Firm-specific factors as determinants of capital structure in the absence of taxes

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Available online: 11 Oct 2011

To cite this article: Wafaa M. Sbeti & Imad Moosa (2012): Firm-specific factors as determinants of capital structure in the absence of taxes, Applied Financial Economics, 22:3, 209-213

To link to this article: http://dx.doi.org/10.1080/09603107.2011.610738

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Firm-specific factors as determinants of capital structure in the absence of taxes

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Extreme Bounds Analysis (EBA) is used to identify the determinants of capital structure in a tax-free environment, using data on Kuwaiti shareholding companies. The results which are more supportive of the pecking order theory than the trade-off theory, show some evidence for the importance of growth opportunities and profitability. Judged by robustness, the number of determining variables is smaller than what is typically found in the literature.

Keywords: extreme bounds analysis; capital structure; Modigliani–Miller theorem; Kuwait

JEL Classification: P34; A10

I. Introduction

The Modigliani–Miller (1958) finding that the financial structure of a firm does not affect its market value is based on a set of highly restrictive assumptions, including perfect capital markets, homogeneous expectations and the absence of taxes and transaction costs. Modigliani and Miller argued that, under these strict conditions, a firm’s value depends solely on the level and risk of its future cash flows. If this is the case, firms will be indifferent between debt and equity financing, which implies that an optimal capital structure does not exist.

The Modigliani–Miller work has motivated a vast amount of literature, leading to the formulation of alternative theories suggesting a number of specific factors that may affect the capital structure. The trade-off theory postulates that the optimal capital structure involves a trade-off among the effects of corporate and personal taxes, bankruptcy costs and agency costs. In contrast, the pecking order hypothesis proposed by Myers and Majluf (1984) rejects the idea of a well-defined target debt ratio, postulating a sequence starting with retained earnings, followed by less risky debt, and last comes risky external equity financing.

The presence of taxes provides an important reason for firms to seek an optimal capital structure, given that interest payments on debt are tax deductible. Studies of capital structure have been conducted typically in the presence of taxes. It may therefore be interesting to examine the determinants of capital structure in a tax-free environment, such as that prevailing in Kuwait. For this purpose, we use the technique of Extreme Bounds Analysis (EBA), as suggested by Leamer (1983, 1985), and the extensions

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II. Methodology

The methodology typically used in studies of capital structure is based on a regression of the form

\[ L = \alpha_0 + \sum_{i=1}^{n} \alpha_i x_i + \varepsilon \]  

where \( L \) is the leverage ratio and the \( x_i \)'s are explanatory variables. Studies based on Equation 1 invariably report a sample of regressions encompassing various combinations of the explanatory variables. The reported regressions are chosen for convenience because they produce 'nice' results, in the sense that they vindicate the researcher’s pre-conceived ideas. This problem arises because the theory is not adequately explicit about what variables should appear in the ‘true’ model. For example, the following situation is often encountered: \( x_1 \) may be significant when the regression includes \( x_2 \) and \( x_3 \), but not when \( x_4 \) is included. So, which combination of all available \( x_i \)'s do we choose?

EBA can be used to find out if there is robustness in the determinants of the dependent variable (the leverage ratio). Hussain and Brookins (2001) argue that the usual practice of reporting a preferred model with its diagnostic tests, which is what was invariably done in previous studies, need not be sufficient to convey the degree of reliability of the determinants (explanatory variables). However, EBA enables the investigator to find upper and lower bounds for the parameter of interest from all possible combinations of potential explanatory variables, hence it is possible to assess and report the sensitivity of the estimated coefficients to specification changes. The relation between the dependent variable and a given explanatory variable is considered to be robust if the estimated coefficient on that variable remains statistically significant and correctly signed when the set of explanatory variables are changed.

EBA is based on a linear regression that is used to explain the capital structure, proxied by the leverage ratio (\( L \)), in terms of some explanatory variables. The model takes the form

\[ L = \alpha + \sum_{i=1}^{n} \beta_i x_i + \beta Q + \sum_{j=1}^{m} \gamma_j Z_j + \varepsilon \]  

where \( x_i \) is an explanatory variable that is always included in the regression because its importance has been established by previous studies, \( Q \) is the variable whose robustness we want to test, and \( Z_i \) is a potentially important variable. The \( X_i \)’s are called ‘free variables’, whereas \( Q \) is called the ‘variable of interest’.

The procedure involves varying the set of \( Z \) variables included in the regression to find the widest range of coefficients on the variable of interest, \( \beta \), that standard tests of significance do not reject. If the extreme values remain significant and of the same sign, then one can infer that the result (and hence, the variable of interest) is ‘robust’. Otherwise, the variable is ‘fragile’.

A number of attempts have been made to refine the robustness criteria in order to reduce the probability of obtaining ‘unreasonable’ extreme bounds (e.g., Granger and Uhlig, 1990). As a result, a reasonable EBA test has been developed to estimate the extreme bounds on the coefficient of interest by eliminating models with poor goodness-of-fit as measured by \( R^2 \). Granger and Uhlig proposed this refinement of EBA by imposing a condition on the level of goodness-of-fit, such that all models with low \( R^2 \) are irrelevant for the calculation of extreme bounds. This criterion is represented by

\[ R^2_\phi \geq [(1 - \phi)R^2_{max} + \phi R^2_{min}] \]

where \( 0 < \phi < 1 \). This modification results in the so-called ‘Restricted EBA’ (REBA).

III. The Choice and Measurement of Variables

As we have said before, the existing literature does not offer a consistent theoretical framework for guiding empirical work on capital structure, because no single model specifies a full list of the determining variables. As a result, we use a number of potential explanatory variables where robustness (with respect to their effect on capital structure) is determined by EBA.

The dependent variable is the leverage ratio (\( L \)). The literature does not provide a clear-cut definition
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of leverage, and the specific choice depends on the objective of the analysis. Rajan and Zingales (1995) apply four alternative definitions of leverage: (i) the ratio of total liabilities to total assets, (ii) the ratio of debt to total assets, (iii) the ratio of total debt to net assets, and (iv) the ratio of total debt to capital. An additional issue is whether leverage should be computed as the ratio of the book or market value of equity. Fama and French (2000) argue that most of the theoretical predictions apply to book value. In this study, the choice falls on the ratio of the book value of total debt to the book value of total assets.

It is generally accepted that firm size (SIZ) is an important determinant of the ability of firms to raise capital through debt or equity, and the majority of studies suggest a positive relation between leverage and size. The most important underlying argument is that information asymmetries are less severe for large firms than for small ones. Furthermore, large firms can diversify their investment projects on a broader basis and limit their exposure to cyclical fluctuations in one particular line of production. Following previous studies, we proxy firm size by the value of total assets.

The second explanatory variable is liquidity (LIQ), which is defined as the ratio of current assets to current liabilities. This ratio is a measure of the ability of the firm to cover its short-term financial commitments. A negative relation between leverage and liquidity is expected, simply because using more debt means more liabilities, thus implying fewer current assets remaining after covering liabilities. A negative relation between leverage and liquidity implies that firms finance their activities following the financing hierarchy of the pecking order theory.

There are conflicting theoretical predictions on the effects of profitability (PRF) on leverage. According to the pecking order theory, firms raise capital by using retained earnings first, then to debt, and to issuing new equity as a last resort. In the trade-off theory, however, agency costs and bankruptcy costs push more profitable firms towards higher book leverage, thus a positive relation between profitability and leverage is expected.

Asset tangibility (TAN) is another potential explanatory variable. Titman and Wessels (1988), Rajan and Zingales (1995), and Fama and French (2000) argue that the ratio of fixed to total assets (tangibility) should be an important factor in so far as it affects leverage. The trade-off theory predicts a positive relation between leverage and the proportion of tangible assets. On the other hand, since tangible assets can be used as collateral (thus reducing the creditor’s risk of suffering such agency costs of debt), a high fraction of tangible assets is expected to be associated with high leverage.

Growth opportunities (GOP) is also an important variable. The relation between the expected growth of a firm and its leverage ratio should be negative because (i) the cost of financial distress increases with expected growth, forcing managers to reduce debt in the capital structure (trade-off theory); and (ii) firms issue equity instead of debt when overvaluation leads to higher expected growth (information asymmetry). On the other hand, if firms require external financing, they issue debt before equity (the pecking order theory), growth opportunities should be positively associated with leverage (Kremp et al., 1999). Following Myers (1984), Smith and Watts (1992), Rajan and Zingales (1995) and Lang et al. (1996), we use Tobin’s Q as a proxy for firm’s growth opportunities. It is defined as

\[
Q = (TA - EBV + EMV)/TA
\]  

(4)

where TA is total assets, EBV is the book value of equity and EMV is its market value.

The payout ratio (POR) is likely to play an important role in the formulation of financing decisions, primarily due to market imperfections. Miller and Rock (1985) show that a firm’s dividend policy and financing policy are closely related. The direction and significance of the relation between capital structure and payout policy should depend on the net impact of information asymmetries, agency costs, ownership structure, and the tax laws of the country where the firm operates. The payout ratio is measured by the ratio of dividends to net income.

According to the pecking order theory, information asymmetries between managers and outside investors force managers to sell equity at a discount, which suggests an inverse relation between share price performance (SPP) and the leverage ratio. In this study, stock price performance is measured by the annual return on the stock (capital gains).

The firm’s age (AGE), which is measured by the number of years since incorporation, should play a role in determining capital structure because older firms have longer track records and therefore a higher reputational value. The last explanatory variable to be considered is income variability (VAR), which should be negatively related to leverage according to the trade-off theory. If, however, higher income variability makes Myer’s (1977) underinvestment problem less severe (thus reducing the agency costs of debt), a positive relation emerges between income variability and leverage (Cools, 1993). Income variability is measured as the SD of
In Table 1, of interest with three regressions, 35 regressions for each of the variables seven are included in each regression.

<table>
<thead>
<tr>
<th>Variable</th>
<th>( \hat{\beta}_{\text{max}} )</th>
<th>( t )</th>
<th>( \hat{\beta}_{\text{min}} )</th>
<th>( t )</th>
<th>Significant ( \hat{\beta} )'s at 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>( LIQ )</td>
<td>0.030</td>
<td>1.84</td>
<td>0.002</td>
<td>0.08</td>
<td>0.0</td>
</tr>
<tr>
<td>( PRF )</td>
<td>-0.017</td>
<td>-1.46</td>
<td>-0.053*</td>
<td>-6.93</td>
<td>42.9</td>
</tr>
<tr>
<td>( TAN )</td>
<td>-0.276</td>
<td>-0.69</td>
<td>-0.532*</td>
<td>-2.18</td>
<td>5.7</td>
</tr>
<tr>
<td>( GOP^a )</td>
<td>0.731*</td>
<td>9.61</td>
<td>0.473*</td>
<td>4.98</td>
<td>100.0</td>
</tr>
<tr>
<td>( POR )</td>
<td>0.036</td>
<td>1.13</td>
<td>0.003</td>
<td>0.07</td>
<td>0.0</td>
</tr>
<tr>
<td>( SPP )</td>
<td>0.791</td>
<td>1.15</td>
<td>-0.156</td>
<td>-0.28</td>
<td>0.0</td>
</tr>
<tr>
<td>( AGE )</td>
<td>0.017*</td>
<td>2.51</td>
<td>0.003</td>
<td>0.34</td>
<td>8.6</td>
</tr>
<tr>
<td>( VAR )</td>
<td>-0.001</td>
<td>-0.22</td>
<td>-0.881</td>
<td>-0.12</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Notes: *Robust variable.
*Denotes significance at the 5% level.

The data used in this study were obtained from the Gulf Investment Guide, which is a periodical issued by Zugaibi and Kabbani, financial consultants based in Jeddah, Saudi Arabia. It covers shareholding companies of the six member countries of the Gulf Co-operation Council. The sample consists of 59 publicly-listed shareholding companies. The implementation of extreme bounds analysis requires each regression to contain a set of free variables that are always included in the model, the variable of interest and the \( Z \) variables. For theoretical and empirical considerations, only size is used as a free variable, as the importance of this variable has been established. In addition to the free variable and the variable of interest, three \( Z \) variables from a remaining list of seven are included in each regression.

This exercise involves running a total of 245 regressions, 35 regressions for each of the variables of interest with three \( Z \) variables and one \( X \) variable. In Table 1, \( \hat{\beta}_{\text{max}} \) and \( \hat{\beta}_{\text{min}} \) are reported, together with their \( t \)-statistics and the percentage of regressions producing significant \( \hat{\beta} \)'s at the 5% significance level. These are, therefore, the results of traditional EBA. They show that the only robust variable is growth opportunities. Notice that other variables would appear to be significant if the reported regressions were selected in such a way as to show ‘nice’ results. These variables include profitability, tangibility and age.

Table 2, on the other hand, reports the results of restricted EBA, where \( \hat{\beta}_{\text{max}} \) and \( \hat{\beta}_{\text{min}} \) are picked from the equations with the highest 40% \( R^2 \). The results show that there are two robust variables: profitability and growth opportunities. These results are more supportive of the pecking order theory that predicts a negative relation between leverage and profitability and a positive relation with growth opportunities.

IV. Data and Results

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V. Concluding Remarks

In this article we used EBA to identify the determinants of capital structure of a cross-sectional sample of 59 Kuwaiti shareholding companies operating in a tax-free environment. In the absence of a specific theoretical model with defined explanatory variables, EBA is used to circumvent the problem of choosing combinations of explanatory variables, which typically arises in cross-sectional studies, particularly in corporate finance.

Since EBA is a stringent test of robustness, only a few of the variables suggested in the corporate finance literature as determinants of the capital structure appear as robust variables. The results, which are more supportive of the pecking order theory than the trade-off theory, indicate the robustness of growth opportunities and profitability as determinants of capital structure. Since there is evidence for the importance of some factors in determining capital structure, it is plausible to conclude that the capital structure decision does matter, even in the absence of taxes.

References

Fama, E. F. and French, K. R. (2000) Testing tradeoff and pecking order predictions about dividends and debt,
Working Paper, University of Chicago and Sloan School of Management (MIT).


