	1059	0.30	0.53	0.00	2.81
LTDBV	1081	0.23	0.45	0.00	2.64
LTDMV	1067	0.22	0.43	0.00	2.79
STDBV	1103	0.12	0.34	0.00	2.82
STDMV	1085	0.11	0.34	0.00	2.78

Table 5

Correlation Matrix for Variables used in Models

	GOV	FAM	TANTA	INTANTA	NDTS	LNS	SDOE	EBITTA	MTR	MB	DIVNI	MTRDIV	TDBV	TDMV	LTDBV	LTDMV	STDBV	STDMV
GOV	1.00																	
FAM	-0.74	1.00																
TANTA	-0.07	0.03	1.00															
INTANTA	0.14	-0.15	-0.22	1.00														
NDTS	-0.12	0.10	0.09	-0.09	1.00													
LNS	0.05	-0.01	-0.12	0.07	-0.06	1.00												
SDOE	-0.05	0.00	0.03	0.02	-0.06	-0.17	1.00											
EBITTA	-0.07	0.05	-0.08	-0.07	0.38	0.13	-0.19	1.00										
MTR	0.00	0.06	0.09	-0.03	0.19	0.18	0.00	0.01	1.00									
MB	0.03	-0.04	-0.05	-0.02	0.04	0.18	-0.09	0.18	0.06	1.00								
DIVNI	-	0.0	-0.16	-0.06	0.00	0.2	-	0.10	0.0	0.1	1.00							

	GOV	FAM	TANTA	INTANTA	NDTS	LNS	SDOE	EBITTA	MTR	MB	DIVNI	MTRDIV	TDBV	TDMV	LTDBV	LTDMV	STDBV	STDMV
	0.04	0				4	0.15		0	7								
MTRDIV	-0.01	-0.09	-0.10	-0.09	0.08	0.15	-0.12	0.07	0.10	0.17	0.48	1.00						
TDBV	-0.05	0.17	0.11	0.06	0.12	0.24	-0.01	-0.03	0.53	0.08	-0.09	-0.08	1.00					
TDMV	0.01	0.12	0.12	0.06	0.02	0.15	-0.03	-0.11	0.36	-0.06	-0.13	-0.12	0.68	1.00				
LTDBV	-0.03	0.11	0.17	0.06	0.07	0.23	0.01	-0.04	0.36	0.08	-0.12	-0.08	0.84	0.57	1.00			
LTDMV	-0.01	0.08	0.18	0.07	-0.02	0.11	0.00	-0.11	0.21	-0.07	-0.17	-0.11	0.61	0.80	0.69	1.00		
STDBV	-0.03	0.13	-0.03	0.00	0.09	0.11	-0.02	-0.01	0.41	0.09	0.01	0.00	0.56	0.44	0.20	0.18	1.00	
STDMV	-0.01	0.13	-0.02	0.03	0.07	0.11	0.00	-0.06	0.34	-0.05	-0.01	-0.03	0.46	0.57	0.17	0.21	0.71	1.00

Table 6
Estimated Coefficients for the First Hypothesis
The dependent variables are the total, long-term and short-term debt to equity ratios divided by both book and market values of equity. The explanatory variables are as in Table 4. The regression is estimated using maximum likelihood and a censored Tobit model. The estimated model is:

$$\frac{D}{E} = \beta_0 + \beta_1 DTAX + \beta_2 MTR + \beta_3 NDTS + \beta_4 MB + \beta_5 DIVNI + \beta_6 MTRDIV + \beta_7 FAM +$$
$$\beta_8 GOV + \beta_9 TANTA + \beta_{10} INTANTA + \beta_{11} LNS + \beta_{12} SDOE + \beta_{13} EBITTA + \varepsilon$$

Ind. Variables	TDBV	LTDBV	STDBV	TDMV	LTDMV	STDMV
Intercept	-2.234***	-2.435***	-1.055***	-1.461***	-1.624***	-1.830***
	(-6.16)	(-5.45)	(-2.78)	(-2.55)	(-2.02)	(-2.81)
Dtax	0.035	0.142*	-0.003	0.277***	0.335***	0.061
	(0.18)	(1.60)	(-0.04)	(2.92)	(3.01)	(0.45)
MTR	0.818***	0.407**	0.823***	1.318***	0.728***	1.054***
	(3.86)	(1.70)	(7.61)	(4.41)	(1.97)	(3.27)
NDTS	1.782***	1.281***	0.541**	0.251	0.314	1.372***
	(3.99)	(2.29)	(1.67)	(0.39)	(0.38)	(2.99)
MB	0.038**	0.040**	-0.012	-0.062***	-0.046**	-0.068***
	(1.96)	(1.96)	(-0.56)	(-1.99)	(-1.80)	(-2.01)
DIVNI	-0.160**	-0.276***	0.107*	-0.184*	-0.403***	0.272***
	(-1.69)	(-2.73)	(1.58)	(-1.64)	(-2.96)	(2.00)
MTRDIV	-0.450	-0.092	-0.663	-0.623	0.250	-1.695***
	(-0.99)	(-0.12)	(-1.32)	(-1.03)	(0.28)	(-1.99)
FAM	0.363**	0.411**	0.232*	0.233	0.248	0.337
	(1.88)	(1.86)	(1.65)	(1.12)	(1.15)	(1.36)
GOV	0.013	0.195	-0.017	0.028	0.032	0.137
	(0.05)	(0.99)	(-0.02)	(0.06)	(0.08)	(0.40)
TANTA	0.353***	0.451***	0.007	0.503***	0.601***	0.035
	(.2.09)	(2.11)	(0.05)	(2.65	(3.01)	(0.19)
INTANTA	1.852***	1.294***	0.763***	2.196***	2.311***	0.177***
	(3.44)	(2.97)	(2.27)	(4.52)	(5.15)	(2.26)
LNS	0.129***	0.131***	0.048***	0.092***	0.094***	0.087***
	(6.72)	(6.12)	(1.98)	(3.43)	(3.22)	(2.08)
SDOE	-0.102	-0.132*	-0.112**	-0.231***	-0.268***	-0.159**
	(-1.29)	(-1.49)	(-1.78)	(-1.97)	(-2.13)	(-1.83)
EBITTA	-1.911***	-1.986***	-0.231	-1.529***	-1.786***	-0.765*
	(-4.14)	(-2.99)	(-0.68)	(-2.38)	(-2.11)	(-1.59)

The sample size is from 624-1108. The significance levels of the TOBIT model estimated coefficients are for the two-tailed test based on *a priori* predictions. T values are given in parentheses. ***Significant at the 0.01 level, **Significant at the 0.05 level, and *Significant at the 0.10 level.

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Table 7

Estimated Coefficients for the Second, Fourth, Fifth, Sixth and Seventh Hypotheses
The dependent variables are the total, long-term and short-term debt to equity ratios divided by both book and market values of equity. The explanatory variables are as in Table 4. The regression is estimated using maximum likelihood and a censored Tobit model. The estimated model is:

$$\frac{D}{E} = \beta_0 + \beta_1 MTR + \beta_2 NDTS + \beta_3 MTRDIV + \beta_4 DIVNI + \beta_5 MB + \beta_6 GOV +$$

$$\beta_7 FAM + \beta_8 TANTA + \beta_9 INTANTA + \beta_{10} LNS + \beta_{11} SDOE + \beta_{12} EBITTA + \varepsilon$$

Ind. Variables	TDBV	LTDBV	STDBV	TDMV	LTDMV	STDMV
Intercept	-1.735***	-1.914***	-0.858***	-0.388	-0.871*	-1.171***
	(-3.02)	(-2.66)	(-1.96)	(-0.66)	(-1.62)	(-1.96)
MTR	0.637***	0.325	0.530***	1.061***	0.548**	0.779***
	(3.46)	(1.22)	(5.98)	(4.12)	(1.88)	(2.73)
NDTS	1.070***	0.883**	-0.520	-0.845	-0.428	0.422
	(1.99)	(1.68)	(-1.12)	(-1.02)	(-0.46)	(0.48)
MTRDIV	-1.486***	-0.695	-1.875***	-2.243***	-0.563	-3.312***
	(-2.04)	(-1.07)	(-2.88)	(-3.15)	(-0.45)	(-3.33)
DIVNI	-0.141*	-0.252***	0.104*	-0.123	-0.366***	0.302***
	(-1.47)	(-2.98)	(1.52)	(-1.13)	(-3.00)	(1.99)
MB	0.050***	0.047***	0.0111	-0.049**	-0.039*	-0.05***
	(3.46)	(2.02)	(0.97)	(-1.92)	(-1.47)	(-1.97)
GOV	-0.007	0.163	-0.035	0.023	0.026	0.086
	(-0.07)	(0.56)	(-0.18)	(0.09)	(0.09)	(0.27)
FAM	0.249	0.331*	0.073	0.119	0.210	0.103
	(1.35)	(1.48)	(0.35)	(0.34)	(0.75)	(0.38)
TANTA	0.362***	0.479***	-0.022	0.451***	0.569***	0.003
	(3.03)	(2.84)	(-0.08)	(2.05)	(2.01)	(0.02)
INTANTA	1.727***	1.295***	0.427*	1.790***	2.087***	-0.349
	(2.91)	(3.17)	(1.56)	(3.77)	(4.51)	(-0.52)
LNS	0.128***	0.132***	0.044***	0.084***	0.088***	0.081***
	(5.74)	(4.88)	(2.06)	(2.23)	(2.20)	(2.18)
SDOE	-0.061	-0.128*	-0.050	-0.181**	-0.260***	-0.059
	(-0.55)	(-1.45)	(-0.76)	(-1.78)	(-1.99)	(-0.44)
EBITTA	-1.639***	-1.735***	0.129	-0.893*	-1.208**	-0.503
	(-3.60)	(-2.77)	(0.22)	(-1.45)	(-1.75)	(-1.05)

The sample size is from 624-1108. The significance levels of the TOBIT model estimated coefficients are for the two-tailed test based on *a priori* predictions. T values are given in parentheses. ***Significant at the 0.01 level, **Significant at the 0.05 level, and *Significant at the 0.10 level.

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Table 8

Estimated Coefficients for the Third Hypothesis in Both Tax Arab Countries and Non-Tax Arab Countries

The dependent variables are the total, long-term and short-term debt to equity ratios divided by both book and market values of equity. The explanatory variables are as in Table 4. The regression is estimated using maximum likelihood and a censored Tobit model. The estimated model is:

$$\frac{D}{E} = \beta_0 + \beta_1 NDTS * DTAX + \beta_2 NDTS * NDTAX + \beta_3 MTR + \beta_4 DIVNI + \beta_5 MB +$$

$$\beta_6 GOV + \beta_7 FAM + \beta_8 TANTA + \beta_9 INTANTA + \beta_{10} LNS + \beta_{11} SDOE + \beta_{12} EBITTA + \varepsilon$$

Ind. Variables	TDBV	LTDBV	STDBV	TDMV	LTDMV	STDMV
Intercept	-1.639***	-1.809***	-0.843***	-0.339	-0.739	-1.165***
	(-2.99)	(-2.36)	(-1.99)	(-0.93)	(-1.29)	(-1.96)
NDTSTAX	-0.824	-1.058	-0.903	-1.857	-2.873	0.287
	(-0.78)	(-0.72)	(-0.84)	(-1.03)	(-1.41)	(0.13)
NDTSNONTAX	1.224***	1.027***	-0.485	-0.744	-0.192	0.429
	(2.69)	(1.97)	(-1.25)	(-1.28)	(-0.29)	(1.20)
MTR	0.594***	0.283	0.522***	1.035***	0.496*	0.776***
	(3.67)	(1.27)	(6.01)	(3.68)	(1.62)	(2.96)
MTRDIV	-1.577***	-0.801	-1.888***	-2.291***	-0.687	-3.318***
	-(2.01)	(-1.08)	(-3.01)	(-3.11)	(-0.77)	(-3.67)
DIVNI	-0.143*	-0.254***	0.105*	-0.124	-0.368***	0.301***
	(-1.58)	(-2.02)	(1.58)	(-1.17)	(-2.96)	(2.01)
MB	0.051***	0.047***	0.011	-0.048***	-0.038*	-0.051***
	(3.17)	(2.05)	(1.16)	(-1.97)	(-1.50)	(-1.99)
GOV	-0.006	0.164	-0.036	0.022	0.026)	0.085
	(-0.07)	(1.14)	(-0.31)	(0.05)	(0.06)	(0.22)
FAM	0.252	0.333*	0.071	0.121	0.213	0.102
	(1.31)	(1.52)	(0.45)	(0.43)	(0.38)	(0.48)
TANTA	0.339***	0.454***	-0.026	0.438***	0.540***	(0.016**
	(3.47)	(3.58)	(-0.37)	(4.22)	(4.52)	(1.67)
INTANTA	1.736***	1.303***	0.429*	1.803***	2.098***	-0.347
	(3.03)	(3.19)	(1.49)	(3.96)	(3.99)	(-0.59)
LNS	0.127***	0.130***	0.043***	0.083***	0.087***	0.080***
	(5.65)	(5.05)	(2.22)	(2.03)	(2.13)	(2.07)
SDOE	-0.059	-0.124	-0.049	-0.180**	-0.254***	-0.059
	(-0.46)	(-1.40)	(-0.44)	(-1.78)	(-2.03)	(-0.46)
EBITTA	-1.540***	-1.611***	0.139	-0.847	-1.088*	-0.496
	(-3.01)	(-2.26)	(0.30)	(-1.42)	(-1.48)	(-1.03)

The sample size is from 624-1108. The significance levels of the TOBIT model estimated coefficients are for the two-tailed test based on *a priori* predictions. T values are given in parentheses. ***Significant at the 0.01 level, **Significant at the 0.05 level, and *Significant at the 0.10 level.