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Abstract

The Arab economies present a unique opportunity to test the tax model of capital structure. These economies may be dichotomized into taxable and non-taxable states. The results support a number of implications of the tax-based theories of capital structure. We document relatively higher leverage in economies that impose a corporate income tax. We also document that leverage is significantly positive in the proxy for corporate marginal tax rate. In addition, we find that non-debt tax shield is a positive and significant determinant of capital structure in non-taxed economies, but is insignificant in taxed economies. Additionally, we find that leverage is systematically related to size, collateral, and profitability. The overall results are suggestive of the portability of capital structure theory(ies) across diverse economies.

The Role of Taxes in Capital Structure: Evidence from Taxed and Non-Taxed Arab Economies

1. Introduction

One of the enduring theories of capital structure is the static trade-off (STO) model of capital structure, which can be traced to the works of Modigliani and Miller (MM) (1958, 1963). The hallmark of the STO model is that debt structure choice depends on the relative benefits and costs of debt. As pointed out by MM, a primary benefit of debt is the tax shield effect while on the cost side bankruptcy (among other things) may act as a significant countervailing force. Since the MM studies, research on capital structure theory has been refined to include the effects of non-debt tax shield, personal taxes, agency costs, asymmetric information costs, input/product market factors and others.

Although debt tax shield plays such a central role in the STO model, there are few studies that examine explicitly the effects of corporate tax on the capital structure choice (a point noted by Stewart Myers in his presidential address to the American Finance Association (Myers (1984)). One problem is that the research is largely cross-sectional in nature and unless there is significant cross-sectional variation in marginal tax rates, the effect of taxes on capital structure choice would be difficult to detect. Consequently most studies that model the cross-sectional behavior of debt structure do not even include an explicit measure of the tax effect (e.g., Bradley, Jarrell, and Kim (1984), and Titman and Wessels (1988)). A second problem is that even in the few studies that attempt to calculate the marginal tax rate, trying to back out the marginal tax rate from accounting data can be a daunting exercise (e.g., Graham (1996)). Finally, some studies examine changes in debt structure following tax law changes, but these are beset with problems associated with adequately controlling for other macro-economic effects that may have a bearing on the debt structure choice decision and problems with the stickiness of leverage over time.

In this paper we are presented with a unique opportunity to test the tax models of capital structure theory using data from the Arab world. The Arab states as a group are distinctive in that some of the states levy corporate taxes while others do not, permitting

us to test the differential impact of taxes on capital structure choice. This paper is also unique in that it is one of few studies to tackle the issue of capital structure determinants outside the US, especially among developing countries. Notable exceptions are Booth et al. (2001) who study capital structure determinants in a sample of 10 developing countries and Rajan and Zingales (1995) who examine the same issue among the G-7 nations. Investigations into capital structure determinants across a variety of countries should provide evidence on the universality of capital structure theories developed primarily in the US. As noted by Booth et al., the test of capital structure portability should be "especially severe" if the environments being considered are characterized by institutional, cultural, and economic factors that are significantly different from those in the West. Given the very unique nature of Arab economies on these dimensions, an examination of capital structure determinants in Arab countries should be especially valuable in yielding insights into the portability of capital structure theories developed in the West.

The sample of economies for the study is drawn from the Arab League. We focus on the countries in the Arab League as this allows for some measure of homogeneity including many institutional aspects and commonality of cultural mores.[1] Of the 22 Arab states in the Arab League, only the 12 states that have stock markets are included in the study: Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates, Oman, Morocco, Tunisia, Egypt, Jordan, Palestine and Lebanon. While relatively homogeneous from a cultural perspective, these economies represent a diverse group in terms of a number of economic characteristics including tax structure, economic development, stock market, and debt activity as revealed in Table 1. The statistics shown are for the year 2001, which is the latest year of the sample period included in the study. From a corporate tax perspective these economies can be divided into two main groups: the economies that do not levy taxes—Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates—and the remaining tax levying economies.[2] The treatment of personal taxes on interest mirrors

[1] The Arab League was formed in 1945 to strengthen relations among the member Arab states, improve coordination, safeguard independence and sovereignty and otherwise protect the interests of Arab countries (www.arableagueonline.org).

[2] The astute observer will note that the non-tax levying countries are also the "wealthier" economies. In our robustness tests (discussed later) we control for the wealth differential between the economies and find that our main results are robust to any wealth effect that might affect corporate capital structure choice.

that of the corporate tax treatment, i.e., economies that levy taxes on corporate income also levy taxes on personal interest income (with the exception of Oman where personal interest income is not taxed but corporate income is, albeit at a low rate of 0-7.5 percent). Dividends are generally not taxed at the personal level regardless of whether corporate income is taxed, with two exceptions—Lebanon and Jordan, both corporate tax levying countries that tax dividends at 5% and 10%, respectively. Capital gains are not taxed in any of the 12 Arab states included in the study.

The Arab states included in the study are characterized by considerable diversity in terms of their economic characteristics including the development of capital markets. The gross domestic product (GDP) varies from a low of US$ 4 billion in Palestine to a high of US$ 186.5 billion in Saudi Arabia. Per capita income varies from a modest US$ 1,146 in Morocco to a high of US$ 28,140 in Qatar. The number of listed companies varies from 14 in Lebanon to 1,110 in Egypt. Market capitalization of equity ranges from US$ 743 million in Palestine to US$ 154 billion in the United Arab Emirates (UAE). The market capitalization percent to GDP varies from 7.5% for Lebanon to 228% for the UAE. The surprisingly high percentage for the UAE is a reflection of the preeminence of its stock exchange as a regional exchange with listings from domestic as well as numerous companies from the broader Middle Eastern region. The liquidity of the exchanges as captured by the percentage of trading volume to market capitalization shows that Kuwait is the most liquid at 44% while the least liquid is Bahrain with trading volume representing only 4% of its market capitalization. Despite the fact that Arab economies are closely associated with Islamic banking, private bank lending is not uncommon. Bank credit as a percent of GDP varies between 24% in Palestine to as high as 202% in Lebanon.

The primary focus of our paper is on the role of taxes in explaining capital structure preference with emphasis on corporate taxes. To this end, we 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 widely used in prior literature.

This paper finds support for tax-based models of capital structure; thus, tax models of capital structure are robust and portable across countries regardless of country specific

factors. The notable findings of the paper include:

(1) Companies operating in regimes that levy corporate income taxes use more debt than those in regimes devoid of corporate income taxes.

(2) Corporate marginal tax rate is a significantly positive determinant of financial leverage.

(3) Non-debt tax shield (depreciation and investment tax credit) is significantly positively related to firm leverage in non-taxed economies supporting the notion that non-debt tax shield, as measured, is proxying for the collateral value of assets and its positive impact on leverage. On the other hand we document that non-debt tax shield is not significant in taxed economies consistent with the view that our measure of non-debt tax shield is picking up the collateral and substitution effects in these regimes.

(4) Personal taxes do not appear to impact firm leverage.

In addition, we find that leverage is systematically related to size, collateral, and profitability similar to that documented in a number of prior US and international studies. In supplementary tests we find that for Arab firms leverage and family ownership are positively related but we do not find evidence that government ownership is a significant determinant of corporate debt. The overall results are indicative of the portability of capital structure theories across economies with very diverse institutional backgrounds.

The rest of the paper is organized as follows. Section 2 contains a very brief review of relevant literature. Section 3 presents an overview of the institutional background of Arab economies with respect to taxes, and sources and characteristics of debt. Section 4 develops the hypotheses and variable descriptions. Section 5 describes the sample source, data, and the methodology used. Section 6 details the empirical results. Section 7 provides a brief summary and highlights the contributions of this study.

2. Literature Review

The literature on capital structure is rather voluminous and extensive. Since the focus of our paper is on the role of tax-based aspects of debt choice, we review related theoretical and empirical evidence. Even within this space we confine our survey to selected articles that in our opinion are especially relevant.

MM (1963) are the first to rigorously demonstrate the role of the tax benefit of debt. Given perfect market assumptions and the presence of corporate taxes, MM show that the value of the firm increases by an amount equivalent to the debt tax shield, i.e., present value of the future tax shield benefits. Miller (1977) incorporates the role of personal taxes into the capital structure issue. Under certain assumptions, Miller 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 independent of its capital structure as originally conceived in MM (1958). Specifically, Miller demonstrates that if (a) the capital gains provisions or other special relief effectively eliminates 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, then the tax shield gains from corporate leverage vanish entirely. That is, the gains from interest deductibility at the corporate level are exactly offset by the added burden of interest includability under the personal tax.

DeAngelo and Masulis (1980) consider the effects of non-debt sources of tax shield. In their model the tax shield benefit of debt kicks in only after other sources of tax shield benefits are exhausted, i.e., depreciation, losses, and investment tax credit. Thus, in the DeAngelo and Masulis framework the tax shield benefit of debt is moderated by the presence of non-debt tax shield benefits.

We now turn to empirical evidence with respect to the various tax-related aspects of corporate debt choice. As noted previously there are few empirical investigations that may be considered to be direct tests of the tax shield model of debt. Givoly, et al. (1992) test the effect of the Tax Reform Act (TRA) of 1986 on the change in leverage in US firms. They test leverage around the enactment of the TRA and find support for tax-based theories of capital structure. 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) calculates and uses the marginal tax rate (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 used in Givoly, et al. (1992) to test its impact on capital structure choice. He uses data on US firms to regress changes in debt on MTR, σMTR, STR (the statutory tax rate) minus MTR, plus a number of control variables. He

finds that the coefficient for MTR confirms a positive relationship between debt use and the marginal tax rate. Also, he finds that firms 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) use data from 9 developing countries from various locations around the world; they find that 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.). Their evidence renders some indirect 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 find that—across countries—debt ratios are negatively related to tax rates. They attribute this seemingly odd finding to the possibility that the average tax rate measure used in their study is proxying for profitability (i.e., higher the average tax rate higher the profitability) rather than the debt tax shield potential. Antoniou, et al. (2002) use panel data from Britain, France, and Germany but find mixed results (amongst countries) for the tax rate variable and other factors. These mixed results, they argue, show that institutional arrangements and country traditions contribute to capital structure decisions.

Empirical tests of the non-debt tax shield (NDTS) effect on debt policy are mixed. A few (e.g. Givoly, et al. 1992, Graham 1996) find a negative relationship between the firm's level of debt and the amount of NDTS supporting DeAngelo and Masulis' (1980) substitutability hypothesis. Others (e.g. Bradley, et al. (1984) and Bathala, et al. (1994)) find a positive relationship between the firm's level of debt and the amount of NDTS. A positive relationship contradicts the traditional substitutability argument between debt tax shield and NDTS. The positive relationship is argued away by suggesting that NDTS is an instrumental variable for debt collateral, i.e., NDTS is picking up the collateral effect of debt—higher the NDTS, higher the collateral value of assets.

With regard to the effect of personal taxes, only a limited number of studies were encountered in our review of the literature. Givoly, et al. (1992) find that personal taxes

have a negative effect on the firm's leverage while Graham (1996) observes that the relative taxation of debt and equity at the personal level has no effect on debt.

3. Institutional Aspects of the Arab World

In this section we provide a brief discussion of two institutional aspects of the Arab world—the tax system and the debt market. Since taxes are a central aspect of the study, it is important to understand the dichotomy of the Arab economies into tax and non-tax countries. Discussing the nature of the debt market in Arab economies also is important for two reasons: first, there is the popular misconception that because interest is considered taboo in Arab countries no debt is used in corporate and personal financing and, second, there are significant differences between how debt is structured and obtained in the Arab countries compared to the Western economies.

a. Tax Regimes in Arab Countries

Tax laws in Arab economies for the most part are derived 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. Table 1 shows both corporate and personal tax rates for the Arab economies considered in this paper along with other aggregate level data.[3]

As noted earlier, Arab economies may be divided into two groups: economies that impose taxes (tax countries) and economies that do not levy taxes (non-tax countries). The no tax economies include the UAE, Kuwait, Saudi Arabia, Bahrain, and Qatar while the remaining economies fall into the tax group. The tax classifications are based on the tax rates for corporations domiciled in the country and majority owned by local investors.[4]

[3] A common aspect of the taxed Arab countries, not evident from Table 1, is that loss carry backs are not permitted.

[4] This qualification is important because foreign owned corporations are usually taxed at different (typically, higher) rates. One other qualification relevant to this study is that in the non-tax Arab states certain sectors may be taxed—usually oil related. For example, Bahrain (classified as a non-tax economy)

The division of the Arab economies into two tax groups is very important because of its implication for the determinants of leverage. Other factors being equal (e.g., risk, bankruptcy, liquidity, maturity, agency and information asymmetry costs), there should not be a relative preference for debt or equity in the non-taxed economies. However, for taxed economies the story is much different. The relative attractiveness of the securities should be based on similar considerations as in most Western economies. However, one aspect that may distinguish taxed Arab economies from Western economies, especially the US, is that dividends are either not taxed or taxed at a lower level than interest (See Table 1). For this reason, investors in taxed Arab regimes will require a comparatively higher return on debt to compensate them for the personal tax disadvantage, and this will eat up the corporate tax advantage of debt. To make matters worse, it is generally acknowledged that in the Arab world investing in corporate securities is largely confined to those in high tax brackets. The personal tax disadvantage of debt could make debt relatively more expensive to firms than equity. From this discussion it is evident the presence or absence of corporate taxes and the relative treatment of personal taxes on interest and dividends may have a bearing on corporate capital structure choice in Arab economies.

b. Debt Markets in the Arab World

One of the distinguishing aspects of Arab economies is a strong resistance to interest-based finance. This resentment stems from the prohibition of interest rates in Islam. For example, the Quran states: *Those who devour usury will not stand except as stands one whom the devil by his touch has driven to madness…. 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.* [Surah al Baqarah, verse 275-280]. As a result of this admonition, Arab economies have developed an alternative to the conventional interest-based economy in general and to conventional banking and financial instruments in particular. This

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taxes oil companies at 45% but other corporations (unless foreign owned) are not taxed on their income. We exclude such firms and industries from our sample.

alternative financial system has come to be known as “Islamic finance” or “Islamic banking.”

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. *Riba* is prohibited on the principle of “no pain no gain.” Interest is replaced by a *share-out* key determined beforehand wherein a share of risks and profits is allocated between the borrower, the bank, and the owner of the productive capital. This suggests that Islamic banking involves risks similar to venture capital finance or an equity investment. However, there are many different types of transactions that are permissible under the strictures of Islamic banking. Islamic banks submit all new types of transactions to a "*Sharia* (Islamic law) committee" in order to check their conformity with Islamic principles. Edwardes (2000) notes that 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” and not “interest.”

While Islamic banking is a distinguishing feature of Arab financing practice, several observations are relevant with regard to our research: (1) Most of the Islamic banking transactions are at the individual level. For example, in a study commissioned by Al Ahli bank of Saudi Arabia in 2002 it was reported that 95% of Islamic banking practice was confined to business done with individuals to buy durable goods. The remaining 5% was in the form of long and short-term loans to small businesses. Since the companies in this paper’s sample are the largest in their respective countries, their debt for the most part is not affected by the no-interest strictures of Islamic banking. Even in the case of firms that may have Islamic debt, as noted in Edwardes (2000), the predetermined mark-up in lieu of interest is considered a form of interest bearing debt. (2) From a financial statement reporting perspective, no distinction is made between the two types of debt. (3) In taxed economies interest in the form of a “mark-up” is considered tax deductible.[5]

While banking practices in Arab countries may not conform to the Western world in some aspects, the Arab banking systems are quite advanced and capable of assuming their

[5] For example, Palestine Telecom has Islamic debt on its balance sheet and reports the “mark-up” as a tax deductible expense.

role in furnishing "loans" needed to fulfill the external capital requirements of Arab public enterprises. 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). From table 1 we observe that, with the exception of a very low (high) ratio for Palestine (Lebanon), the proportion of private sector bank debt to GDP varies from approximately 40 percent for Saudi Arabia to just over 100 percent for Jordan. Bank debt is the primary source of debt for most Arab firms. There is a thin primary corporate bond market but there is no formal secondary market for trading in these securities.

The preference for informed debt to arm's length debt is only partially attributable to the lack of a secondary market for debt. There are other reasons why bank debt is preferred over arm's length debt in the Arab world. First, banks are frequently holders of the borrowing firm's stock and give loans with better terms and conditions. Second, the long-term relationship between banks and their clients enhances the performance of the firms and lowers bankruptcy costs and risks; consequently, banks are willing to renegotiate loans and would be less likely to take legal action against the firm (Antoniou, et al. (2002)). Finally, banking relationships are often associated with bank representatives serving on the clients' corporate board of directors. When combined with bank equity ownership, this minimizes both manager-shareholder and bondholder-shareholder agency conflicts and costs.

4. Hypotheses Development and Variable Descriptions

In this section we develop the hypotheses and the variables used in the regression models to test the various hypotheses.

a. Hypotheses Development

As discussed previously, the Arab world provides us with a rare opportunity to test the tax model of capital structure in a natural setting. These economies are characterized by relatively homogeneous traits in many respects, with the exception that some of the

countries do not have corporate taxes. Such a situation should give us a clearer answer as to whether taxes affect the level of a firm's leverage. If firms in the taxed Arab states use more debt than those in the non-taxed Arab states, then it would appear that taxes do affect the choice of capital structure thus supporting the debt tax shield model of capital structure. This leads us to the first testable hypothesis of the paper.

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

While differences in leverage between taxed and non-taxed regimes may be consistent with the tax hypothesis of capital structure, to test the robustness of the tax model we further examine the relationship between the firm's level of leverage and its marginal tax rate (MTR). If the tax model of capital structure theory is valid, the level of leverage should be positively related to 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 states that levy corporate income taxes, leverage is expected to be positively related to the marginal tax rate*.

The third hypothesis tests DeAngelo and Masulis' (1980) non-debt tax shield (NDTS) effect. If NDTS is a substitute for the debt tax shield then leverage and NDTS should be negatively related in taxed countries. Thus:

H3: *Non-debt tax shield is expected to be negatively related to leverage in taxed Arab economies but not in non-taxed tax Arab economies.*

One caveat with respect to testing the above hypothesis is the previously reported mixed evidence with respect to empirical measures of *NDTS* and firm leverage. Most studies document a positive coefficient for NDTS suggesting that NDTS is proxying for the collateral effect of debt. If NDTS proxies for its intended effect, we should find that it should have a negative association with leverage in taxed Arab countries but not in the non-taxed Arab economies. On the other hand if NDTS proxies for the collateral effect we should observe a positive relationship between leverage and NDTS in non-taxed countries and either a positive, negative or insignificant coefficient for NDTS in taxable

regimes depending on the relative strength of the substitution vs. collateral effects.

Finally, we test the personal tax aspect of the capital structure theory. In Arab countries with taxes, dividends and capital gains are either not taxed or taxed at a lower level than interest income (see Table 1). This tax bias towards dividend income over interest income at the personal level should lower the use of leverage, *ceteris paribus*. Testing the personal tax effect is not easy owing to the difficulty in capturing the relative personal tax effect of interest and dividend income to the marginal investor. We use the dividend payout ratio as a rough proxy to capture the relative personal tax advantage of dividend income, i.e., firms that pay out a higher proportion of their earnings as dividends do so because of lower relative marginal tax rates on dividend income. Thus, a negative relationship between dividend yield and leverage is posited. Note that this would hold for taxed Arab economies but not non-taxed Arab states. Hence, we can state the fourth testable hypothesis as follows:

> H4: *In accordance with the personal tax model of capital structure, in taxed Arab economies, firms with relatively higher dividend yield will use less leverage than firms with lower dividend yields.*

The above four hypotheses will be tested using a pooled regression framework with alternative measures of debt leverage as the dependent variable. The explanatory variables consist of tax-related proxies to test the above hypotheses. Additionally, the independent variables include a number of control variables deemed important from prior literature.

b. Measures of Debt

Similar to Titman and Wessels (1988) in the US, we use six debt ratios as dependent variables to test the determinants of capital structure in Arab firms. These ratios are: short-term debt (STD), long-term debt (LTD), and total debt (TD) divided alternatively by book and market values of equity.

c. Explanatory Variables

In this section we elaborate on variables used to test the hypotheses previously described and other control variables.

Collateral

Issuing debt secured by tangible property reduces losses associated with information asymmetry (Myers and Majluf (1984)) and asset substitution (Jensen and Meckling (1976), Long and Malitz (1985), among others). Rajan and Zingales (1995) note that collateralizing debt diminishes the risk of lenders suffering from the agency costs of debt. Additionally, the literature recognizes that tangible assets retain a greater value in liquidation and creditors are more likely to impose greater restrictions when a firm has fewer tangible assets thereby increasing the cost of debt. Consistent with these arguments, most empirical studies on capital structure find debt to be positively related to the ratio of fixed assets to total assets. We measure collateral as the ratio of tangible assets to total assets (*TANTA*).

Non-Debt Tax Shield

According to DeAngelo and Masulis (1980) tax deductions for depreciation, losses, and investment tax credits are substitutes for the tax benefits of debt financing. Consequently, an inverse relationship between debt and non-debt tax shields is to be expected. Non-debt tax shield (*NDTS*) is calculated as the 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 financing to mitigate this agency problem. However, as noted by Titman and Wessels (1988) this relationship may be moderated for short term debt and may even be positive. Consistent with many other studies in the area we use the market-to-book ratio of equity (*MB*) as a proxy for growth.

Size

Warner (1977) suggests that leverage ratios might be related to firm size. He provides evidence that relative bankruptcy costs are negatively correlated with firm size for railroad companies. Rajan 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. Given that most developing countries including the Arab countries studied here probably have a weak secondary market for assets and a weak takeover market, bankruptcy costs are expected to be high. The natural log of sales, *LNS*, is used as a proxy for size in this study. Previous studies show that size usually exhibits a positive relationship with long-term debt and a negative relationship with short-term debt (e.g., Titman and Wessels (1988)).

Volatility

Bradley, et al.'s (1984) theoretical analysis suggests that volatility and optimal debt ratio are inversely related. Their empirical results conform to their theoretical hypothesis. Several other studies include volatility as a determinant of leverage including Titman and Wessels (1988), Hovakimian et al. (2001), and Ferri and Jones (1979). We define volatility as the standard deviation of earnings before interest and taxes scaled by total assets (*SDOE*).

Profitability

Myers (1977) cites evidence from other empirical work suggesting that firms follow a pecking order in their financing sources, first from retained earnings, second from debt, and finally from issuing new equity. Myers and Majluf (1984) state that firms use retained earnings as the first and safest source of financing to mitigate information asymmetry and transaction costs. This argument suggests that a firm's profitability is inversely related to its use of debt leverage. Using an agency framework, Jensen (1986) suggests a positive relationship since, in a strong corporate control market, firms are forced to commit to paying cash by leveraging up. Shareholders use debt as a disciplinary tool against managers to avoid consumption of excess perquisites. In their international examination of debt determinants, Rajan and Zingales (1995) suggest that investors are more willing to lend to firms with high profits, thus reducing the cost of debt, providing incentives for profitable firms to use more debt. In this study we use the ratio of earnings before interest and taxes to total assets to capture profitability's relation to debt (*EBITTA*).

Marginal Tax Rate

The tax model of capital structure implies that firms subject to a higher marginal tax rate have an incentive to use more debt. As in most studies (e.g., Booth et al. (2001) and Hovakimian et al. (2001)), *MTR* is calculated as taxes paid divided by earnings before taxes.

Dividends

We use dividends divided by net income (*DIVNI*) to proxy for the relative personal tax effect of dividends on debt choice. A higher payout ratio implies a relatively lower marginal tax rate on dividend income relative to interest income, thus an inverse relationship between leverage and DIV/NI is expected for taxed Arab countries.

Table 2 summarizes the determinants of debt discussed above along with their expected signs.

5. Data and Methodology

There exists no set of ready data (for example, the equivalent of Compustat and CRSP for the US) in the Arab world, thus data gathering was a challenging part of the study. The two most common sources of data in previous investigations of capital structure determinants in an international setting are Compustat Global Vantage and International Finance Corporation (IFC). The Compustat Global Vantage used in a number of studies (e.g., Rajan and Zingales (1995)) had at most 5 companies in each of the Arab states that are a part of this study; moreover even when data was available it tended to be spotty. The IFC database (used, for example, by Booth et al. (2001) and Singh and Hamid (1995)) has selected balance sheet and income statement data for the largest companies for various countries. The drawback of the IFC database as noted by Booth et al. (2001) and Singh and Hamid (1995) is that the financial statement variables tend to be at a high level of aggregation. For example, short term debt and depreciation are not available which limits the testing of the theories. In view of the limitations of the Global Vantage and IFC databases, we decided to assemble the dataset for the study from multiple sources while at the same time ensuring data reliability.

The data for the study is largely gathered from financial statements maintained by private and state-sponsored sources like Shuaa' Capital, a private financial institution in

the UAE (a securities firm with businesses in brokerage and investment banking) and Alshabaca (an information-based institution that was established by the Union of Arab Stock Exchanges), and supplemented with data from the Arab Monetary Fund, IFC and other published sources. In addition, some data are obtained from financial statements found at company websites, some are requested from companies themselves, and some are obtained through personal contacts, especially in Palestine and Jordan. Where possible, data are crosschecked against two sources to ensure reliability.[6]

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 the UAE. The resulting dataset consists of 461 companies and 1,115 firm years (1 to 5 years per firm) worth of data. Table 3 gives a description of the sample. Table 4 presents summary statistics of the variables used in the models.[7] The table is broken into 3 panels. Panel A presents data for the full sample, while panels B and C present data for the taxed and non-taxed Arab economies, respectively. Table 5 shows the pair-wise correlation matrix for all independent variables used in the main regression models. The correlation matrix does not suggest any serious concerns for multicollinearity problems.

To test the hypotheses we estimate cross-section time series regression models with debt ratio as the dependent variable and explanatory variables that capture the hypothesized effects and other determinants of capital structure. Accordingly, the general empirical model is expressed as:

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

The dependent variable, debt ratio, is defined as the book value of debt (D) divided by the value of equity (E). We use three measures of debt (short term, long term, and total debt) and two measures of equity (book value and market value) for a total of six proxies for the debt ratio. It is important to recognize the dependent variable proxies all

[6] Since data are gathered from several different countries there is a legitimate concern as to the differences in accounting conventions across the countries. Barakat (2003) observes that accounting conventions in the sample countries are similar and that all adhere to international accounting standards.

[7] To avoid outlier problems data was winsorized by dropping the upper and lower 1% of observations.

suffer from the limited dependent variable problem given that the debt ratio is left censored at zero. Greene (1997) shows that, by construction, the error term of the truncated model has zero mean but it is heteroscedastic. Thus, using OLS will cause the loss of both efficiency and unbiasedness. The use of a censored regression model will produce slopes and standard errors that are consistent and more efficient than those obtained from OLS regression. Consequently, and consistent with a number of studies in the area (e.g., Rajan and Zingales (1995) and Hovakimian et al. (2001)), we use the heteroscedastic Tobit model to provide regression estimates in our tests.

To test the first hypothesis that firms in taxed Arab countries use more leverage than non-taxed Arab countries we run several versions of the basic regression model (1). The first two models may be considered to be parsimonious models. In the first model we regress debt leverage on a dummy variable that is equal to 1 if the firm is domiciled in a country that imposes corporate income taxes (*DTAX*) and 0 otherwise. In the second model, in addition to *DTAX,* we include size as a control variable (log of sales, *LNS*). The two parsimonious models may be expressed as:

$$\frac{D}{E} = \beta_0 + \beta_1 DTAX + \varepsilon \tag{2}$$

$$\frac{D}{E} = \beta_0 + \beta_1 DTAX + \beta_2 LNS + \varepsilon \tag{3}$$

Equation (2) simply tests whether the average firm leverage ratio for taxed Arab countries is different than for non-taxed countries without any controlling variables. This can be viewed as an aggregate level test based on individual company data. In equation (3) in addition to the dummy tax variable we include size (*LNS*) as a controlling variable. Since size has been a significant determinant of leverage in most studies it would be appropriate to include it in any empirical test of capital structure. In addition to the above two parsimonious models, we consider a third model that adds a number of additional control variables besides size:

$$\frac{D}{E} = \beta_0 + \beta_1 DTAX + \beta_2 NDTS + \beta_3 MB + \beta_4 DIVNI + \beta_5 TANTA + \beta_6 LNS + \beta_7 SDOE + \beta_8 EBITTA + \varepsilon \tag{4}$$

The additional variables included are non-debt tax shield (*NDTS*), which could proxy for collateral or the non-debt tax shield effect; a proxy for growth, market to book ratio (*MB*); dividend payout ratio (*DIVNI*); a proxy for collateral value of assets, the ratio of tangible assets to total assets (*TANTA*); volatility of earnings (*SDOE*); and a proxy for profitability, ratio of earnings before interest and taxes to total assets (*EBITTA*). In all of the above models a finding of a positive coefficient for the dummy tax regime variable, *DTAX*, would support the hypothesis that the availability of potential debt tax shields is an important determinant of corporate borrowing.

The second hypothesis tests the effect of the marginal tax rate on the level of leverage in Arab countries that impose corporate taxes. We do this by interacting our proxy for the marginal tax rate (*MTR*=taxes paid/earnings before taxes) with the *DTAX* dummy variable.[8] The empirical equation to test this hypothesis is given below:

$$\frac{D}{E} = \beta_0 + \beta_1 MTR * DTAX + \beta_2 NDTS + \beta_3 MB + \beta_4 DIVNI + \beta_5 TANTA + \beta_6 LNS + \beta_7 SDOE + \beta_8 EBITTA + \varepsilon \quad (5)$$

The *NDTS* variable in equation 4 or 5 captures the effect of depreciation and investment tax credit on the firm's level of leverage for all firms regardless of the corporate tax environment. Recall that the empirical specification of *NDTS* can proxy for the collateral and/or the substitution effect. To separate the effect of NDTS in taxable economies (which may be subject to both effects) from that in non-taxable economies (which are subject only to the collateral effect) we replace *NDTS* with two interaction variables that capture the differential effects of *NDTS* between taxed and non-taxed Arab states. The first interaction variable is *NDTS*DTAX*, which captures the effect of non-debt tax shield in economies with corporate taxes. To capture the effect in non-debt taxed economies we interact *NDTS* with a dummy variable, *DNOTAX*, which takes on the value 1 for firms operating in non-tax countries and 0 otherwise. The resulting interaction term is labeled *NDTS*DNOTAX*. The regression model to test the differential effects of *NDTS* in taxed and non-taxed regimes is given by:

[8] We use an interaction variable rather than simply including MTR as an explanatory variable because some of the non-tax countries impose a minimal "tax" on all individuals and companies, which constitutes a "charity" (referred to as *zakat*). Since this would result in a positive MTR value we suppress it by interacting our calculated MTR variable with the dummy tax variable, DTAX.

$$\frac{D}{E} = \beta_0 + \beta_1 MTR * DTAX + \beta_2 NDTS * DTAX + \beta_3 NDTS * DNOTAX + \beta_4 MB + \beta_5 DIVNI + \beta_6 TANTA + \beta_7 LNS + \beta_8 SDOE + \beta_9 EBITTA + \varepsilon \quad (6)$$

In our final hypothesis we test the impact on leverage of the relative personal tax rate on dividend income and interest income. As argued earlier, higher relative personal tax rates on dividend income (compared to interest income) should have a direct impact on corporate leverage. This applies to taxed Arab countries but not to non-taxed Arab economies. To test this we interact the dividend payout ratio, *DIVNI*, the proxy for the relative personal tax advantage of dividends, with the tax dummy variable, *DTAX*. A finding of an inverse coefficient for the resulting interaction term (*DIVNI*DTAX*) would suggest that a relative personal tax advantage to equity may offset the corporate tax advantage of debt. Note that in the estimated model we include *DIVNI* as a separate variable to control for any independent effects of dividend payout ratio on debt leverage. The specific model to test the personal tax advantage effect of equity is as follows:

$$\frac{D}{E} = \beta_0 + \beta_1 MTR * DTAX + \beta_2 NDTS + \beta_4 MB + \beta_5 DIVNI + \beta_5 DIVNI * DTAX + + \beta_6 TANTA + \beta_7 LNS + \beta_8 SDOE + \beta_9 EBITTA + \varepsilon \quad (7)$$

6. Empirical results

The first hypothesis predicts that leverage ratios will be higher in taxed Arab states compared to non-taxed Arab states. Table 6 presents regression estimates of the two parsimonious models of the test of the first hypothesis. Panel A presents estimates with *DTAX*, the dummy variable for taxable regime, as the only explanatory variable. Six sets of estimates are presented depending upon how the dependent variable, debt ratio, is calculated. The first three models use the book values of short-term debt, long-term debt, and total debt to the book value of equity as the dependent variable, respectively. The next three models use the same measures of debt but are now scaled by the market value of equity. The six models are labeled: *STDBV, LTDBV, TDBV, STDMV, LTDMV, TDMV*, respectively. Panel B is structured similar to panel A but, in addition to the dummy tax variable, size is included as a control variable. In panel A we observe that the coefficient for *DTAX* is generally positive and is significant when regressed on *LTDBV*

and *LTDMV*. In panel B when size is introduced as a control variable the coefficient for *DTAX* is always positive and is significant in three of the six models. Table 7 presents model estimates with the full set of control variables. The coefficient for *DTAX* is positive across all 6 models and significantly so in all instances with the exception of the first equation where STDBV is the dependent variable.

The results in tables 6 and 7 provide substantial empirical support for the fact that firms in taxed Arab states use more debt than non-tax Arab states. This result conforms to the predictions of the debt tax shield theory of capital structure as outlined by MM.

The second hypothesis examines the tax shield hypothesis of debt using a proxy for the marginal tax rate of debt. This should be a more powerful test of the hypothesis compared to the use of the *DTAX* explanatory variable, which merely tests whether the debt ratio in taxable economies is significantly greater than in non-taxable economies. Table 8 presents the results of the regression estimates for equation (5) using the effective tax rate for firms domiciled in taxable Arab economies. We only present results using the full set of control variables. As can be seen the coefficient for *MTR*DTAX* is significantly positive in all six models as expected under the tax hypothesis.

Antoniou, et al. (2002) did not find any significant effect of corporate tax on financial decisions in Europe. Givoly, et al. (1992) find the effective tax rate to be positive and significant for US firms. Graham (1996) finds that firms with higher *MTR* issue more debt than those with smaller *MTR*. Booth, et al. (2001) use the statutory tax rate instead of *MTR* and find the perverse result of a positive relationship with leverage in their sample of firms from developing countries. The conclusion from our study is that in taxed Arab countries leverage and *MTR* are positive related consistent with the tax based model of the STO capital structure theory.

Table 9 presents results of the third hypothesis on the role of non-debt tax shield on debt choice. Recall that we test for the effect of *NDTS* on taxable and non-taxable Arab economies by interacting *NDTS* with separate dummy variables for taxable and non-taxable regimes, i.e., *NDTS*DTAX* and *NDTS*DNOTAX*. Table 9 reveals that the coefficient for *NDTS*DNOTAX* is always positive and significantly so in 4 out of the 6 models. Thus, it appears that leverage is positively related to depreciation expense in non-taxed economies, implying that *NDTS* captures collateral value in these economies

(as noted in several Western-based studies). Interestingly enough, in taxed Arab states *NDTS* is not significant. A possible explanation for the insignificance of *NDTS*DTAX* is that in a taxable regime *NDTS* proxies for both the non-debt tax shield effect as well as for the collateral effect; however, because the two effects are opposing in nature the resulting coefficient is insignificant. Thus, the insignificance of the *NDTS* in taxed economies but positive significance in non-taxed economies provides indirect support for DeAngelo and Masulis's substitution argument.

Our final hypothesis examines the personal tax implications for debt policy using the dividend payout ratio as a proxy for the relative personal tax advantage of dividends to debt income. Specifically we test the hypothesis by interacting the payout ratio with the dummy variable for taxable regimes, *DIVNI*DTAX*. The coefficient is significant in 2 of the 6 models as can be seen from Table 10. The coefficient for the interaction term is significantly positive when long term debt is the dependent variable. Contrary to the personal tax hypothesis higher dividend payout firms (which are personal tax advantage biased towards dividends over interest) are associated with greater use of long term debt. Assuming our proxy for the personal tax effect (*DIVNI*) is reasonable, these findings do not support the hypothesis that personal taxes influence leverage choice. In this regard the Arab evidence is consistent with most previous evidence for non-Arab countries.

Results for Non-Tax Related Variables

The results show a positive and significant relationship between debt-to-book value of equity ratios and growth (*MB*) and a consistently negative relationship between debt-to-market value of equity ratios and growth. The positive and significant coefficient for *MB* in the debt-to-book value of equity equations could be 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 stemming from a number of reasons including: (1) banks foster long-term relationships with their clients, (2) banks are major partners in client firms by serving as members of the firms' boards and advising committees, and (3) banks may have partial ownership stakes in their client firms. Therefore, we expect debt agency costs to be relatively lower in Arab countries. Consequently, growth is not expected to cause any serious agency conflicts. On the contrary, growth may portend a promising future for the firm, encouraging banks to provide them with loans. Our results for the book measures of

debt are consistent with this view of a positive relationship between growth and leverage. On the other hand, the negative relationship between the debt-to-market value of equity and MB is probably an artifact of the time series nature of the data. The increase in market prices of equity in the late 1990s caused the leverage ratios to be understated while MB ratios increased resulting in an inverse relationship between the two variables. In sum our results for the Arab countries are contrary to those found in Western economies that document, consistent with the agency framework, an inverse relationship between growth and leverage.

The dividend payout ratio, *DIVNI*, is generally negative and significant in models using long-term debt or total debt as the dependent variable. The negative relation can be explained by the fact that banks (the primary source of debt in the Arab world) prefer firms that pay low dividends. The inverse relation is also consistent with the view that debt holders impose stringent covenants on dividend constraints.

Collateral (*TANTA*) is positive and significant 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. Our results are consistent with those documented for Western economies.

The coefficient for the size variable (*LNS*) is positive and significant for all debt ratios, with higher magnitudes for long-term debt and total debt than for short-term debt ratios. Given that most developing countries including the Arab countries studied here probably have a weak secondary market for assets and a weak takeover market, bankruptcy costs are expected to be high. Thus, a significant positive coefficient for size implies that debt holders are sensitive to bankruptcy costs. The results are consistent with that observed in the US (e.g., Titman and Wessels (1988)).

The coefficient for earnings volatility (*SDOE*) is generally negative but lacks statistical significance. The lack of significance may be attributed to the limited time series data needed to calculate the volatility measure. The negative coefficient for volatility is consistent with the view that borrowing capacity and default risk are inversely related. These results are consistent with those documented by Brickley et al. (1984) for the US.

Finally, the results show that the relationship between the level of debt and profitability is significantly negative for all debt ratios. Other US and international studies find similar results suggesting support of the pecking order model of capital structure.

Robustness tests

We conduct several robustness tests. Our first robustness test involves dropping the *SDOE* variable and repeating all the regression tests. From Table 4 note that *SDOE* is a limiting variable with number of observations that is approximately half of the other variables considered in the study. This is a reflection of the fact that we have limited panel data and estimation of *SDOE* requires that we have at least three consecutive years of data. The sample size for the regression tests are approximately doubled in size after dropping this variable approximately. The results (not shown) are qualitatively and quantitatively very similar, albeit of stronger statistical significance.

Our second set of robustness tests allow for inclusion of additional variables that capture the unique corporate ownership structure of Arab economies. Arab companies are associated with significant family ownership concentrations, many of whom are actively involved in managing the firm as well. The impact of family ownership on debt is not obvious. Family ownership may lead to increased debt usage because the founding families may wish to avoid ownership dilution and reduce the risk of losing control of the firm. On the other hand, many Arab banks themselves are family owned with crossholdings in the businesses they lend to thus promoting leverage. For our full sample, family ownership (by the founding family) of equity represents a mean proportion of 44%. The mean family ownership is approximately the same for taxed and non-taxed economies. Arab firms are also characterized by significant government ownership of equity. Antoniou, et al. (2002) suggest that if the government is an owner in firms, these firms are expected to have a higher level of debt because of the assurance effect the government has on the lenders and because of the lower probability of agency conflicts. For our sample, the mean proportion of equity held by the government is 16% and is approximately the same when data is parsed by corporate tax regime.

We find that our main regression results (not shown) are qualitatively the same when family ownership and government ownership are introduced as additional

explanatory variables. The regression estimates also show that the coefficient of family ownership is positive and significant in most models while government ownership is positive but not significant. The positive coefficient for family ownership is consistent with the view that family owned firms eschew external equity in favor of debt due to dilution and/or low debt aversion considerations as outlined above. With regard to government ownership, the evidence does not support the view that government ownership is associated with an implicit assurance that the firm will not fail and, therefore, an increased willingness to lend to such firms. The insignificance of the government ownership coefficient however may also be attributed to the fact that governments are privatizing and the value of any implicit assurance associated with government ownership has diminished.

Our next robustness test considers potential confounding effects arising from the fact that taxed Arab states appear to be less prosperous than their non-taxed counterparts. This is evident from a casual inspection of Table 1, which reveals generally higher GDP and per capita incomes for the non-taxed Arab states compared to the taxed states. We control for this potential bias by including per capita income as an additional explanatory variable. Our results (not shown) suggest that the findings are robust to this potential bias.

We also estimate the regressions with individual country dummy variables added to the various models. As in Booth et al. (2001), we do this to control for country specific variables that may have been omitted, yet may have an impact on firm leverage. Our main results still hold, although similar to Booth et al. we find that some of the country dummy variables are significant suggesting that there may be additional (country specific) determinants of leverage not specified in the model.

Our final robustness test involves sensitivity of the results to the particular regression estimation procedure employed. While we argue for and present results using the heteroscedastic Tobit estimation procedure, we find that the results are qualitatively unaffected when alternate estimation procedures are used: OLS, maximum likelihood with random and fixed effects and non-heteroscedastic Tobit.

7. Conclusions

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

(1) Firms operating in Arab states that have a corporate tax system in place utilize more debt than those operating in countries that do not have a corporate tax system.

(2) The effective marginal tax rate has a positive and significant impact on financial leverage. This implies firms with higher *MTR* utilize more debt because of greater debt tax shield benefits.

(3) Our proxy for non-debt tax shield (*NDTS*), depreciation and investment tax credit to total assets, is a positive and significant determinant of capital structure in non-tax Arab economies. This implies that *NDTS* is proxying for collateral. However, for firms operating in countries that have a tax system we find that *NDTS* is not significant. The insignificance of *NDTS* in taxable economies in conjunction with positive significance in non-taxed economies is consistent with the view that in tax countries *NDTS* is picking up both a collateral and substitution effect.

(4) Personal taxes do not appear to have an impact on capital structure choice in taxed Arab countries.

In addition to testing the tax aspects of capital structure theory, we document that a number of non-tax determinants of leverage are portable internationally including Arab nations. Like Rajan and Zingales (1995), who examine G7 countries, and Booth et al., who examine 10 developing countries, we find that corporate debt in the Arab world are systematically influenced by size, profitability, and collateral. However, we also find differences; for example, we find that leverage (book value) and growth are positively related for Arab countries contrary to the inverse relationship commonly noted in the US and other developed countries (e.g., Rajan and Zingales (1995)).

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Table 1

Tax and Selected Economic Variables for the Arab Economies in the Sample

This table presents data on tax rates and other institutional data for the sample of Arab countries included in this study. The corporate tax rate shown is for a domestic corporation that is locally owned. The personal tax rates on dividends and on interest income are for domestic investors. GDP is the Gross Domestic Product expressed in US$. Listed companies refers to the number of companies listed in the primary exchange. Mkt. Cap. is the market capitalization of all listed stocks. Mkt. Cap/GDP is the market capitalization of listed firms as a percent of the GDP. Trading Vol./Mkt. Cap. is the trading volume of common stocks on the primary exchange as a percent of market capitalization. Bank credit-% of GDP is private bank credit as a percent of GDP. All figures are for 2001.

	Morocco	**Tunisia**	**UAE**	**Qatar**	**Oman**	**Lebanon**	**Kuwait**	**Jordan**	**Saudi**	**Egypt**	**Bahrain**	**Palestine**
Corporate. tax rate	35%	35%	0%	0%	0-7.5%	10%	0%	15-35%	0%	32-40%	0%	20%
Pers. tax rate—divs.	0%	0%	0%	0%	0%	5%	0%	10%	0%	0%	0%	0%
Pers. Tax rate—interest	13-44%	0-35%	0%	0%	0%	2-28%	0%	5-30%	0%	10-48%	0%	5-35%
Pers. Tax rate—cap. gains	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GDP (In Mill. US$)	33,491	20,043	67,761	16,152	19,945	16,709	32,812	8,829	186,489	91,064	7,936	4,012
Per capita GDP (US$)	1,146	2,072	20,602	28,140	8,314	4,399	14,629	1,704	8,197	1,409	11,115	1,236
Listed companies	55	45	27	23	96	14	88	161	76	1,110	42	23
Mkt. Cap. (Mill. US$)	9,031	2,230	154,270	6,678	2,634	1,248	26,662	6,314	73,201	24,309	6,601	743
Mkt. Cap/ GDP	25%	11%	228%	41%	13%	7.5%	87%	73%	40%	24%	63%	20%
Trading Vol./ Mkt. Cap.	9%	15%	9%	24%	16%	4%	44%	15%	34%	24%	4%	5%
Bank credit-% of GDP	88%	66%	45%	47%	42%	202%	94%	102%	39%	95%	40%	24%

Table 2
Summary of the Determinants of Capital Structure and their Expected Signs

This table summarizes the explanatory variables (column 1) used in the study, their definitions (column 2), the attribute they indicate (column 3), and their hypothesized impact on leverage for all Arab countries, taxable countries, and non-taxable countries (columns 4,5,6, respectively).

Explanatory Variable	Definition	Indication	All Arab Countries	Tax Countries	Non-tax Countries
DTAX	Dummy variable for presence or absence of corporate taxes	Effect of debt tax shield	NA	+	NA
MTR	Marginal tax rate	Effect debt tax shield	NA	+	NA
NDTS	Non debt tax shield	Substitute for tax shield	NA	-	NA
DIVNI	Payout ratio	Effect of personal taxes-relative advantage of dividends to interest income	NA	-	NA
MB	Market-to-book ratio	Growth-agency conflict	-/?	-/?	-/?
TANTA	Tangible assets divided by total assets	Collateral	+	+	+
LNS	Natural log of sales	Size	+	+	+
SDOE	Standard deviation of earnings scaled by total assets	Volatility, business risk	-	-	-
EBITTA	Earnings before interest and taxes divided by total assets	Profitability	+/-	+/-	+/-

Table 3
Country-Company Data Summary

The table below shows the sample size from each of the Arab countries included in the study. Column 1 identifies the particular country. Column 2 shows the total number of companies listed on the individual country's stock exchange. Column 3 shows the number of non-financial listed companies for which data were available for inclusion in the study. The last column shows the number of company-years of data available for each country.

Country	Total listed companies	Companies in sample	Company-years in sample
Jordan	161	141	401
Bahrain	41	19	56
Tunisia	44	9	13
Saudi	75	62	176
Oman	131	52	69
Kuwait	86	65	133
Lebanon	13	5	12
Egypt	1,071	69	158
Morocco	55	1	3
Palestine	23	6	12
Qatar	22	9	19
UAE	35	23	63
Total	1,757	461	1,115

Table 4
Sample Descriptive Statistics

This table presents sample descriptive statistics for firms in the full sample (Panel A), firms in taxed Arab countries (Panel B), and firms in non-taxed Arab countries (Panel C). Each panel shows number of observations, N (column 2), mean (column 3), standard deviation, STDV (column 4), and the 90th and 10th percentile values (columns 5 and 6, respectively) for each of the explanatory and dependent variables used in the study. The explanatory variables are: *DTAX*=dummy variable equal to 1 if firm is in a taxed Arab country, 0 otherwise; *MTR*=marginal tax rate defined as taxes paid divided by income before taxes; *NDTS*=non debt tax shield defined as sum of depreciation and investment tax credit divided by total assets; *MB*= market price per share divided by book value per share; *DIVNI*= dividends paid divided by net income; *LNS*=natural log of sales; *TANTA*= tangible assets divided by total assets; *SDOE*= standard deviation of earnings before interest and taxed scaled by total assets; and *EBITTA*= earnings before interest and taxes divided by total assets. The dependent variables are defined as follows (debt is always in book value): *TDBV*= total debt divided by book value of equity, *TDMV*= total debt divided by market value of equity, *LTDBV*= long term debt divided by book value of equity, *LTDMV*= long term debt divided by market value of equity, *STDBV*= short term debt divided by book value of equity, and *STDMV*= short term debt divided by market value of equity.

Panel A: Full sample

Variable	N	MEAN	STDV	90% Percentile	10% Percentile
Explanatory Variables:					
DTAX	1094	0.476	0.500	1.000	0.000
MTR	1084	0.055	0.140	0.198	0.000
NDTS	1044	0.044	0.087	0.118	0.000
MB	1068	1.411	1.427	2.759	0.356
DIVNI	1046	0.281	0.416	0.846	0.000
LNS	1054	16.695	2.169	19.251	13.890
TANTA	1074	0.411	0.260	0.775	0.044
SDOE	618	0.438	0.427	1.027	0.040
EBITTA	1036	0.105	0.137	0.218	0.010
Dependent Variables:					
TDBV	1057	0.289	0.500	0.863	0.000
TDMV	1047	0.288	0.509	0.898	0.000
LTDBV	1060	0.211	0.418	0.591	0.000
LTDMV	1054	0.216	0.427	0.677	0.000
STDBV	1082	0.103	0.306	0.330	0.000
STDMV	1071	0.100	0.320	0.250	0.000

Table 4 (Continued)

Panel B: Non-taxed Arab countries

Variable	N	MEAN	STDV	90% Percentile	10% Percentile
Explanatory Variables:					
NDTS	546	0.044	0.084	0.122	0.000
MB	559	1.422	1.505	2.845	0.325
DIVNI	544	0.261	0.372	0.790	0.000
LNS	549	16.873	2.146	19.139	14.047
TANTA	561	0.417	0.253	0.776	0.052
SDOE	347	0.406	0.413	1.009	0.036
EBITTA	556	0.099	0.103	0.260	0.008
Dependent Variables:					
TDBV	551	0.293	0.497	0.930	0.000
TDMV	543	0.267	0.498	0.833	0.000
LTDBV	553	0.203	0.418	0.664	0.000
LTDMV	550	0.182	0.390	0.604	0.000
STDBV	556	0.095	0.264	0.344	0.000
STDMV	559	0.101	0.337	0.225	0.000

Panel C: Taxed Arab countries

Variable	N	MEAN	STDV	90% Percentile	10% Percentile
Explanatory Variables:					
MTR	515	0.055	0.137	0.190	0.000
NDTS	498	0.044	0.089	0.112	0.000
MB	509	1.399	1.337	2.700	0.397
DIVNI	502	0.302	0.458	0.928	0.000
LNS	505	16.501	2.179	19.445	13.692
TANTA	513	0.404	0.266	0.773	0.038
SDOE	271	0.479	0.441	1.090	0.051
EBITTA	480	0.113	0.168	0.268	0.011
Dependent Variables:					
TDBV	506	0.286	0.504	0.820	0.000
TDMV	504	0.310	0.520	1.460	0.000
LTDBV	507	0.220	0.418	0.583	0.000
LTDMV	504	0.253	0.461	0.788	0.000
STDBV	516	0.111	0.347	0.290	0.000
STDMV	512	0.100	0.300	0.289	0.000

Table 5

Correlation Matrix for Explanatory Variables (Continuous) used in Models

This table present pair-wise correlations between the various explanatory variables (continuous) used in the regressions. *MTR*=marginal tax rate defined as taxes paid divided by income before taxes; *NDTS*=non debt tax shield defined as sum of depreciation and investment tax credit divided by total assets; *MB*= market price per share divided by book value per share; *DIVNI*= dividends paid divided by net income; *TANTA*= tangible assets divided by total assets*; LNS*=natural log of sales; *SDOE*= standard deviation of earnings before interest and taxed scaled by total assets; and *EBITTA*= earnings before interest and taxes divided by total assets.

	MTR	*NDTS*	*MB*	*DIVNI*	*TANTA*	*LNS*	*SDOE*	*EBITTA*
MTR	1.00							
NDTS	0.22	1.00						
MB	0.07	0.05	1.00					
DIVNI	0.02	-0.01	0.17	1.00				
TANTA	0.08	0.08	-0.04	-0.16	1.00			
LNS	0.21	-0.06	0.19	0.24	-0.11	1.00		
SDOE	0.00	-0.08	-0.09	-0.16	0.03	-0.17	1.00	
EBITTA	0.03	0.40	0.18	0.10	-0.08	0.13	-0.19	1.00

Table 6
Regression Tests of the Impact of Tax Regimes on Firm Leverage: Parsimonious Models

This table presents tests of the impact of the tax regime on firm leverage using two parsimonious models: (1) Leverage = $\beta_0 + \beta_1 DTAX + \varepsilon$ and (2) Leverage = $\beta_0 + \beta_1 DTAX + \beta_2 LNS + \varepsilon$. Six alternate measures of leverage are used with debt always measured in book value terms: *STDBV*= short term debt divided by book value of equity, *LTDBV*= long term debt divided by book value of equity, *TDBV*= total debt divided by book value of equity, *STDMV*= short term debt divided by market value of equity, *LTDMV*= long term debt divided by market value of equity, and *TDMV*= total debt dividend by market value of equity. *DTAX* is a dummy variable equal to 1 if the firm is in a country with corporate taxes; otherwise it is equal to 0. *LNS* is the natural log of sales used as a proxy for firm size. The regression estimates are based on the heteroscedastic Tobit estimation procedure. The first column identifies the dependent variable used, the second column (and third column in Panel B) presents the coefficient estimates for the explanatory variable(s) along with the chi-square statistic for the significance of the coefficient in parentheses, and the last column to the right contains the Log Likelihood ratio and number of observations used in the model estimation. Panel A (Panel B) present estimates for equation 1 (2). ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Panel A: Leverage = $\beta_0 + \beta_1 DTAX + \varepsilon$

Model	*DTAX*	Log Likelihood N
STDBV	0.0327	-714.4
	(0.62)	1082
LTDBV	0.0683*	-861.8
	(3.24)	1060
TDBV	0.0011	-951.7
	(0.00)	1057
STDMV	0.0132	-717.8
	(0.09)	1071
LTDMV	0.1293***	-869.2
	(11.05)	1054
TDMV	0.0566	-954.1
	(1.98)	1047

Panel B: Leverage = $\beta_0 + \beta_1 DTAX + \beta_2 LNS + \varepsilon$

Model	*DTAX*	*LNS*	Log Likelihood N
STDBV	0.0576	0.0569***	-675.1
	(1.86)	(29.62)	1044
LTDBV	0.1131***	0.0927***	-765.2
	(9.56)	(104.58)	1024
TDBV	0.0475	0.0927***	-859.7
	(1.54)	(100.01)	1021
STDMV	0.0417	0.0567***	-684.1
	(0.88)	(26.92)	1034
LTDMV	0.1570***	0.0668***	-816.9
	(15.58)	(47.15)	1017
TDMV	0.0854**	0.0725***	-897.5
	(4.38)	(53.76)	1010

Table 7
Regression Test of the Impact of Tax Regimes on Firm Leverage: Full Model

This table presents the impact of tax regime on firm leverage using the following regression model:
Leverage = $\beta_0 + \beta_1 DTAX + \beta_2 NDTS + \beta_3 MB + \beta_4 DIVNI + \beta_5 TANTA + \beta_6 LNS + \beta_7 SDOE + \beta_8 EBITTA + \varepsilon$. Six alternate measures of leverage are used with debt always measured in book value terms: *STDBV*= short term debt divided by book value of equity, *LTDBV*= long term debt divided by book value of equity, *TDBV*= total debt divided by book value of equity, *STDMV*= short term debt divided by market value of equity, *LTDMV*= long term debt divided by market value of equity, and *TDMV*= total debt divided by market value of equity. The explanatory variables are: *DTAX*=dummy variable equal to 1 if firm is in a taxed Arab country, 0 otherwise; *NDTS*=non debt tax shield defined as sum of depreciation and investment tax credit divided by total assets; *MB*= market price per share divided by book value per share; *DIVNI*= dividends paid divided by net income; *TANTA*= tangible assets divided by total assets; *LNS*=natural log of sales; *SDOE*=standard deviation of earnings before interest and taxes scaled by total assets; and *EBITTA*= earnings before interest and taxes divided by total assets. The regression estimates are based on the heteroscedastic Tobit estimation procedure. The first column identifies the explanatory variable. The columns labeled 1-6 refer to the 6 regressions using alternate measures of the dependent variable indicated below the column number. For each explanatory variable we show the coefficient estimate along with the chi-square statistic for the significance of the coefficient in parentheses. The last row shows the Log Likelihood ratio for each of the regression models and the number of observations used in the model estimation. ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Model	**1** *STDBV*	**2** *LTDBV*	**3** *TDBV*	**4** *STDMV*	**5** *LTDMV*	**6** *TDMV*
DTAX	0.0577 (2.24)	0.1909*** (15.32)	0.1312*** (6.98)	0.0869* (2.78)	0.2058*** (14.08)	0.1575*** (8.18)
NDTS	1.3841*** (25.37)	0.3628 (1.17)	0.8326** (5.99)	1.6761*** (20.34)	0.1930 (0.26)	0.6478* (2.93)
MB	0.0068 (0.27)	0.0380** (5.25)	0.0419** (5.97)	-0.0312* (2.79)	-0.0358* (3.48)	-0.0421** (4.76)
DIVNI	0.0413 (0.79)	-0.2564*** (18.97)	-0.2341*** (15.36)	0.0829 (1.74)	-0.2755*** (17.19)	-0.2182*** (10.74)
TANTA	-0.0119 (0.02)	0.4503*** (20.99)	0.3445*** (11.91)	0.0355 (0.11)	0.5034*** (21.00)	0.4001*** (13.16)
LNS	0.0644*** (39.48)	0.1367*** (110.86)	0.1319*** (106.09)	0.0686*** (25.84)	0.1113*** (60.73)	0.1103*** (60.58)
SDOE	-0.0330 (0.45)	0.0058 (0.01)	-0.0403 (0.43)	-0.0815 (1.48)	-0.0405 (0.36)	-0.1003 (2.15)
EBITTA	-0.8195*** (11.55)	-0.3414* (3.03)	-0.4967** (6.00)	-1.0770*** (10.77)	-0.4179* (3.55)	-0.6021*** (7.17)
Log Likelihood	-254.7	-383.0	-425.2	-312.2	-432.1	-465.9
N	564	552	551	560	552	546

Table 8

Regression Test of the Impact of Marginal Tax Rates on Firm Leverage

This table presents the impact of tax regime on firm leverage using the following regression model: Leverage = $\beta_0 + \beta_1$ *MTR*DTAX* + β_2 *NDTS* + β_3 *MB* + β_4 *DIVNI* + β_5 *TANTA* + β_6 *LNS* + β_7 *SDOE* + β_8 *EBITTA* + ε. Six alternate measures of leverage are used with debt always measured in book value terms: *STDBV*= short term debt divided by book value of equity, *LTDBV*= long term debt divided by book value of equity, *TDBV*= total debt divided by book value of equity, *STDMV*= short term debt divided by market value of equity, *LTDMV*= long term debt divided by market value of equity, and *TDMV*= total debt divided by market value of equity. The explanatory variables are: *MTR*DTAX*= interaction term of marginal tax rate and a tax dummy variable equal to 1 if firm is in a taxed Arab country, 0 otherwise. The marginal tax rate is determined as taxes paid divided by income before taxes. The interaction terms captures the effect of the marginal tax rate on leverage use in Arab countries with corporate taxes. *NDTS*=non-debt tax shield defined as sum of depreciation and investment tax credit divided by total assets. *MB*= market price per share divided by book value per share. *DIVNI*= dividends paid divided by net income. *TANTA*= tangible assets divided by total assets. *LNS*=natural log of sales. *SDOE*=standard deviation of earnings before interest and taxes scaled by total assets. *EBITTA*= earnings before interest and taxes divided by total assets. The regression estimates are based on the heteroscedastic Tobit estimation procedure. The first column identifies the explanatory variable. The columns labeled 1-6 refer to the 6 regressions using alternate measures of the dependent variable indicated below the column number. For each explanatory variable we show the coefficient estimate along with the chi-square statistic for the significance of the coefficient in parentheses. The last row shows the Log Likelihood ratio for each of the regression models and the number of observations used in the model estimation. ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Model	**1** *STDBV*	**2** *LTDBV*	**3** *TDBV*	**4** *STDMV*	**5** *LTDMV*	**6** *TDMV*
*MTR*DTAX*	0.9874*** (28.64)	0.8278*** (10.13)	1.0674*** (15.85)	1.1489*** (20.85)	1.0651*** (13.20)	1.3996*** (22.31)
NDTS	1.0260*** (14.08)	0.1296 (0.14)	0.5380 (2.39)	1.2819*** (11.67)	-0.1178 (0.09)	0.2550 (0.43)
MB	0.0104 (0.67)	0.0401** (5.72)	0.0444*** (6.81)	-0.0276 (2.25)	-0.0335* (2.99)	-0.0389** (4.15)
DIVNI	0.0272 (0.36)	-0.2513*** (17.89)	-0.2368*** (16.01)	0.0700 (1.28)	-0.2721*** (16.64)	-0.2237*** (11.59)
TANTA	-0.0500 (0.43)	0.4029*** (16.31)	0.2927*** (8.71)	-0.0125 (0.01)	0.4482*** (16.31)	0.3367*** (9.50)
LNS	0.0556*** (31.61)	0.1266*** (95.01)	0.1221*** (93.37)	0.0584*** (19.49)	0.0996*** (48.94)	1.0978*** (49.15)
SDOE	-0.0536 (1.23)	-0.0128 (0.04)	-0.0446 (0.53)	-0.0964 (2.14)	-0.0367 (0.29)	-0.1083 (2.58)
EBITTA	-0.7133*** (9.28)	-0.2547 (1.66)	-0.4264** (4.50)	-0.9684*** (8.89)	-0.3171 (2.03)	-0.5108** (5.30)
Log Likelihood	-241.0	-385.1	-420.8	-302.6	-431.7	-458.6
N	562	550	551	559	550	545

Table 9
Regression Test of the Impact of Non-Debt Tax Shields on Firm Leverage

This table presents the impact of non-debt tax shields on firm leverage using the following regression model: Leverage = β_0 + β_1 *MTR*DTAX* + β_2 *NDTS*DTAX* + β_3 *NDTS*DNOTAX* + β_4 *MB* + β_5 *DIVNI* + β_6 *TANTA* + β_7 *LNS* + β_8 *SDOE* + β_9 *EBITTA*+ ε. Six alternate measures of leverage are used with debt always measured in book value terms: *STDBV*= short term debt divided by book value of equity, *LTDBV*= long term debt divided by book value of equity, *TDBV*= total debt divided by book value of equity, *STDMV*= short term debt divided by market value of equity, *LTDMV*= long term debt divided by market value of equity, and *TDMV*= total debt divided by market value of equity. The explanatory variables are: *MTR*DTAX*= interaction term of marginal tax rate and a tax dummy variable equal to 1 if firm is in a taxed Arab country, 0 otherwise. The marginal tax rate is determined as taxes paid divided by income before taxes. The interaction terms captures the effect of the marginal tax rate on leverage use in Arab countries with corporate taxes. *NDTS*DTAX* = interaction of non-debt tax shield and the tax dummy variable. *NDTS* is defined as sum of depreciation and investment tax credit divided by total assets. *NDTS*DNOTAX* = interaction term between *NDTS* and a dummy variable that is equal to 1 for firms operating in countries with no corporate income tax, 0 otherwise. The *NDTS* interaction terms capture the differential effects of depreciation and investment tax credit (sources of non-debt tax shield in taxed economies) on leverage for taxed and non-taxed countries. *MB*= market price per share divided by book value per share. *DIVNI*= dividends paid divided by net income. *TANTA*= tangible assets divided by total assets. *LNS*=natural log of sales. *SDOE*=standard deviation of earnings before interest and taxed scaled by total assets. *EBITTA*= earnings before interest and taxes divided by total assets. The regression estimates are based on the heteroscedastic Tobit estimation procedure. The first column identifies the explanatory variable. The columns labeled 1-6 refer to the 6 regressions using alternate measures of the dependent variable indicated below the column number. For each explanatory variable we show the coefficient estimate along with the chi-square statistic for the significance of the coefficient in parentheses. The last row shows the Log Likelihood ratio for each of the regression models and the number of observations used in the model estimation. ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Model	**1** *STDBV*	**2** *LTDBV*	**3** *TDBV*	**4** *STDMV*	**5** *LTDMV*	**6** *TDMV*
*MTR*DTAX*	1.2139*** (39.14)	0.9050*** (10.89)	1.2713*** (20.39)	1.3828*** (26.85)	1.1428*** (13.67)	1.5670*** (25.28)
*NDTS*DTAX*	0.2720 (0.62)	-0.1188 (0.07)	-0.1358 (0.09)	0.5262 (1.25)	-0.3669 (0.53)	-0.2973 (0.35)
*NDTS*DNOTAX*	1.7594*** (27.36)	0.4173 (0.79)	1.2255*** (7.50)	2.0525*** (19.16)	0.1766 (0.11)	0.8347* (2.75)
MB	0.0064 (0.25)	0.0390** (5.39)	0.0412** (5.89)	-0.0327* (3.11)	-0.0344 (3.16)	-0.0419** (4.79)
DIVNI	0.0269 (0.37)	-0.2521*** (18.01)	-0.2387*** (16.42)	0.0696 (1.28)	-0.2730*** (16.75)	-0.2259*** (11.87)
TANTA	-0.0513 (0.46)	0.4022*** (16.28)	0.2898*** (8.62)	-0.0149 (0.02)	0.4479*** (16.31)	0.3336*** (9.37)
LNS	0.0546*** (31.69)	0.1261*** (94.25)	0.1208*** (92.48)	0.0575*** (19.24)	0.0991*** (48.37)	0.0969*** (48.57)
SDOE	-0.0513 (1.17)	0.0147 (0.06)	-0.0406 (0.45)	-0.0948 (2.09)	-0.0346 (0.26)	-0.1046 (2.42)
EBITTA	-0.7540*** (10.29)	0.5153 (1.62)	-0.4215** (4.44)	-1.0122*** (9.57)	-0.3154 (2.01)	-0.5057** (5.22)
Log Likelihood	-234.6	-384.7	-418.1	-2991	-431.4	-457.1
N	562	550	551	559	550	545

Table 10
Regression Test of the Impact of Relative Personal Taxes on Firm Leverage

This table presents the impact of personal taxes on firm leverage using the following regression model: Leverage = $\beta_0 + \beta_1$ *MTR*DTAX* $+ \beta_2$ *MB* $+ \beta_3$ *DIVNI* $+ \beta_4$ *DIVNI*DTAX* $+ \beta_5$ *TANTA* $+ \beta_6$ *LNS* $+ \beta_7$ *SDOE* $+ \beta_8$ *EBITTA* $+ \varepsilon$. Six alternate measures of leverage are used with debt always measured in book value terms: *STDBV*= short term debt divided by book value of equity, *LTDBV*= long term debt divided by book value of equity, *TDBV*= total debt divided by book value of equity, *STDMV*= short term debt divided by market value of equity, *LTDMV*= long term debt divided by market value of equity, and *TDMV*= total debt divided by market value of equity. The explanatory variables are: *MTR*DTAX*= interaction term of marginal tax rate and a tax dummy variable equal to 1 if firm is in a taxed Arab country, 0 otherwise. The marginal tax rate is determined as taxes paid divided by income before taxes. The interaction terms captures the effect of the marginal tax rate on leverage use in Arab countries with corporate taxes. *NDTS* is defined as sum of depreciation and investment tax credit divided by total assets. *DIVNI*= dividends paid divided by net income. *DIVNI*DTAX* is the interaction of *DIVNI* and *DTAX*; it captures the relative preference for dividends over interest due to personal tax differentials in taxable Arab countries. *TANTA*= tangible assets divided by total assets. *LNS*=natural log of sales. *SDOE*= standard deviation of earnings before interest and taxed scaled by total assets. *EBITTA*= earnings before interest and taxes divided by total assets. The regression estimates are based on the heteroscedastic Tobit estimation procedure. The first column identifies the explanatory variable. The columns labeled 1-6 refer to the 6 regressions using alternate measures of the dependent variable indicated below the column number. For each explanatory variable we show the coefficient estimate along with the chi-square statistic for the significance of the coefficient in parentheses. The last row shows the Log Likelihood ratio for each of the regression models and the number of observations used in the model estimation. ***denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level.

Model	**1** *STBV*	**2** *LTBV*	**3** *TDBV*	**4** *STMV*	**5** *LTMV*	**6** *TDMV*
*MTR*DTAX*	1.0245***	0.6807**	1.0090***	1.2224***	0.8808***	1.3371***
	(29.09)	(6.57)	(13.50)	(22.31)	(8.68)	(19.41)
NDTS	1.0138***	0.1962	0.5611	1.2571***	-0.0306	0.2803
	(13.69)	(0.32)	(2.59)	(11.18)	(0.01)	(0.52)
MB	0.0109	0.0384**	0.0437**	-0.0265	-0.0357*	-0.0397**
	(0.73)	(5.26)	(6.61)	(2.07)	(3.43)	(4.32)
DIVNI	0.0579	-0.3855***	-0.2888***	0.1309*	-0.4399***	-0.2791***
	(0.99)	(22.55)	(13.08)	(2.73)	(23.21)	(9.92)
*DIVNI*DTAX*	-0.0575	0.2279**	0.0897	-0.1148	0.2837***	0.0952
	(0.70)	(5.95)	(0.94)	(1.49)	(7.32)	(0.87)
TANTA	-0.0525	0.4182***	0.2976***	-0.0169	0.4650***	0.3414***
	(0.47)	(17.56)	(8.99)	(0.03)	(17.61)	(9.75)
LNS	0.0546***	0.1305***	0.1236***	0.0564***	0.1043***	0.0995***
	(30.21)	(99.40)	(94.15)	(18.06)	(52.98)	(49.96)
SDOE	-0.0495	-0.0035	-0.0511	-0.0879	-0.0569	-0.1152*
	(1.05)	(0.00)	(0.69)	(1.78)	(0.70)	(2.88)
EBITTA	-0.7084***	-0.2788	-0.4354**	-0.9589***	-0.3481	-0.5205**
	(9.08)	(2.00)	(4.69)	(8.64)	(2.46)	(5.49)
Log Likelihood	-240.7	-382.1	-420.3	-301.9	-428.1	-458.2
N	562	550	551	559	550	545