The Determinants of Capital Structure: Evidence from an Emerging Market

ALI SAEEDI
Taylor’s Business School, Taylor’s University, Selangor, Malaysia
alisaeediv@yahoo.com

IMAN MAHMOODI
Department of Accounting, University of Isfahan, Hezarjerib Street, Isfahan, Iran
im_mahmoodi@yahoo.com

Abstract: This study investigates the determinants of capital structure of Iranian firms listed in the Tehran Stock Exchange. The investigation is performed using Generalized Method of Moment (GMM) approach for 146 listed firms in the Tehran Stock Exchange over the period 2003 to 2008. 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. The results indicate that leverage decreases with profitability, liquidity and tangibility while increases with business risk. There is no significant relationship between leverage and effective tax rate. Moreover, the results show that firm size has a positive relationship with market leverage while has a negative relationship with book leverage. Furthermore, our findings indicate that growth opportunity is positively related to market leverage, but by contrast, growth opportunity is negatively related to book leverage. Finally, our results indicate that both trade-off and pecking order theories can explain financing decisions of Iranian firms. In the other words, none of these theories could be rejected.

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

1 Introduction

In recent decades, it is generally believed that the most important role of management is to maximize the wealth of shareholders (Worthington and West, 2001) and hence all of the 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 be made in every business. However, Modigliani and Miller (1958) proposed that in the perfect market, capital structure choices do not affect on the firm value. They claim later that the firm value can be increased by using tax’s advantages (Modigliani and Miller, 1963).

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

The static trade-off theory assumes a target capital structure for firms which can be achieved by establishing a balance between advantages (interest tax-shields) and disadvantages (bankruptcy and agency costs) of using 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 the firms. This theory assumes 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).

There is voluminous research on the capital structure to test the explanatory power of capital structure theories but, with controversial results. Fama and Ferench (2002) suggest that none of these theories can be rejected and both of them have the explanatory power of firms’ capital structures. 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).

However, most of the empirical studies on the determinants of leverage have been conducted in the mature capital markets, for example Rajan and Zingales (1995) and Wald (1999), and also the related research in the developing and emerging markets, especially in Iran as an emerging market, are not sufficient. In Iran, the majority of listed firms have been owned by the state and in recent years the state has started to reduce its control and ownership of these companies. Iranian firms typically use debt and equity in their capital structure.

We investigate the capital structure of Iranian firms to specify whether financing strategies in Iran are different from those in the other capital markets. 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 2003-2008 is employed. Our results suggest that both trade-off and pecking order theories can explain Iranian firms’ financing decisions. In the other words, none of these theories could be rejected.

The reminder of this paper is organized as follows: the next section 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 research. Section 4 repots the empirical results. Finally, in section 5, the conclusions are provided.

2 Leverage and Determinants of capital structure

2.1 Capital structure
Following the similar studies (Rajan and Zingales, 1995; Wiwattanakantang, 1999; Korajczyk and Levy, 2003; Lipson and Mortal, 2009; Kayo and Kimura, 2011), capital structure is defined using two alternative measures, including book leverage and market leverage. The book leverage is computed as the ratio of total book value of debts to total book value of assets. The market leverage is calculated by dividing total book value of debt by the sum of book value of debts and market value of equity.

2.2 Tangibility
The reported results from the effects of tangibility on capital structure, generally, suggest that tangibility is positively related to capital structure because 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 is measured by dividing total tangible assets by total assets.

2.3 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 relation 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). However, in this study, the logarithm of total assets is used as a proxy for firm size.

2.4 Profitability
The trade-off theory assumes a positive relation 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). On the other hand, the pecking order theory states firms with high level of profitability prefer to fund by retained earnings (internal sources) rather than debt and equity. Therefore, a negative relationship is expected between capital structure and profitability (Wiwattanakantang, 1999; Huang and Song, 2006; Karadeniz et al., 2009; Chakraborty, 2010). In this study, the ratio of operating income to total assets and ROA which is calculated by dividing sum of the net earnings and interest expenses by total assets are used to measure profitability.
2.5 Effective tax rates
Most of scholars accept that effective tax rate is an important determinant of capital structure (Huang and Song, 2006; Karadeniz et al., 2009). The trade-off theory assumes a positive relation between effective tax rate and capital structure (Huang and Song, 2006; Karadeniz et al., 2009). The pecking order theory does not establish a definite association between effective tax rate and leverage (Karadeniz et al., 2009). In this study, following Karadeniz et al. (2009), effective tax rate is calculated by dividing firm tax by earnings before tax.

2.6 Business risk
The research on the effect of volatility (business risk) on the capital structure has produced mixed results. Several researchers found a negative relation between leverage and business risk while several scholars revealed that business risk is positively related to capital structure. Moreover, no significant relationship is also reported between these variables (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 as a proxy for the business risk.

2.7 Growth opportunity
According to the pecking order theory, growth opportunity is positively related to capital structure because of existence of an asymmetric information problem among insiders and outsiders (Myers, 1984; Myers and Majluf, 1984). The trade-off theory assumes a negative relation between them due to firms with great growth opportunities cannot put them up as collateral and have more financial distress costs (Delcorle, 2007; Karadeniz et al., 2009). In this study, two alternative measures are employed to estimate growth opportunity. First, following Booth et al. (2001), the ratio of market value to book value of equity is used. Second, following Rajan and Zingales (1995), Huang and Song (2006) and Kayo and Kimura (2011), Tobin’s Q which is calculated by dividing the sum of debts book value and equity market value by total assets book value, is used to measure the growth opportunity.

2.8 Liquidity
According to the theoretical and empirical related literature, a negative relation is expected between liquidity and capital structure. Lipson and Mortal (2009), for instance, investigate the effects of equity market liquidity and found firms with more liquidity prefer to use equity in their capital structure than debts. Udomsirikul et al. (2010) revealed similar results from Thai firms. In this study, the ratio of current assets to current liabilities is employed to measure firm liquidity.

3 Data and Methodology

3.1 Data
In this study, a sample of Iranian firms listed in the Tehran Stock Exchange (TSE) for the period of 2003 to 2008 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. The sample was more reduced due to the lack of some company data. Finally, the sample was consisted of 146 firms during the period from 2003 to 2008.

3.2 Methodology
We use the two-step generalized method of moment (GMM) estimation to analysis the data, because it is more efficient that of one-step GMM estimation. We investigate the determinants of capital structure of Iranian companies using the following models:

\[ \text{LEV1}_{it} = \alpha_0 + \delta \text{LEV1}_{it-1} + \alpha_1 \text{PR1}_{it} + \alpha_2 \text{Tan}_{it} + \alpha_3 \text{S}_{it} + \alpha_4 \text{ETR}_{it} + \alpha_5 \text{LIQ}_{it} + \alpha_6 \text{BR}_{it} + \alpha_7 \text{GO1}_{it} + \lambda_1 + \theta_1 + \epsilon_{it} \]

\[ \text{LEV1}_{it} = \alpha_0 + \delta \text{LEV1}_{it-1} + \alpha_1 \text{PR2}_{it} + \alpha_2 \text{Tan}_{it} + \alpha_3 \text{S}_{it} + \alpha_4 \text{ETR}_{it} + \alpha_5 \text{LIQ}_{it} + \alpha_6 \text{BR}_{it} + \alpha_7 \text{GO2}_{it} + \lambda_1 + \theta_1 + \epsilon_{it} \]

\[ \text{LEV2}_{it} = \alpha_0 + \delta \text{LEV2}_{it-1} + \alpha_1 \text{PR1}_{it} + \alpha_2 \text{Tan}_{it} + \alpha_3 \text{S}_{it} + \alpha_4 \text{ETR}_{it} + \alpha_5 \text{LIQ}_{it} + \alpha_6 \text{BR}_{it} + \alpha_7 \text{GO1}_{it} + \lambda_1 + \theta_1 + \epsilon_{it} \]

\[ \text{LEV2}_{it} = \alpha_0 + \delta \text{LEV2}_{it-1} + \alpha_1 \text{PR2}_{it} + \alpha_2 \text{Tan}_{it} + \alpha_3 \text{S}_{it} + \alpha_4 \text{ETR}_{it} + \alpha_5 \text{LIQ}_{it} + \alpha_6 \text{BR}_{it} + \alpha_7 \text{GO2}_{it} + \lambda_1 + \theta_1 + \epsilon_{it} \]

Where, \text{LEV1}_{it} and \text{LEV2}_{it} stand for book leverage and market leverage of firm \(i\) in the year \(t\), \text{LEV1}_{it-1} and \text{LEV2}_{it-1} are the lagged dependent variables. Both \text{PR1}_{it} and \text{PR2}_{it} are profitability measures of firm \(i\) in the year \(t\), ROA and the ratio of operating...
income to total assets, respectively. $T\alpha_n(t), S_{it}, ETR_{it}, \text{LIQ}_{it}$ and $BR_{it}$ indicate tangibility assets, firm size, effective tax rates, firm liquidity and business risk respectively. Finally, $\varepsilon_{it}$ is the error term of firm $i$ in period $t$.

4 Empirical findings

4.1 Descriptive Statistics

Table I presents the descriptive statistics of all variables. As shown in the Table I, all of the variables have a positive mean. Furthermore, mean statistics produce some main results. First, the mean of book leverage (0.695) indicates Iranian firms prefer to finance their assets by debts rather than equity. Second, the mean of the market leverage (0.525) is lower than book leverage (0.695) which reveals that market value of equity in the Iranian firms is higher than their equity book values. This finding is supported by the mean results of the market-to-book equity ratio (GO1). Third, the means of profitability measures, operating income to total assets ratio (0.156) and ROA (0.163), indicate that Iranian firms by considering the inflation rate, the average rate of inflation during the study period was 16.15 percent, had a poor performance over the research period. Finally, the mean of Tobin’s Q (1.620) is higher than one which suggests Iranian companies should invest more and more in capital.

Table I: Descriptive statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std.dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV1</td>
<td>0.695</td>
<td>3.640</td>
<td>0.142</td>
<td>0.252</td>
</tr>
<tr>
<td>LEV2</td>
<td>0.525</td>
<td>0.983</td>
<td>0.051</td>
<td>0.222</td>
</tr>
<tr>
<td>PR1</td>
<td>0.156</td>
<td>3.474</td>
<td>-0.335</td>
<td>0.176</td>
</tr>
<tr>
<td>PR2</td>
<td>0.163</td>
<td>3.412</td>
<td>-0.301</td>
<td>0.169</td>
</tr>
<tr>
<td>Tan</td>
<td>0.246</td>
<td>1.868</td>
<td>0.000</td>
<td>0.177</td>
</tr>
<tr>
<td>S</td>
<td>12.962</td>
<td>18.115</td>
<td>5.715</td>
<td>1.364</td>
</tr>
<tr>
<td>LIQ</td>
<td>1.169</td>
<td>6.991</td>
<td>0.132</td>
<td>0.551</td>
</tr>
<tr>
<td>ETR</td>
<td>0.106</td>
<td>0.418</td>
<td>0.000</td>
<td>0.086</td>
</tr>
<tr>
<td>BR</td>
<td>0.057</td>
<td>1.819</td>
<td>0.000</td>
<td>0.099</td>
</tr>
<tr>
<td>GO1</td>
<td>2.999</td>
<td>42.052</td>
<td>-41.837</td>
<td>4.979</td>
</tr>
<tr>
<td>GO2</td>
<td>1.620</td>
<td>11.804</td>
<td>0.528</td>
<td>1.189</td>
</tr>
</tbody>
</table>

4.2 The Research Results

Table II and III show the results of estimation of models. Table II shows the results of estimation of regressions 1 to 4, which in the models book leverage (LEV1) is considered as dependent variable. As shown in Table II, 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 useful to consider the firm-specifics as exogenous.

According to the results, the coefficients of lagged dependent variables (market leverage) are significant for all models (5 to 8). Therefore, we can conclude that Iranian firms change their financing strategies for achieving target capital structure. The results indicate that profitability is negatively related to market leverage.
Our findings indicate that growth opportunities are negatively related to market leverage while a positive relationship was reported between growth opportunities and book leverage. Furthermore, liquidity is negatively correlated with market leverage. Firm size is positively related to leverage. Table III shows tangibility is negatively related to leverage. There is no significant correlation between effective tax rate and book leverage. Our results also show that liquidity is negatively related to leverage which is consistent with Lipson and Mortal (2009) and Parsit et al. (2010). We show that tangibility has a negative effect on leverage. Similar results were documented by Rajan and Zingales (1995), Wald (1999), Wiwattanakantang (1999), Booth et al. (2001), Huang and Song (2006) and Kayo and Kimura (2011). However, our results generally indicate that both the trade-off and the pecking order theories can explain Iranian firms’ financing decisions.

This study could be extended by considering other firm-level, industry-level and country-level variables.

5 Conclusion

This study examines the determinants of capital structure in the Iranian firms using GMM approach. The results show that profitability is negatively related to leverage which is consistent with 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). Growth opportunities have a positive relationship with market leverage, which is consistent with Wald (1999), Dalbor and Upneja (2004) and and Tang and Jang (2007), and negative relationship with book leverage, which is consistent with Rajan and Zingales (1995), Booth et al. (2001), Deesomsak et al. (2004), Huang and Song (2007) and Kayo and Kimura (2011). Business risk is also positively related to leverage. Furthermore, the results indicate that there is a negative relationship between firm size and book leverage while a positive relation was shown between firm size and market leverage. These findings are consistent with the capital structure literature which has produce mixed results. There is no significant correlation between effective tax rate and book leverage. Our results also show that liquidity is negatively related to leverage which is consistent with Lipson and Mortal (2009) and Parsit et al. (2010). We show that tangibility has a negative effect on leverage. Similar results were documented by Rajan and Zingales (1995), Wald (1999), Wiwattanakantang (1999), Booth et al. (2001), Huang and Song (2006) and Kayo and Kimura (2011). However, our results generally indicate that both the trade-off and the pecking order theories can explain Iranian firms’ financing decisions.

This study could be extended by considering other firm-level, industry-level and country-level variables.

References:


