Corporate Capital Structure Decisions: Evidence from an Emerging Market

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Abstract: This study investigates the determinants of capital structure of listed firms in the Tehran Stock Exchange using both static and dynamic approaches over the period 2003 to 2011. This study employs two alternative leverage measures (including book leverage and market leverage) as dependent variables and seven factors (including profitability, growth opportunity, liquidity, business risk, effective tax rate, size and tangibility) as determinants of capital structure. We provide evidence that although capital structure theories could be portable to Iran but, there are several major differences indicating that specific features of Iranian capital market are at work.

Key words: Capital Structure, Trade-off Theory, Pecking Order Theory, GMM Estimation, Tehran Stock Exchange

INTRODUCTION

In recent decades, it was believed that the most crucial role of management is to maximize the wealth of shareholders (Worthington and West, 2001, 2004), and hence all of firm activities and management's decisions must be directed toward attaining this goal. Financing decision is one of the main kinds of decisions that managers must make in every business. However, Modigliani and Miller (1958) proposed that, in the perfect market, capital structure choices do not affect the firm value. They later claim that the firm value can be increased by using tax advantages (Modigliani and Miller, 1963).

Since 1960s, especially after the seminal work of Modigliani and Miller (1958), capital structures of corporations has become one of the most interested topics among scholars and practitioners (Karadeniz *et al*., 2009, Chakraborty, 2010). The focus of recent researches on capital structure led to developing two main theories, namely the static trade-off and the pecking order theories, which each of them has its own certain assumptions.

The static trade-off theory assumes a target capital structure for a firm which can be achieved by establishing a balance between advantages (interest tax-shields) and disadvantages (bankruptcy and agency costs) of debts in the capital structure (Myers and Majluf, 1984; Rajan and Zingales, 1995; Wald, 1999; Booth *et al*., 2001; Fama and French, 2002; Huang and Song, 2006; Tang and Jang, 2007; Karadeniz *et al*., 2009 and Chakraborty, 2010).

According to the pecking order theory, which developed by Myers and Majluf (1984), there is no optimal leverage for firms. Since there is asymmetric information between managers and investors, therefore, when managers want to issue new risky securities investors discount these new and existing risky securities. In order to minimize this asymmetric information between insiders and outsiders, managers prefer to use first internal sources (such as retained earnings), then debts and finally equity in their capital structure (Myers and Majluf, 1984; Rajan and Zingales, 1995; Wald, 1999; Booth *et al*., 2001; Fama and French, 2002; Huang and Song, 2006; Tang and Jang, 2007; Karadeniz *et al*., 2009; Chakraborty, 2010).

The empirical studies on capital structure theories are voluminous, but with controversial results. Fama and French (2002) suggest that none of these theories can be rejected, and both of them have the explanatory power of firm's capital structure. Mayers (2003) argues that there is no universal theory to explain firm financing choices and all of the theories are conditional (Huang and Song, 2006).

The most of empirical studies on the determinants of leverage have been conducted in the mature capital markets, for example, Rajan and Zingales (1995) and Wald (1999). Recently, several scholars such as Booth *et al*. (2001), Chen (2004) and Huang and Song (2006) considered this issue in the emerging markets. There is a severe shortage of these studies in Iran, as an emerging market. Iranian firms typically use debt and equity in their capital structure. Figure 1 shows the percentage of using short-term debts (STD), long-term debts (LTD), total debts (TD) and equity (EQU) in the capital structure of listed firms in the Tehran Stock Exchange (TSE) during the period of 2000 to 2011. These results indicate that Iranian firms prefer financing by STD among other choices, and they do not use a lot of LTD because of the challenges in issuing bonds.
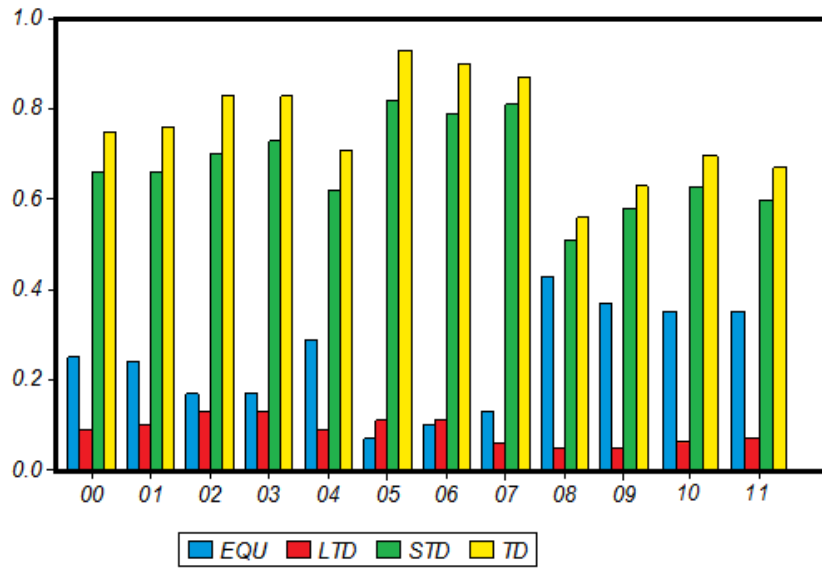
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Fig. 1: Capital structure of listed firms in the TSE during 2000-2011

We investigate the capital structure of Iranian firms to specify whether financing strategies in Iran are different from those in the other capital markets. According to the literature, several factors have been known that affect the capital structure. In this study, seven determinants of capital structure including profitability, tangibility, business risk, effective tax rates, liquidity, growth opportunities and firm size are considered. In the study, a sample consisting of 146 Iranian firms listed in the TSE over the period 2003-2011 is employed. Our results suggest although, capital structure theories could be portable to Iran but there are several major differences indicating that specific features of Iranian capital market are at work.

The remainder of the paper is organized as following: Section 2 describes the leverage measures, the determinants of the capital structure and also related literature on those proxies. Section 3 presents the data and methodology of the research. In section 4, we report on the descriptive statistics and results. Finally, we conclude in section 5.

Leverage And Determinants Of Capital Structure:
Capital structure:
Following the previous studies (Rajan and Zingales, 1995; Wiwattanakantang, 1999; Korajczyk and Levy, 2003; Lipson and Mortal, 2009; Kayo and Kimura, 2011) in this study, two alternative measures of leverage including book leverage (LEV1) and market leverage (LEV2) are used. These two measures are defined as follows:

$$\text{Book leverage} = \frac{\text{Book value of Debts}}{\text{Book value of Assets}}$$

$$\text{Market leverage} = \frac{\text{Book value of Debts}}{\text{Book value of Debts} + \text{Market value of Equity}}$$

Although a number of variables have been proposed to determine a firm's capital structure, but in this study we employ seven determinants of capital structure such as tangibility, firm size, profitability, effective tax rates, business risk, growth opportunities and liquidity.

Tangibility:
The reported results from the effects of tangibility on capital structure, suggest that tangibility is positively related to capital structure, due to tangible assets can be used as collateral (Rajan and Zingales, 1995; Wald, 1999; Wiwattanakantang, 1999, Booth *et al*., 2001; Huang and Song, 2006; Kayo and Kimura, 2011). Following most of empirical studies, in this study tangibility (Tan) is measured by dividing total tangible assets by total assets.

Firm Size:
The empirical studies have not provided a conclusive result for the effects of firm size on leverage. According to the trade-off theory, a positive relationship exists between firm size and leverage, while the pecking order theory suggests a negative association between these two variables (Wiwattanakantang, 1999;

Karadeniz *et al.*, 2009 and Chakraborty, 2010). In the other words, Titman and Wessels (1988) argue that larger firms tend to be more diversified, therefore, have less bankruptcy risk and the cost of financial distress. Rajan and Zingales (1995), Wiwattanakantang (1999), Booth *et al.* (2001), Huang and Song (2006) and Kayo and Kimura (2011) revealed a positive relationship between size and leverage. On the other hand, Rajan and Zingales (1995) state larger firms have less asymmetric information than smaller ones due to the provision of more information to outsiders and they experience a lower cost of capital. Therefore, they tend to use more equity in their capital structures. In this line, Chakraborty (2010) shows that leverage is negatively related to firm size. In this study, the logarithm of total assets is a proxy for firm size.

Profitability:

The relationship between profitability and leverage is ambiguous. The trade-off theory assumes a positive relationship between performance and leverage because of having more tax-shield advantages and more capacity to borrow (Rajan and Zingales, 1995; Wald, 1999; Wiwattanakantang, 1999; Huang and Song, 2006; Chakraborty, 2010). Roden and Lewellen (1995), Hadlock and James (2002) and Berger and Bonaccorsi di Patti (2006) revealed that leverage is positively correlated with profitability. On the other hand, according to the pecking order theory, firms with a high level of profitability prefer to finance by retained earnings (internal sources) rather than debt and equity; and thus, a negative relationship is expected between capital structure and profitability (Wiwattanakantang, 1999; Huang and Song, 2006; Karadeniz *et al.*, 2009; Chakraborty, 2010). Rajan and Zingales (1995), Wald (1999), Booth *et al.* (2001), Chiang *et al.* (2002), Huang and Song (2006), Karadeniz *et al.* (2009), Chakraborty (2010) and Kayo and Kimura (2011) indicate that profitability has a negative effect on leverage. In this study, the ratio of operating income to total assets (PR1) and ROA (PR2) which is calculated by dividing the sum of the net earnings and interest expenses by total assets are used to measure profitability.

Effective Tax Rates:

Most scholars accept that effective tax rate is an important determinant of capital structure (Huang and Song, 2006; Karadeniz *et al.*, 2009). According to the trade-off theory, firms with a higher level of effective tax rate tend to use more debts to reach tax-shield advantages. Hence a positive relationship is expected between effective tax rate and capital structure (Huang and Song, 2006; Karadeniz *et al.*, 2009). By contrary, the pecking order theory does not establish a definite association between effective tax rates and leverage (Karadeniz *et al.*, 2009). In this study, following Karadeniz *et al.* (2009), effective tax rate (ETR) is calculated by dividing firm tax by earnings before tax.

Business Risk:

The effects of business risk (volatility) on the capital structure are unclear. Several researchers found a negative relationship between leverage and business risk while others revealed that business risk is positively related to capital structure. Moreover, no significant relationship between these variables has been reported (Hatzinikolaou *et al.*, 2002). Although there are several measures to determine earnings volatility, but in this study the three-year standard deviation of ROA is used to measure the business risk (BR).

Growth Opportunity:

According to the pecking order theory, growth opportunity is positively related to capital structure due to existence of an asymmetric information problem among insiders and outsiders (Myers, 1984; Myers and Majluf, 1984). In this line, Wald (1999), Dalbor and Upneja (2002) and Tang and Jang (2007) report a positive correlation between growth opportunity and debt levels. On the other hand, the trade-off theory assumes a negative relationship between growth opportunity and leverage due to firms with outstanding growth opportunities cannot put them up as collateral and have more financial distress costs (Delcoure, 2007; Karadeniz *et al.*, 2009). Rajan and Zingales (1995), Booth *et al.* (2001), Deesomsak *et al.* (2004), Huang and Song (2007) and Kayo and Kimura (2011) found a negative association between growth opportunity and capital structure. In this study, two measures are employed to estimate growth opportunity. Following Booth *et al.* (2001), the ratio of market value to book value of equity (GO1) and following Rajan and Zingales (1995), Huang and Song (2006) and Kayo and Kimura (2011), Tobin's Q (GO2) are used to measure the growth opportunity. Tobin's Q is calculated as follows:

$$\text{Tobin's Q} = \frac{\text{Book value of total debts} + \text{Market value of equity}}{\text{Book value of total assets}}$$

Liquidity:

According to the literature, a negative relationship between liquidity and capital structure is expected. Lipson and Mortal (2009), for instance, investigate the effects of equity market liquidity and found firms with more liquidity prefer to use the equity in their capital structure than debts. Deesomsak *et al.* (2004) and

Udomsirikul *et al*. (2011) revealed similar results. In this study, the ratio of current assets to current liabilities is employed to measure firm liquidity (LIQ).

Data and Methodology:
Data and Sample:

In this study, a sample of firms listed in the Tehran Stock Exchange (TSE) over the period of 2003-2011 is employed. Since financial firms and banks operate in a different way, therefore, all of them have been excluded from the sample. Moreover, in order to increase comparability, the companies, which their fiscal and calendar years do not match, are omitted. Furthermore, the sample was reduced more due to the lack of some company data. Finally, the sample was consisted of 146 firms for the research period.

Generalized Method of Moments (GMM) Estimation:

The dynamic panel data methods help the researchers better understand the many dynamic economic relationships achieve this purpose. To characterize these dynamic relationships, a lagged dependent variable is added to regressors as following:

$$y_{it} = \alpha + \delta y_{i,t-1} + \beta x_{it} + u_{it} \qquad i = 1, 2, \dots, N \qquad t = 1, 2, \dots, T$$
$$u_{it} = \eta_i + v_{it}$$

Where y_{it} denotes dependent variable, α is the intercept term, δ is a scaler and the coefficient of lagged dependent variable, $y_{i,t-1}$ denotes lagged dependent variable, β is the coefficient on the explanatory variables, η_i is an unobserved individual-specific effect time-invariant and v_{it} denotes the remainder disturbance.

In these situations some of the basic problems, including autocorrelation due to the presence of a lagged variable among the regressors and individual effects, are emerged. However, since explanatory variable $y_{i,t-1}$ is positively correlated with error terms due to the presence of individual-specific effect, therefore, ordinary least square (OLS) method is inconsistent and biased upward in estimating the dynamic relationships (Hsiao, 1985; Baltagi, 2005). The Within Group estimator wipes out the individual effect time-invariant by transforming the above equation to eliminate η_i. In panels which time period is small, this transformation lead to exist a negative correlation between transformed lagged dependent variable and the transformed error terms. Therefore, the Within Group estimator is also inconsistent and biased downward (Baltagi, 2005). However, to solve these problems several scholars recently introduced new estimation techniques which one of the best well-known of them is generalized method of moments (GMM) estimation. This method has been developed by Hansen (1982), and has gained popularity in economics and finance models.

In this study, the two-step estimation GMM is used for analysis of data because of its efficiency than that of one-step GMM estimation. The efficiency of GMM depends on the validity of lagged dependent variable and explanatory variables and also the correlation among error terms (Chakraborty, 2010). Arellano and Bond (1991) proposed three tests, including the first and second order serial autocorrelation of the error term and Sargan test of validity of instruments, to determine the efficiency of GMM estimation.

However, we investigate the determinants of capital structure of the Iranian companies using the following general form of GMM estimation:

$$y_{it} = \alpha + \delta y_{i,t-1} + \beta x_{it} + \lambda_i + \theta_t + \varepsilon_{it} \qquad i = 1, 2, \dots, N \qquad t = 1, 2, \dots, T$$

Where y_{it} stands for the dependent variable, α is the intercept, δ is the coefficient of lagged dependent variable, $y_{i,t-1}$ is the lagged dependent variable, β is the coefficient of explanatory variables, λ_i is firm-specific effects time-invariant and θ_t denotes the time-specific effects firm-invariant and ε_{it} denotes the error term.

In this study, the dependent variable is capital structure and the explanatory variables include profitability, tangibility, firm size, effective tax rate, liquidity, business risk, and growth opportunity. Table I shows the description of variables.

Table I: Summary of dependent and independent variables

Variables		Description
Dependent Variables	Book leverage (LEV1)	Ratio of book value of total debts to book value of total assets
	Market leverage (LEV2)	Ratio of book value of total debts to market value of the firm, where market value of the firm is the sum of book value of debts and market value of equity
Independent Variables	Profitability (PR)	Ratio of operating income to total assets (PR1) and ROA (PR2).
	Tangibility (Tan)	Ratio of tangible assets to total assets.
	Size (S)	Size is defined by the logarithm of total assets.
	Effective tax rates (ETR)	Ratio of firm tax to operating income before tax.
	Liquidity (LIQ)	Ratio of current assets to current liabilities.

Business risk (BR)	Business risk is defined as the three-year standard deviation of ROA.
Growth opportunity (GO)	Ratio of market-to-book value of equity (GO1) and Tobin's Q (GO2)

Since we use two alternative measures for each of the capital structure, profitability, and growth opportunity variables, therefore, we run eight separate regression models as following:

$$LEV1_{it} = \alpha_0 + \delta LEV1_{i,t-1} + \alpha_1 PR1_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO1_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (1)$$

$$LEV1_{it} = \alpha_0 + \delta LEV1_{i,t-1} + \alpha_1 PR1_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO2_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (2)$$

$$LEV1_{it} = \alpha_0 + \delta LEV1_{i,t-1} + \alpha_1 PR2_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO1_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (3)$$

$$LEV1_{it} = \alpha_0 + \delta LEV1_{i,t-1} + \alpha_1 PR2_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO2_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (4)$$

$$LEV2_{it} = \alpha_0 + \delta LEV2_{i,t-1} + \alpha_1 PR1_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO1_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (5)$$

$$LEV2_{it} = \alpha_0 + \delta LEV2_{i,t-1} + \alpha_1 PR1_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO2_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (6)$$

$$LEV2_{it} = \alpha_0 + \delta LEV2_{i,t-1} + \alpha_1 PR2_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO1_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (7)$$

$$LEV2_{it} = \alpha_0 + \delta LEV2_{i,t-1} + \alpha_1 PR2_{it} + \alpha_2 Tan_{it} + \alpha_3 S_{it} + \alpha_4 ETR_{it} + \alpha_5 LIQ_{it} + \alpha_6 BR_{it} + \alpha_7 GO2_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (8)$$

Where, $LEV1_{it}$ and $LEV2_{it}$ stand for book leverage and market leverage of firm i in the year t, $LEV1_{i,t-1}$ and $LEV2_{i,t-1}$ are the lagged dependent variables. Both $PR1_{it}$ and $PR2_{it}$ are profitability measures of firm i in the year t, ROA and the ratio of operating income to total assets, respectively. Tan_{it}, S_{it}, ETR_{it}, LIQ_{it} and BR_{it} indicate tangibility of assets, firm size, effective tax rates, firm liquidity and business risk, respectively. Finally, ε_{it} is the error term of firm i in period t.

Empirical Findings:
Descriptive Statistics:
Table II presents the descriptive statistics of all variables. As shown in the Table II, all of the variables have a positive mean. Furthermore, mean statistics produce some main results. First, the mean of book leverage (0.705) indicates that Iranian firms prefer to finance their assets by debts rather than equity. Second, the mean of the market leverage (0.54) is lower than book leverage (0.705), which reveals that, the equity market values for the Iranian firms are higher than their equity book values. This finding is supported by the mean results of the market-to-book equity ratio (GO1). Third, the mean of profitability measures, operating income to total assets ratio (0.16) and ROA (0.166), indicate that Iranian firms by considering the inflation rate, the average rate of inflation during the study period was 25.2 percent, had a poor performance over the research period. Finally, the mean of Tobin's Q (1.73) is higher than one which suggests Iranian companies should invest more and more in the capital.

Table II: Descriptive statistics

Variables	Mean	Maximum	Minimum	Std.dev
LEV1	0.705	3.640	0.112	0.27
LEV2	0.54	0.983	0.032	0.284
PR1	0.16	3.5	-0.335	0.20
PR2	0.166	3.51	-0.301	0.19
Tan	0.27	1.87	0.000	0.171
S	12.5	18.12	5.715	1.53
LIQ	1.21	7.05	0.12	0.81
ETR	0.09	0.418	0.000	0.10
BR	0.052	1.83	0.000	0.11
GO1	3.42	45.02	-42.6	5.27
GO2	1.73	12.20	0.48	1.49
Note: This table presents the descriptive statistics of all variables. The sample consists of 146 listed firms in the Tehran Stock Exchange from 2003 to 2011. LEV1 and LEV2 stand for the book and market leverage, respectively. PR1 and PR2 stand for the ratio of operating income to total assets (PR1) and return on assets (PR2). Tan stands for tangibility. S stands for firm size. LIQ, ETR and BR stand for liquidity, effective tax rate and business risk, respectively. GO1 and GO2 stand for growth opportunity.				

Table III presents the correlation matrix of variables. LEV2 has the highest correlation with LEV1 (62 percent). BR is highly correlated with PR1 (43 percent) and two alternative measures of growth opportunity

(GO1 and GO2) are also highly correlated (64 percent). PR1 has the highest correlation coefficient with LEV2 (48 percent) among other variables. Since there are some high-correlation coefficients among variables, therefore, the multicollinearity may exist in this study. The multicollinearity is not a serious problem while the variance inflation factor (VIF) values are less than 10 (Ott and Longnecker, 2001). Accordingly, the results indicate in this study the multicollinearity problem does not exist. More details are reported in Table III.

Table III: The correlation matrix of variables

	LEV1	LEV2	BR	ETR	GO1	GO2	LIQ	PR1	PR2	S	Tan	VIF
LEV1	1											
LEV2	0.62	1										
BR	0.01*	-0.07	1									4.7
ETR	-0.09	-0.16	-0.10	1								2.87
GO1	-0.009*	-0.44	0.09	0.06	1							3.1
GO2	0.07	-0.52	0.09	0.22	0.64	1						1.93
LIQ	-0.43	-0.29	0.06	0.19	-0.14	-0.14	1					6.5
PR1	-0.39	-0.48	0.43	0.14	0.27	0.30	0.31	1				4.2
PR2	-0.33	-0.50	0.38	0.05	0.29	0.3	0.39	0.84	1			5.07
S	0.09	0.21	-0.04	-0.13	-0.04	-0.01*	-0.21	-0.13	0.12	1		3.2
Tan	-0.12	-0.03*	0.12	-0.08	-0.09	-0.07	-0.24	-0.15	-0.16	-0.10	1	4.03

Note: LEV1 is defined as the ratio of book value of total debts to book value of total assets. LEV2 is defined as the ratio of book value of total debts to market value of the firm. PR1 and PR2 are the profitability proxies and defined as the ratio of operating income to total assets (PR1) and return on assets (PR2). Tangibility (Tan) is the ratio of tangible assets to total assets. Size (s) is the logarithm of total assets. Liquidity (LIQ) is current assets divided by current liabilities. Effective tax rate (ETR) is firm tax divided by operating income before tax. GO1 and GO2 are growth opportunity proxies and defined as the ratio of market-to-book value of equity (GO1) and Tobin's Q (GO2) which Tobin's Q is market value of assets divided by book value of assets. Business risk (BR) is defined as the three-year standard deviation of return on assets. All of correlation coefficients, except for those which marked with (*), are significant at 5 percent level.

The Research Results:

In this study, eight distinct regression models are used to examine the determinants of capital structure using Arrelano-Bond GMM approach. Table IV shows the results of the estimations. Panel A shows the results of estimations of regressions 1 to 4, which consider book leverages (LEV1) as dependent variables. The results of Sargan test indicate that the validity of instruments is not significant at 1-percent level for all models; therefore, it is more appropriate to consider the firm-specifics as exogenous. The estimated coefficients of lagged leverage (lagged dependent variable) are significant at 1-percent level in all regressions (1 to 4) and are 0. 392, 0.47, 0.41, 0.52, respectively. These coefficients are between the range of zero and one [0, 1], which suggest that the dynamic capital structure exists in Iran. Since the speed of capital structure adjustment toward the target capital structure is (1-β), where β is the coefficient of lagged leverage, therefore we can conclude Iranian firms quickly respond to the internal or external changes to achieve their target leverages. Panel B of Table IV presents the results of regressions 5 to 8, which consider market leverages as dependent variables. Similar to panel A, the results of Sargan test indicate that the validity of instruments is not significant. According to the results, the coefficient of lagged dependent variable (market leverage) is significant for all models (5 to 8). Therefore, we can conclude that Iranian firms change their financing strategies to achieve the target capital structure.

The results of Panel A and B show that the profitability is significantly and negatively related to leverage in all regressions. Our findings are in favor of the pecking order theory that asserts profitable firms tend to internal financing and hence they should have lower leverage in their capital structure. These results are consistent with Friend and Lang (1988), Titman and Wessels (1988), Rajan and Zingales (1995), Wald (1999), Booth *et al*. (2001), Chiang *et al*. (2002), Huang and Song (2006), Chakraborty (2010) and Kayo and Kimura (2011) who revealed that profitability has a negative relationship with leverage in the developed and developing capital markets.

According to the results, there is a negative relationship between liquidity and leverage. This means firms with high liquidity will borrow less. Managers in high-liquidity companies can use current assets both to finance their investments and in favor of shareholders against the interest of debt holders. Deesomsak *et al*. (2004), Lipson and Mortal (2009) and Udomsirikul *et al*. (2011) indicate a negative relationship between liquidity and leverage.

The growth opportunity variable has a positive effect on book leverage in models 1 to 4. On the other hand growth opportunity is negatively related to market leverage in all models (5 to 8). Accordingly, the effect of growth opportunity on leverage is ambiguous. Our findings are precisely consistent with Chakraborty (2010) for Indian capital market. The theoretical studies generally predict that firms with high growth opportunities have low debts due to the costs of financial distress. In addition, while firms have growth opportunities stock prices of the firms tend to go up and thus firms prefer to issue stocks. Both of these possible reasons can explain the negative relationship between growth opportunity and leverage.

Table IV: Two-step GMM estimation of the determinants of leverage

Panel A: The book leverage is considered as dependent variable				
Variables	Model 1	Model 2	Model 3	Model 4
C	0.63***	0.72***	0.82***	0.91***
LEV1 (-1)	0.392***	0.47***	0.41***	0.52***
PR1	-0.04**	-0.12**		
PR2			-0.26***	-0.09***
GO1	0.02***		0.02***	
GO2		0.127***		0.10***
BR	0.13***	0.18***	0.34***	0.28***
ETR	0.43	0.58	0.41	0.36
LIQ	-0.26***	-0.35***	-0.11***	-0.27***
S	-0.02***	-0.03***	-0.01***	-0.01***
Tan	-0.17**	-0.21***	-0.20***	-0.15***
Adjusted R-squared	0.78	0.73	0.75	0.81
Correlation 1	0.63***	0.67***	0.70***	0.71***
Correlation 2	-0.42	-0.43	-0.39	-0.40
Sargan Test (p)	27.7 (0.21)	29.6 (0.32)	24.01 (0.28)	20.12 (0.16)
Panel B: The market leverage is considered as dependent variable.				
Variables	Model 5	Model 6	Model 7	Model 8
C	-0.24***	0.61**	0.29***	0.31***
LEV2 (-1)	0.56***	0.49***	0.36***	0.43***
PR1	-0.14***	-0.10**		
PR2			-0.18***	-0.12***
GO1	-0.01***		-0.02**	
GO2		-0.25***		-0.22***
BR	0.12**	0.24***	0.09***	0.03**
ETR	-0.01	-0.02	-0.02	-0.01
LIQ	-0.06***	-0.09***	-0.03***	-0.09***
S	-0.02***	-0.007**	-0.09***	-0.006**
Tan	-0.15***	-0.126***	-0.05***	-0.13***
Adjusted R-squared	0.78	0.70	0.73	0.75
Correlation 1	-0.43***	0.72***	-0.31***	0.87***
Correlation 2	-0.05	0.01	-0.02	-0.05
Sargan Test (p)	13.1 (0.14)	24.03 (0.21)	11.4 (0.10)	27.1 (0.13)

Note: *, ** and *** significant at 10, 5 and 1 percent level. In panel A, the dependent variable is LEV1 that is measured using the ratio of book value of debts to book value of assets. LEV1 (-1) is the book leverage in year t-1. In panel B, the dependent variable is LEV2 that is book value of total debts divided by market value of the firm. LEV2 (-1) is the market leverage in year t-1. PR1 is measured by the ratio of operating income to total assets and PR2 is defined as ROA. The growth opportunity is defined using the ratio of market-to-book value of equity (GO1) and Tobin's Q (GO2). Business risk (BR) is defined as the three-year standard deviation of ROA; effective tax rate (ETR) as the ratio of firm tax to operating income before tax; liquidity (LIQ) as current assets to current liabilities ratio; size (S) as the logarithm of assets and tangibility (Tan) as the ratio of tangible assets to total assets.

The estimated coefficients of business risk (BR) have positive signs and are significant in all regressions. Hsia (1981) states: "As the variance of the values of the firm's assets increases the systematic risk of equity decreases. So the business risk is expected to be positively related to leverage" (Huang and Song, 2006, p. 7). However, our findings are inconsistent with the traditional capital structure theories. Firms with high volatility (risk) may not be able to settle their debts and hence the probability of financial distress increases. Therefore, an inverse relationship between volatility (risk) and leverage is expected.

There is no significant relationship between effective tax rate (ETR) and leverage. As expected, higher effective tax rate increases the tax-shield advantages due to decreasing of effective cost of debt. Thus a positive relationship between effective tax rate and the tendency of firms to more borrow should be expected. Nonetheless, MacKie-Mason (1990) argues that "the reason why many studies fail to find plausible or significant tax effects on financing behaviors, which is implied by the Modigliani and Miller theorem, is because the debt-equity ratios are the cumulative result of years' of separate decisions, and most tax shields have a negligible effect on the marginal tax rate for most firms" (Huang and Song, 2006, p. 5).

The firm size (S) is negatively related to leverage. Our findings are consistent with Rajan and Zingales (1995) who revealed larger firms tend to have more debts in the G-7 countries, with the exception of German. Larger firms provide more information for outside investors than smaller ones and also have less asymmetric information. They tend to issue equity relative to be deeply in debts. Consequently, firm size inversely affects leverage.

The coefficients of tangibility (Tan) are negatively significant at 1-percent level in all regressions. These results are inconsistent with Rajan and Zingales (1995), Wald (1999), Wiwattanakantang (1999), Booth *et al*. (2001) and Huang and Song (2006). The capital structure theories state that leverage increases when tangible assets increase since they can be used as collateral.

The Robustness Analyses:

We use pooling panel data procedure to analyze the robustness results. The general form of pooling panel data method is as following;

$$Y_{it} = \alpha_{it} + \sum_{i=1}^{n} \beta_i x_{it} + \varepsilon_{it}$$

Where Y_{it} is the dependent variable (leverage) of firm i in year t. X_{it} is the independent variable (determinants of capital structure) of firm i in year t and ε_{it} is the error term.

Table V: The robustness tests: Panel data estimation

Panel A: The dependent variable: Book leverage				
Variables	Model 1	Model 2	Model 3	Model 4
C	0.96***	1.01***	1. 1***	1.00***
PR1	-0.03***	-0.026***		
PR2			-0.12***	-0.27***
GO1	0.01**		0.02**	
GO2		0.011***		0.011***
BR	0.102**	0.10**	0.12**	0.12**
ETR	0.06	0.054	0.061	0.054
LIQ	-0.13***	-0.14***	-0.15***	-0.14***
S	-0.02***	-0.019***	-0.02***	-0.019***
Tan	-0.08***	-0.10***	-0.09***	-0.068***
Adjusted R-squared	0.83	0.79	0.77	0.78
F-statistic	92.7***	87. 2***	101.3***	103.2***
Durbin-Watson stat	2.10	2.3	2.06	2.23
F-test	14.6***	15.1***	13.5***	19.2***
Husman test	48.3***	51. 7***	58.4***	62.6***
Panel B: The dependent variable: market leverage				
Variables	Model 5	Model 6	Model 7	Model 8
C	-1.02***	1.24***	-1. 8**	1.3**
PR1	-0.12***	-0.03***		
PR2			-0.12***	-0.20***
GO1	-0.04**		-0.02**	
GO2		-0.08**		-0.07**
BR	0.24***	0.21***	0.28***	0.203***
ETR	-0.12**	-0.32*	-0.27*	-0.14**
LIQ	-0.13***	-0.16***	-0.19***	-0.15***
S	-0.31*	-0.16**	-0.11***	-0.17**
Tan	-0.09*	-0.105***	-0.10**	-0.098***
Adjusted R-squared	0.70	0.74	0.77	0.75
F-statistic	90.8***	104.3***	95.6***	124.5***
Durbin-Watson stat	2.1	1.98	1.89	2.07
F-test	14.02***	10. 5***	13.29***	9.4***
Husman test	120. 6***	89.7***	104.5***	106.25***

Note: * significant at 10 percent, ** significant at 5 percent level and *** significant at 1 percent level. LEV1 is defined as the ratio of book value of total debts to book value of total assets. LEV2 is defined as the ratio of book value of total debts to market value of the firm. PR1 and PR2 are the profitability proxies and defined as the ratio of operating income to total assets (PR1) and return on assets (PR2). Tangibility (Tan) is the ratio of tangible assets to total assets. Size (s) is the logarithm of total assets. Liquidity (LIQ) is current assets divided by current liabilities. Effective tax rate (ETR) is firm tax divided by operating income before tax. GO1 and GO2 are growth opportunity proxies and defined as the ratio of market-to-book value of equity (GO1) and Tobin's Q (GO2) which Tobin's Q is market value of assets divided by book value of assets. Business risk (BR) is defined as the three-year standard deviation of return on assets.

Table V reports the results of panel data estimation. Our findings show that profitability (PR) is significantly and negatively related to leverage in all regressions. The variable growth opportunity (GO) has a positive effect on book leverage while has an inverse relation with market leverage. Therefore, the relationship between growth opportunity and leverage is ambiguous. This result is highly consistent with our findings in GMM estimation. Liquidity (LIQ) is negatively related to leverage in all models. Business risk (BR) has a significant and positive sign on leverage in all models. Similar to GMM estimation, there is no significant relation between effective tax rate (ETR) and leverage in all models except for models 5 and 8. Firm size (S) is negatively related to leverage in all models except for model 5. The variable tangibility (Tan) is negatively related to leverage in all models. However, the results from panel data method are more consistent with our findings which are obtained from GMM method and thus our study is not sensitive to the estimation techniques. Consequently, our results are robust.

Conclusions:

This study examines the determinants of capital structure in Iranian capital market using static and dynamic approaches during 2003-2011. Our findings indicate leverage decreases with profitability, firm size, liquidity and tangibility and increases with business risk (volatility). The effect of growth opportunity on leverage is ambiguous and there is no a significant relationship between effective tax rate and leverage.

Do the determinants of capital structure of Iranian firms have the same behavior as in the developed and emerging markets? Rajan and Zingales (1995) examine the firm's capital structure in the G-7 countries (including the USA, Japan, Germany, France, Italy, the UK and Canada). They generally reveal that leverage increases with tangibility and firm size and decreases with profitability and growth opportunity. Booth *et al*. (2001) investigate the capital structure of 10 developing countries and find, although specific country factors are at work, but capital structure decisions are similar between developing and developed countries. Chen (2004) indicates profitability and firm size are negatively related to leverage while tangibility and growth opportunities have positive signs on leverage in China.

According to the previous studies in the developed and developing countries, we can conclude capital structure decisions in Iran have similarities and differences with those capital markets. Leverage, for instance, is negatively related to profitability, firm size and liquidity. These findings are consistent with recent studies such as Rajan and Zingales (1995), Wald (1999), Wiwattanakantang (1999), Booth *et al*. (2001), Chen (2004), Huang and Song (2006), Deesomsak *et al*. (2004) and Chakraborty (2010). The pecking order theory assumes firms prefer internal funds to external funds, therefore, profitable firms have low leverage ratio. One reason behind these similarities is that the Iranian government has seriously adopted the "privatization policy" since last decade. The capital market now plays an active role in country's economy and also Iranian-listed firms face growing competition. Therefore, these firms need to comply with the basic rules of market economy.

As the effect of growth opportunity on leverage is theoretically ambiguous, our findings go along with the literature and do not provide conclusive evidence. This variable definitely affects capital structure decisions. According to the trade-off theory suggests growth opportunity has an inverse effect on firm leverage. Rajan and Zingales (1995), Wald (1999) provide evidence to support this argument. On the other hand, the pecking order theory proposes a positive relation between growth opportunity and leverage. Firms holding growth opportunity would need more fund. The pecking order theory suggests that firms prefer to use external financing and thus a positive relationship between growth opportunity and leverage is expected. Titman and Wessels (1988) argue an inverse relationship between long-term debt and growth opportunities while a positive relation between short-term debt and growth opportunities would be expected. However, we argue that growth opportunity should be positively related to leverage in Iranian context. One reason may be that most of debt obligations of Iranian firms are short-term debts (see figure 1).

The main differences between capital structure in Iranian capital market and other countries refer to the effects of business risk, tangibility and effective tax rate on leverage. We indicate a positive relationship between business risks and leverage a negative relationship between tangibility and leverage. Moreover, our findings report there is no significant relationship between effective tax rate and leverage. Rajan and Zingales (1995), Wald (1999) and Chen (2004) reveal that tangibility is positively related to leverage. Firms with a higher effective tax rate should use more debt to obtain a tax-shield gain and so tax rate has a positive effect on leverage. Since business risk can be understood as a proxy for the probability of bankruptcy, therefore, a negative relation between business risk and leverage is expected. However, we try to provide some reasons that explain these disparities.

On the negative relationship between tangibility and leverage, one reason may be that in Iran most of debt obligations are short-term and firms give creditors a check or promissory note for their borrowing. Iranian firms are not usually required to put up tangibility as collateral. The creditors' major concern is firms' cash flow and profitability so that they meet their obligations.

The chief reason why there is no significant relationship between effective tax rate and leverage in Iran refers to "the laws of direct taxes" which have been developed by Iranian government in recent years and firms

are required to abide by them. However, the tax rate in Iran follows a command economy and firms do not have any control over it.

What is behind of the effect of business risk on leverage in Iran? As mentioned above, Hsia (1981) concludes as the variance of the value of the firm's assets increases, the systematic risk of equity decreases and thus a positive relationship between business risk and leverage is expected (Huang and Song, 2006). However, one possible reason behind this fact is the variance increases in value of assets due to rising inflation in Iran's economy. The structural problems of economy, poor fiscal and monetary policies and especially high costs of foreign transactions as a result of international economic sanctions against Iran cause inflation. Another reason may be that Iranian firms usually use low level of technology. The variance of asset's value increases due to the appearance modern technology.

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