

CAPITAL STRUCTURE DECISIONS AND DEBT MATURITY STRUCTURE: AN EMPIRICAL EVIDENCE FROM JORDAN

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Abstract

This study examines the capital structure decisions and debt maturity structure of 60 industrial companies listed in Amman Stock exchange. To our knowledge this is the first time such study has been attempted for a multi-country emerging market sample. To achieve this objective the study was set to test a number of hypotheses regarding the determinants of capital structure decisions and debt maturity structure.

These hypotheses were related to the effects of profitability, growth opportunities, asset maturity, size, liquidity and age. Total debt ratio was found to be positively and significantly related to the percentage growth in total assets and negatively and significantly related to liquidity and asset structure. A growth opportunity variable was found to be positively and significantly related to long - term debt and was negatively and significantly related to long term debt. The relationship between asset maturity and long term debt was found to be negative and significant. Therefore, there is no support of the hypothesis that debt maturity decreases as the proportion of growth potentials increase. Size was found to be positively and significantly related to long term debt and negatively and significantly related to short term debt implying that larger firms borrow on long term and small ones borrow on short term. Profitability, age and liquidity appeared to have no statistical significance on the different types of debt.

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INTRODUCTION

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Corporate financing choices are likely to be determined by a combination of factors that are related to the characteristics of the firm as well as to the institutional environment. Although most studies examine corporate financing choices within individual countries, and thus focus on the importance of firm characteristics, there is a growing literature {Booth, Aivazian, Demircug-Kunt, and Maksimovic, 2001}

In the past two decades, Jordanian economy has shown remarkable progress in its development and has significantly mobilized domestic savings for financing business investment. Its efficiency and performance have become important for the population of investors who want to improve their investment strategies, and have become an important force in financing investment in Jordan. In the light of these developments, this study is intended to investigate some aspects of companies efficiency listed in ASE.

The topic of optimal capital structure has been the subject of many studies. It has been argued that profitable firms were less likely to depend on debt in their capital structure than less profitable ones. It has also been argued that firms with a high growth rate have a high debt to equity ratio. Firms' size was also found to be an important effect on capital structure. If these three factors are considered as determinants of capital structure, then these factors could be used to determine the firm's performance.

In practice, firm managers who are able to identify the optimal capital structure are rewarded by minimizing a firm's cost of finance thereby maximizing the firm's revenue. If a firm's capital structure influences a firm's performance, then it is reasonable to expect that the firm's capital structure would affect the firm's health and its likelihood of default. From a creditor's point view, it is possible that the debt to equity ratio aids in understanding banks' risk management strategies and how banks determine the likelihood of default associated with financially distressed firms. In short, the issue regarding the capital structure and firm performance are important for both academics and practitioners.

The Jordanian economy has been subject to a large number of external shocks in the Middle East

region. The first Gulf War was broken out in. Both the return of migrant workers and refugees due to this war increased the poverty level and unemployment level in Jordan. In addition, the continuing strife in the West Bank and Gaza, and the second Gulf War in 2003 has had a negative impact on tourism and investment in Jordan. These macroeconomic factors (shocks), which have had an important effect on firm performance and default, are unique Jordanian case and are hardly found in any other existing study. The banking system in Jordan also makes this study unique. The banking system in Jordan is different from western countries as it contains both conventional commercial banks and Islamic banks. The credit policy in Islamic banks is different from the commercial banks, which could affect corporate performance and default risk. Since bond markets and Mutual Funds markets are undeveloped and inactive, both commercial and Islamic banking systems play an important role in providing lending to Jordanian firms. These bank lending are the main source of funds for these firms. Therefore, this unique dual banking systems offers us a new insight into the study on the effect of capital structure on firm performance.

Accordingly, this study examines the determinants of capital structure in general and the determinants of corporate debt maturity in particular for listed company in Jordan. To achieve this object the study was set to test a number of hypotheses regarding the determinants of capital structure and debt maturity. The present paper addresses the determinants of corporate debt maturity structure of listed companies in Amman Stock Exchange. The importance and significance of undertaking this study is supported by several factors. First, the firms under study in this paper operate in an emerging stock market with some features quite different from those prevailing in the developed markets. Some of these features include thin trading, inefficiency, weak organization and poor information disclosure. Moreover, the Arab stock markets including Amman stock market are still smaller and less active than the developing countries average. In addition to being a small market, the market suffers from concentrated ownership, modest number of listings and a fair number of closed companies.

This paper contributes to the existing body of knowledge in several ways. First, we test the Barclay, Marx, and Smith Jr. (2003) theory of joint capital structure and debt maturity determination in a multi-country framework, in an attempt to

understand country-specific differences. The remaining of the paper is structured as follows: the next section presents the theoretical framework, while section 3 literature review, section 4 details the methodology, presents the data sources, and describes the variables used in the empirical model. Section 5 reports and comments the estimation results. Section 6 concludes the paper

THEORETICAL FRAMEWORK

Jordanian Economic Situation

In spite of the overall political and economic conditions, prevailing in the world in general and in the Middle East in particular, the Jordanian economy's performance was outstanding in the past few years. Jordanian economy's performance is attributed to the policies adopted by the Jordanian government with the aim of boosting investments in Jordan, spurring economic growth, maintaining a stable exchange rate for the Jordanian Dinar, lowering interest rates, and keeping the budget deficit to the Gross Domestic Product (GDP) ratio within acceptable levels. Economic Policies are opening up to the world; Jordan's entry into free trade agreements with the US and Europe, Jordan's accession to the World Trade Organization (WTO), setting up of the Aqaba Special Economic Zone (ASEZ) and Qualified Industrial Zones (QIZ), further implementation of the Privatization Program, and technological developments within the ASE all played a part in bolstering confidence in the Jordanian capital market and improving the profitability of public share holding companies, which in its turn reflected positively on ASE's performance.

The enhancement was also the fruit of the major qualitative technological leaps taken by the ASE, the confidence shown by investors in the Jordanian capital market - that has taken long qualitative strides to boost investment in securities on the basis of transparency and disclosure along with the capital market stringent surveillance measures adopted by the JSC with the aim of protecting investors through data dissemination and disclosure of material information that impact prices of securities, the imposition of penalties on parties that breach the law, and regulations and instructions issued by virtue thereof.

Jordan is a small country with limited natural resources. It is among the most water-poor countries in the world. The country is currently exploring ways to expand its limited water supply and use its existing water resources more

efficiently, including through regional cooperation. Jordan also depends on external sources for the majority of its energy requirements. In addition, a natural gas pipeline from Egypt to Jordan through the southern port city of Aqaba is now operational. Jordan developed a new energy strategy in 2007 that aims to develop more indigenous and renewable energy sources, including oil shale, nuclear energy, wind, and solar power. Under King Abdullah, Jordan has undertaken a program of economic reform. The government has eliminated most fuel and agricultural subsidies, passed legislation targeting corruption, and begun tax reform. It has also worked to liberalize trade, joining the World Trade Organization (WTO) in 2000; signing an Association Agreement with the European Union (EU) in 2001; and signing the first bilateral free trade agreement (FTA) between the U.S. and an Arab country, which entered into force in 2001. In January 2010, the agreement comes into full force with the complete elimination of duties on nearly all goods and services. The agreement contains labor and environmental provisions, and also provides for more open markets in communications, construction, finance, health, transportation, and services, as well as the strict application of international standards for the protection of intellectual property.

The government has emphasized the information technology (IT), pharmaceuticals, and tourism sectors as other promising growth sectors. The low tax and low regulation Aqaba Special Economic Zone (ASEZ) is considered a model of a government-provided framework for private sector-led economic growth. Jordan is classified by the World Bank as a "lower middle income country." The per capita GDP is \$4,700. According to Jordan's Department of Statistics, almost 13% of the economically active Jordanian population residing in Jordan was unemployed in 2008, although unofficial estimates cite a 30% unemployment rate. One of the most important factors in the government's efforts to improve the well-being of its citizens is the macroeconomic stability that has been achieved since the 1990s. Jordan's 2008 and 2009 budgets emphasized increases in the social safety net to help people most impacted by high inflation, but these increases were not included in the 2010 budget because of fiscal austerity plans and the low inflation rates during 2009. The average rate of

inflation in 2009 was -0.1%. The currency has been stable with an exchange rate fixed to the U.S. dollar since 1995 at JD 0.708 to the dollar. In 2008, Jordan participated in a Paris Club debt buyback to retire more than \$2 billion in debt using privatization proceeds which, at the time, reduced the percentage of external debt to GDP from 46% to 32%. While pursuing economic reform and increased trade, Jordan's economy will continue to be vulnerable to external shocks and regional unrest. Without calm in the region, economic growth seems destined to stay below its potential. Jordan's conservative banking sector was largely protected from the worldwide financial crisis but many businesses, particularly in the tourism and real estate sector, experienced a slowdown in 2009.

Optimal Maturity Structure

The shareholders' strategic consideration of dynamic adjustments of the debt level yields an optimal maturity structure. The tradeoff in this case is between the transactions costs of issuing debt and the gains from adjusting debt level dynamically. On the one hand, the firm should issue short-maturity debt and therefore affords itself the opportunity to issue new debt optimally, depending on the firm value when the old debt matures. On the other hand, if new debts are issued too often, transactions costs will become too large. When the firm behaves optimally, in addition to an optimal capital structure, an optimal maturity structure emerges.

Debt Maturity Theories

Previous research has developed several theories of the determinants of corporate debt maturity, which can be categorized into four main hypotheses: moral hazard and agency, adverse selection and signaling, taxation, and liquidity risk hypotheses.⁵ The moral hazard and agency hypothesis emphasizes the advantages of short-term debt in reducing agency problems, such as under-investment and asset substitution. Myers (1977) and Barnea et al. (1980) suggest that firms can control the under-investment problem by shortening the effective maturity of their debt, since when short-term debt matures before growth options are exercised, there is an opportunity for firms to recon tract and for debt to be re-priced, so that gains from new investment do not accrue to debt holders. In addition, Barnea et al. (1980)

proposes that short-term debt can also mitigate the adverse risk incentives of debt financing or the asset substitution problem, because short-term debt is less sensitive to risk shifting of the firms' underlying assets. Since short-term debt is less sensitive to changes in the variance of projects, it will reduce shareholders' incentive to engage in high-risk (high-variance) project leading to a lower likelihood of loss of value.

Brick and Ravid (1985) was the first paper to provide a framework for the tax hypothesis and proposes an irrelevance theorem, as well as setting out the conditions under which taxation could affect the maturity decision. Later, Lewis (1990) also argues in favor of the irrelevancy of taxation, and Kane et al. (1985) establish that the net benefit of tax, after allowing for the cost of bankruptcy, tends to be very small and thus not sufficient to offset the amortized transaction, or floatation costs. In this context, firms should lengthen their debt maturity only if their tax advantage is higher than their amortized floatation costs. Adverse selection and signaling, and the liquidity risk hypotheses were developed by Flannery (1986) and Diamond (1991). When there is asymmetric information between lenders and firms, and in particular managers have better or timelier information about firm's value than investors, the nature of equilibrium is determined by transaction or floatation costs. In the presence of asymmetric information, the market cannot distinguish between good and bad quality firms. A separating equilibrium ensues. Firms with the private information that they are relatively high quality prefer short-term debt to avoid paying a market premium on long-term debt too high for their quality, since it reflects the average probability of default. On the contrary, those with the private information that they are low quality prefer long-term debt, because the market premium on long-term debt reflects a probability of default that is lower than their own. Thus, the prediction is that debt maturity is inversely related to firm's quality. Similarly, Diamond (1991) assumes that firms have private information about their credit quality, but in addition a firm would also consider its liquidity risk, defined as the risk that a firm is unable to pay back its debt because of deterioration in financial or economic conditions. It is thus suggested that firms trade off the benefits of short-term debt in improving credit quality rating against their liquidity risk.

Theoretical Work on Capital Structure and Debt Maturity

Explanations for capital structure decisions can be broadly classified in three groups: tradeoff-based theories and information asymmetry-based ones. A group of explanations are based on the proposition that the optimal leverage ratio of the firm is determined by the tradeoff between current tax-shield benefits of debt against higher bankruptcy costs implied by a higher degree of indebtedness. If the assumptions of no taxes, a fixed interest rate, and the independence between bankruptcy likelihood and the degree of leverage – along with the traditional market efficiency hypothesis – are made, then the classical MM Proposition 1 holds: the irrelevance of the capital structure. As imperfections such as taxes, a variable interest rate, credit constraints, and bankruptcy costs are introduced in the model, the tradeoff results (i.e. Modigliani and Miller (1963), Miller (1977), DeAngelo and Masulis (1980)). Other branch of the literature encompasses all those explanations that are based on imperfect information assumptions. The seminal papers in this literature are Myers (1977) and Myers and Majluf (1984). Myers (1977) argues that the value of the firm depends on its assets in place (whose value don't depend on future investment) as well as on growth opportunities (whose value depend on future investment strategy). The implication is that this real option characteristic of the firm induces a transfer of wealth between shareholders and bondholders that may prevent the firm to undertake positive NPV projects (the debt overhang – or underinvestment – problem).

Myers and Majluf (1984) realize that managers have privileged information regarding both tangible (assets in place) and intangible (growth opportunities) assets and that investors are aware of this fact. In light of such imperfect information there may be wealth transfers between old and new shareholders when the firm decides to issue new securities. This information asymmetry affects the firm's financing-investment decision in a way that causes managers to pass up valuable investment opportunities in order to preserve (old) shareholders' interests: the underinvestment problem.

Other streams of literature have also explored the basic information asymmetry set up in their research of the capital structure problem. Jensen and Meckling (1976) and Jensen (1986) suggest the agency theory framework to study the optimal

leverage ratio. In their perspective, too little debt can lead to an overinvestment problem, as managers seek to sustain growth at the expense of profitability. This literature topic is also known as the "free cash flows problem". Finally, Myers (1984) proposed that, as a result of information costs, managers would prefer to finance corporate investment by first tapping the less agency-costly sources. That means that corporate investment should be financed in order by retained earnings, then by debt, and finally – only as a last resort – by equity issues. This variant of the information asymmetry family is known as the Pecking Order Theory.

Theory of the Joint Determination of Capital Structure and Debt Maturity

Barclay, Marx, and Smith Jr. (2003) propose the requirements for a theory of financial policy to have testable implications. The authors focus their work on the choice between leverage and maturity. They develop their model from the argument that a firm chooses leverage and debt maturity to maximize its value given a set of exogenous firm characteristics such as its investment opportunity set and regulatory status. In order to obtain unambiguous predictions in reduced form equations, the value functions must have monotone comparative static's, which is guaranteed only if particular properties are satisfied (single-crossing and quasi-super modularity). The authors show that, for the leverage-maturity problem, the single crossing property holds, but the quasi-super modularity one does not. The practical implication is that leverage and debt maturity are likely to be *substitute* policies instead of complementary ones. The authors illustrate their point empirically using data from 5765 industrial firms in the United States from 1980 to 1999. Besides endogenous variables for capital structure and debt maturity, the authors employ exogenous variables such as growth opportunities, industry regulation, firm size, profitability, tangibility, asset maturity, average tax rate, net-operating loss carry forwards, and a dummy variable for firms with commercial paper programs. Their empirical analysis suggests that capital structure and debt maturity are substitutes in addressing financial problems of the firms although the authors have faced several difficulties in correctly identifying the leverage equation.

One criticism that may be raised against Barclay, Marx, and Smith Jr.'s (2003) paper is that it ignores the effect that lagged leverage and maturity may have on the determination of the contemporaneous endogenous variables. As a matter of fact, it is likely that the change in a firm's capital structure and debt maturity is somewhat rigid and by no means costless. If that is the case, the previous period's level of debt and maturity is a relevant variable in the firm's choice today.

LITERATURE REVIEW

Few studies investigate debt maturity in an international setting. Schiantarelli and Sembenelli (1997) investigate the maturity structure of 604 non-financial firms from the United Kingdom and 750 non-financial firms from Italy and find support for the hypothesis that firm choose the maturity of their liabilities to match those of their assets. Their results are in line with those of Ozkan (2000) who investigates the maturity issue for 429 non-financial British firms in the period 1983-1996 and Heyman, Deloof, and Ooghe (2003) who investigate the maturity of 1,091 Belgian small firms. Antoniou, Guney, and Paudyal (2002) study the determinants of debt maturity for a sample of 358 French, 582 German, and 2,423 British non-financial firms and find that debt maturity depends on both firm-specific and country-specific factors, opening the question of the degree of influence of each group of factors on the maturity structure.

Larger sets of countries are studied by Demirgüç-Kunt and Maksimovic (1999) who explored the hypothesis that the financial development of a country determines the maturity of its firms' debt. The authors investigate 9,649 non-financial firms from 30 countries including developing ones in the period 1980-1991. They find support for the hypothesis that legal and institutional differences among countries explain a large part of the leverage and debt maturity choices of firms. Fan, Titman, and Twite (2003) also study the subject for 11 industries in 39 countries – in addition to 1,524 chemical firms in the period 1991-2000. Their results largely support Demirgüç-Kunt and Maksimovic (1999) findings. Hennessy and Whited (2004) show that a dynamic tradeoff model with features that are not typically included in previous capital structure models can explain many stylized facts. The problem of optimal capital structure has long been an intriguing one among researchers.

Brennan and Schwartz (1978) are perhaps the first to study this problem using the contingent claims analysis approach of Black and Scholes (1973). More recently, Leland (1994) introduces a model of optimal capital structure based on a perpetuity

In contrast to Booth, Aivazian, Demircug-Kunt, and Maksimovic [2001] and Giannetti [2003] we find that taxes, inflation and the suppliers of capital have an important influence on capital structure choices. In particular, firms use less debt when dividends are preferentially taxed and leverage is lower and firms use more short-term debt when inflation is higher. We also find that firms in countries with large amounts of bank deposits tend to have shorter maturity debt, while firms in countries with more life insurance assets tend to have longer maturity debt

Demircug-Kunt and Maksimovic [1999] include a measure of the efficiency of the legal system using the extent to which it is utilized to resolve conflicts. They find longer debt maturity in countries where the legal system is used more to resolve conflicts. In contrast, we focus on the integrity of the legal system using an index of country corruption, and find a strong association between corruption and capital structure choice. In particular, firms in countries that are viewed as more corrupt tend to be more levered and use more short-term debt. However, after controlling for corruption, we find that the legal system per se, i.e., common versus civil law, plays a less important role, influencing only (and somewhat weakly) debt maturity

The propositions advocated by MM [Modigliani, F and Miller, M.H., (1958)] on the issue of capital structure have produced a great deal of debate and discussions about the determinants of capital structure and debt maturity of the firm. According to MM and under the assumptions of perfect capital market, capital structure would be irrelevant, i.e., the market value of the firm and its cost of capital are independent of its capital structure and as a result there is no optimal capital structure. However, in the absence of such perfect market and in the presence of: taxes and flotation costs, MM argued that the value of the firm would be maximized by using as much debt as possible Modigliani, F and Miller, M.H., (1963) . Since then an extensive body of theoretical as well as empirical research has identified a number of factors that were believed to influence the capital structure and debt maturity. These factors include "the maturity matching principles" growth opportunities, asset structure, size, age, liquidity and profitability. In

this section we provide a brief account of the main findings of previous studies with respect to the effects of some of the factors mentioned on the capital structure and debt maturity. In his study on the determinants of financial structure of manufacturing companies .

The rationale for this was that those larger firms have lower agency problems and higher tangible assets and has easy access to long-term debt markets. Titman, S. and Wessels, R. (1988), argued that larger firms have higher leverage ratios because they are more diversified and enjoy easier access to capital markets and can borrow at favorable interest rates. On the other hand smaller firms tend to have lower leverage ratios because they are more likely to be liquidated when they are in financial distress Ozkan, A. (1996), and they face higher failure rates compared to larger firms. Therefore a positive relationship is expected between the firms' size and the total debt ratio. Liquidity may have a mixed impact on capital structure. On the one hand firms with higher liquidity ratios may use this liquidity to meet short-term obligations when they are due and consequently a negative relationship is expected between liquidity and short-term debt.

On the other hand firms may use their higher liquidity in financing their investment instead of debt and in this case a negative relationship is expected between liquidity and debt maturity [Myers, S.C. (1977), Modigliani, F and Miller, M.H., (1958) Ozkan, A. (2001),]. With risky fixed claims in the firm's capital structure as a result of using debt, the benefits from undertaking profitable investment opportunities are split between stockholders and debt holders and in some cases debt holders may gain more benefits than the stockholders. This situation may lead to a conflict of interests between stockholders and debt holders and as a result firms financed with risky debt may be pushed to pass up some valuable investment opportunities in some states of the future. Myers [Myers, S.C. (1977),] refers to this behavior as "an underinvestment problem". One way for the firm to eliminate or reduce this problem according to the author is to shorten the maturity of its debt or include less debt in its capital structure. This implies that firms with more investment opportunities should employ short-term debt in their capital structure. This hypothesis has been tested empirically by a number of researchers Stohs, M. and Mauer. D., (1996) Hall, G., Hutchinson and Chittenden, F. (2000) to mention a

few. However, the findings of these studies were inconclusive. While the first study reported a moderate support of the hypothesis, the second study strongly supported the hypothesis and showed that firms with more growth opportunities in their investment sets tend to have more shorter-debt in their capital structure. Asset structure which shows the level of assets that can be used as collateral by the firm when it opts for borrowing has an impact on debt maturity.

This collateral mitigates information asymmetry and agency problems because it will secure the interests of lenders in the event of problems arising from lack of information or conflicts of interests between the internal and external parties. In this regard it is expected that a 'matching' will take place where long-term assets will be used as collateral for long-term debt and short-term assets for short-term loans Hall, G., Hutchinson and Chittenden, F. (2000). The rationale for matching can be explained by the fact that debt with maturity shorter than the maturity of the asset is risky because the asset might not have yielded enough profit to repay the debt. On the other hand, debt with the maturity longer than the maturity of the asset is also risky because debt might have to be repaid after the asset ceased to yield income. Therefore, firms try to match the maturity of the assets with that of liabilities. The determinants of capital structure were investigated by few scholars in the Arab world. For example, in Kuwait it was reported that the use of debt in capital structure was negatively related to profitability, liquidity and the previous debt ratio and positively related to growth opportunities, dividend payout and collateral Abdulla, J (1994). In Jordan it was found that a positive relationship existed between the use of total debt within the capital structure on one hand and the size of the firm and the retention ratio on the other hand. Moreover, the ratio of long term debt within the capital structure was positively and significantly related to total assets (as a measure of size) and the ratio of fixed assets to total assets. In Saudi Arabia and in absence of tax, negative relationships between the debt ratio on the one hand and growth opportunities and profit margin and return on assets on the other hand were reported. In addition, the governments share in the ownership of public companies and size demonstrated a positive relationship with the debt ratio within the capital structure

AL- Sakaran ,S., (2001). Similar results were reported in a recent study on the determinants of capital structure where the total debt ratio was positively and significantly related to the past debt ratio and size and negatively related to profitability, liquidity, collateral and growth opportunities Abdullah,A. and Elsiddig,B (2002). Surprisingly none of the two studies have addressed the determinants of debt maturity among the Saudi public companies.

THE DATA AND METHODOLOGY

The data used in this section comes from the Amman Stock Exchange (ASE) and includes the traded banks for the period 2005-2009. All industrial companies were required to deliver their financial statements for every year between 2005 and 2009. The data set contains detailed information about each firm. The items of interest were: balance sheets, income statements, tax paid, interest paid, depreciation, and market valuation. By law, the full balance sheets and income statements are available from firms. Our sample contains 60 firms. Based on the review of previous studies with respect to the main determinants of capital structure and debt maturity we have formulated the following three models to define the dependent and independent variables and stated the hypothesized relationships.

In order to achieve our object, this study employs the Ordinary Least Square (OLS) technique. The study was set to test a number of hypotheses regarding the determinants of capital structure and debt maturity. These hypotheses were related to the effect of profitability, growth opportunity, asset maturity, size liquidity and age. In general we regress the total debt, long and short term debt on these variable that stands for different times.

The general construction of the standard model is as follows:

$$Rtd_t = \alpha + \alpha_1 Roa_t + \alpha_2 G_t + \alpha_3 size_t + \alpha_4 Age_t + \alpha_5 Mat_t + \alpha_6 Lqt + \epsilon_t \text{-----(1)}$$

$$RLd_t = \alpha + \alpha_1 Roa_t + \alpha_2 G_t + \alpha_3 size_t + \alpha_4 Age_t + \alpha_5 Mat_t + \alpha_6 Lqt + \epsilon_t \text{-----(2)}$$

$$Rsd_t = \alpha + \alpha_1 Roa_t + \alpha_2 G_t + \alpha_3 size_t + \alpha_4 Age_t + \alpha_5 Mat_t + \alpha_6 Lqt + \epsilon_t \text{-----(3)}$$

Where:

Rtd: is the ratio of total debt to total assets where

total debt includes both short-term and long-term debt. i.e $Rtd = TD/TA$, where TD refers to total debt and TA refers to total assets. Rsd: is the ratio of short-term debt to total debt, where short-term debt includes all types of debt that mature in less than a year (i.e. repayable within a year) i.e. $Rsd = STD/TD$ where STD refers to short term debt and TD refers to total debt. Rld: is the ratio of long-term debt to debt, where long-term debt includes all types of debt that mature beyond one year i.e. $Rld = LTD/TD$ where LTD stands for long term debt.

Roa is the return on total assets as a measure of profitability and defined as a ratio of operating profit to total assets. $Roa = EBIT/TA$ where EBIT is the earnings before interest and tax. The empirical hypothesis here is that profit will be negatively related to both short- and long-term debt. G stands for the growth opportunities facing a firm and they are measured by the percentage change in the total assets over the last five years.

$$G = \frac{TA_t - TA_{t-5}}{TA_{t-5}}$$

The empirical hypothesis is that growth options or opportunities are positively related to short-term debt and negatively related to long-term debt. Size refers to the size of the firm and is measured by the natural logarithm of assets i.e $size = \ln TA$ and expected to be positively related to total debt and long-term debt and negatively related to short-term debt.

Age refers to the age of the firm and is expressed in the number of years and is calculated as the present year (2005) minus the year of inception. The relationship between age and the different types of debt maturity is expected to be negative. The rationale for this expectation is based on the belief that older firms have the ability to accumulate funds and therefore borrow less.

Mat refers to the asset structure or asset maturity and is expressed as a ratio of fixed assets to total assets and serves as collateral and the ratio are expected to be positively related to total debt. However, a matching principle may take place and in this situation the ratio of fixed assets is positively related to long term-debt and negatively related to short-term debt. The maturity of assets is measured by the percentage of total assets that is fixed. $Mat = FA/TA$ where FA refers to fixed assets and TA refers to total assets.

ϵ_t : is a disturbance term.

EMPIRICAL RESULTS

Table 1 shows the Pearson correlation matrix with no primary evidence of existence of the matching principle as measured by asset maturity because the ratio of fixed asset on the one hand and long term and short term debt ratios in other hand is not significant. However there is a significant and negative correlation between asset maturity and ratio of total debt in the capital structure. The growth opportunity related positively with long term debt ratio and negatively with short. A significant and positive correlation between the size of firm and long term debt ratio and a significant and negative with short term debt ratio but the liquidity appear negatively correlated with total debt. Other variables very low and insignificant correlation with dependent variables

Insert table-1 here

In table (2) we report the main determinants of total debt (Rtd). It can be observed from the table that the significant determinants of total debt of the firms are growth opportunities, liquidity and asset structure all of which are significant at 1%. Growth opportunities are positively related to total debt which means that firms faced with higher growth potentials are more likely to use more debt in financing. For asset maturity (mat), the relationship with total debt is negative and statistically significant, as a result that is contrary to the majority of previous studies.

Liquidity is negatively and significantly related to total debt ratio i.e. the more liquid the firm is, the less it resorts to borrowing. This result indicates that firms with higher liquidity use that liquidity to pay off short-term obligations; therefore they reduce short term debt and may also use their liquidity to finance part of their long-term investment

Other independent variables which include profitability, size and age appear to be insignificant determinants of total debt within the capital structure. The dependent variables altogether explain more than 83% of the variations in total debt ratio. Chittenden, F, Hall, G. and Hutchinson P. (1996) suggested that total debt may mask two opposite effects for long-term and short-term debt for some of the explanatory variables. Consequently we investigated the effect of the independent variables on the two types of debt (short-term and long -term) separately and this has been done in table (1). It can be seen that the main determinants are growth opportunities, size and

asset maturity. These independent variables explain about 67% of the variation in both the long term and short term debt ratios.

Growth opportunities variable (G) is found to be positively and significantly related to long term debt and negatively and significantly related to short term debt at 1% level. This result runs contrary to Myers' hypothesis that firms with significant growth opportunities borrow on short term basis. In other words we found no support of the prediction that debt maturity decreases as the proportion of growth options in the firm's investment opportunity set increases. One possible explanation for this result is the fact that firms may have the ability to roll over their short term debts and therefore short term loans are converted to long term debts

Size is found to be positively and significantly related to long term debt and negatively and significantly related to short term debt at 5% level. This result implies that big companies borrow on long term basis while small ones are relatively sticking to short term borrowing. This is so because larger firms have the ability to reduce the unsystematic risk via diversification. The rest of the explanatory variables, namely profitability, age and liquidity are statistically insignificant although some of them display the expected results with the debt maturity variables.

Insert table-2 here

The optimal capital structure has been the subject of many studies. It has been argued that profitable firms were less likely to depend on debt in their capital structure than less profitable ones. It has also been argued that firms with a high growth rate have a high debt to equity ratio. Firms' size was also found to be an important effect on capital structure. If these three factors are considered as determinants of capital structure, then these factors could be used to determine the firm's performance. In practice, firm managers who are able to identify the optimal capital structure are rewarded by minimizing a firm's cost of finance thereby maximizing the firm's revenue. If a firm's capital structure influences a firm's performance, then it is reasonable to expect that the firm's capital structure would affect the firm's health and its likelihood of default. From a creditor's point view, it is possible that the debt to equity ratio aids in understanding banks' risk management strategies and how banks determine the likelihood of default associated with

financially distressed firms. In short, the issue regarding the capital structure and firm performance are important for both academics and practitioners.

CONCLUSIONS

At the outset, we described regression results that indicate that a corporation's capital structure is determined more by the country in which it is located than by its industry affiliation, suggesting that public policy and institutional differences between countries can have a profound effect on capital structure choices. The focus of this paper has been on the determinants of capital structure and debt maturity among listed stock industrial companies operating in Amman Stock Exchange. The companies belong to tow different economic sectors namely industrial and service. The main findings of the paper show that in general the use of debt among the Amman listed companies is low compared to the reported debt ratios in other countries in and outside the region.

The one way analysis of variance shows no significant differences in the use of debt, whether total, short-term or long-term debt among sample companies in the two sectors. Moreover, the results of the indicate significant differences among the companies in the sample with respect to growth opportunities, size, liquidity and age as determinants of capital structure. The regression analysis shows that total debt is positively and significantly related to growth opportunities and negatively and significantly related to both liquidity and asset structure. On the other hand, the long term debt ratio is found to be positively and significantly related to the growth opportunities and size variables and negatively and significantly related to maturity. For the short term debt the only two significant variables are growth opportunities and size variables which are both negatively related. The interpretation of these relationships has been discussed within the context of the framework within which the sample companies operate. The other variables which include profitability and age have no significant effect on capital structure and debt maturity.

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Table (1) Correlations among variables

	RTD	RID	RSD	ROA	G	SIZE	AGE	MAT	LQ
RTD	1								
RID	.45***	1							
RSD	.32***	-.95***	1						
ROA	-.50	.02	-.03	1					
G	.32	.35**	.33**	.03	1				
SIZE	.16	.30**	-.25**	.13	.05	1			
AGE	.04	-.02	.02	.34***	-.29	-.30**	1		
MAT	-.40***	-.15	.17	-.32**	.15	.02	-.10	1	
LQ	-.31**	-.09	.03	-.03	-.07	.32**	-.11	-.15	1

* Correlation is significant at 0.1 level. ** Correlation is significant at 0.05 level *** Correlation is significant at 0.01 level

Table 2: Results of Regression Models:

Years	Rtd (equation1)	Rsd (equation3)	Rtd (equation3)
Constant	0.18***	- 0.19	1.29***
ROA	-0.08 (-0.57)	-0.2 (-0.9)	0.08 (0.7)
G	0.35*** (4.11)	0.39*** (2.83)	0.39*** (-2.9)
Size	0.07 (0.83)	0.05** (2.0)	0.29** (-2.09)

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Age	-0.07 (0.3)	-0.07 (-0.11)	0.05 (0.25)
Mat	0.63*** (-5.6)	0.35* (-1.8)	0.22 (1.7)
Lq	0.55*** (-5.0)	-0.05 (-0.4)	0.5 (0.28)
R²	0.73	0.77	0.69

* Correlation is significant at 0.1 level. ** Correlation is significant at 0.05 level *** Correlation is significant at 0.01 level.