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Does financing behavior of Tunisian firms follow the predictions of the market timing theory of capital structure?

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Abstract

In this paper, we show how capital structure decisions made by non-financial firms listed in the Tunis Stock Exchange are affected by the predictions of the so-called market timing theory. Using a set of some relevant variables which reflect the market-timing signals, the firm fundamentals, and the performance of local stock market, we mainly find that leverage ratio of Tunisian firms is short-term driven by their current market valuations. In the long run, the market timing effects are not present at all. Rather, Tunisian firms seem to behave according to the tradeoff theory of capital structure by attempting to adjust their leverage levels towards a target ratio.

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1. Introduction

The choice of capital structure has always been an important issue in corporate governance practices since all firms are concerned regardless their stage of development and size. In finance literature, a significant number of works, both theoretical and empirical, have studied the determinants of capital structure, but the results are in general not conclusive. For the majority of academic researchers, the recent observed evolutions of the listed firms' debt-equity ratios worldwide are still challenging in the theory of corporate finance and difficult to be puzzled out. The main reason of this assessment is that none of the three competitive theories in the field (Static Tradeoff, Pecking Order and Market Timing Models) can solely explain the dynamic changes of capital structure documented in past studies. Thus, the relative importance of these models depends on different researches and the generalization of the results is not possible for instance.

As a starting point of the paper, it is necessary to recall the foundations and explanations of the aforementioned theories with regard to the management of capital structure. In general, the static tradeoff framework is based on the existence of an optimum capital structure and a target debt-to-equity ratio. The said target ratio is the one which maximizes the firm value and which, by default, shows the optimal level of debts to use. Within this situation, management of the firm considers a balance between tax saving advantages and costs, especially increasing bankruptcy risk and agency costs, associated with debt services.

The pecking order theory of capital structure, which appeared in the seminal work of Myers and Majluf (1984), neglects the existence of such a target debt-to-equity ratio as in the tradeoff theory and rests instead on the domination of the costs related to the asymmetries of information between managers (who are well informed on the future prospects of their firms), and external investors (who are aware of the asymmetric information). Other costs are, according to these authors, of less importance. Practically speaking, firms elaborate a hierarchy of financing sources when a supplementary capital is required. The priority is given to self-financing means when available, debt is preferred over equity when an external financing is needed, and finally equity is only issued at the last resort when it is not possible for a firm to contract more debt.

Another competitor of the tradeoff theory is the market timing theory which states that managers of a firm look for the good times to make appropriate financing decisions. In effect, they issue new stocks when the related cost of equity is lower than that of alternative types of external financing, thanks to high market valuation of the firm's stocks. When the firm's stocks are underevaluated (i.e., the cost of equity issuance is high), they do give up this option and favor the use of debt instruments. As a result, successful timings of the equity markets contribute to reduce significantly the cost of capital supported by considered firms. Researches focusing on market-timing-driven financial decisions are widely motivated by the work of Baker and Wurgler (2002). Indeed, these authors show that temporary changes in past market valuations of the firm lead to management's efforts to time the market and consequently to permanent changes in capital structure. The conclusions of several recent papers are, however, inconsistent with empirical evidences of Baker and Wurgler (2002) as we can see later in the literature review section.

In this paper, we examine the predictions of market timing theory and their effects on the capital structure choices of Tunisian firms. The study is particularly led by two motivations. First, we attempt to test the market timing theory using a different set of data since the debate on its explanatory power is far from settled. Empirical evidences from an emerging market can lead to further insights into the implications of such theory. Second, Tunisian firms are of particular interest because very few studies are devoted to examine this issue and their behavior is influenced by a number of cultural-, legal-, and institutional-specific factors. At the empirical level, we find that market valuations have small impact on the leverage of Tunisian firms in the short run, and this influence is not persistent over time. In addition, the choice of financing means of Tunisian firms is independent of the performance of the local stock exchange.

The rest of the paper is organized as follows. Section 2 presents a brief review of selected papers in the related literature. Section 3 describes our empirical study. Results are discussed in Section 4 and concluding remarks are provided in Section 5.

2. Literature Review

Market timing is not a recent research topic in corporate finance. Studies of this category include, for example, Taggart (1977), March (1982), Javiland and Harris (1984), and Asquith and Mullins (1986), Rajan and Zingales (1995), and Hovakimian and *al*. (2001). It is commonly demonstrated that a firm issues new stocks when its market value exceeds the book value (i.e., usually when the market-to-book ratio is high) and buy back stocks otherwise. If the timing is good, equity issuance is less costly and it would allow the firm to increase its capacity to issue debt securities in the future during the period of less favorable conditions. Equity financing is also used in cases where investors are optimistic about the firm's future earnings. At this stage, the survey of Graham and Harvey (2001) on corporate financial policy joins previous assessments in the sense that management of US firms attaches a great importance to the fluctuations of stock prices at the time of making financing decisions.

In a slightly different manner, Korajczyk and *al*. (1992) develop a model to assess the effect of time-varying asymmetric information on the timing of equity issues and find that firms with assets of high quality generally wait for the market to become better informed before issuing new equity, whereas firms with low asset quality always try to issue immediately as the opportunity arises. Then, the problem of adverse selection becomes more marked as managers receive new private information after the actual issue date.

Subsequent to above studies, the majority of recent papers on market-timing-driven financial decisions can be viewed as reactions to the conclusions of Baker and Wurgler (2002) that the effects of historical market values, measured by the book-to-market ratio, on capital structure are very persistent and that "*capital structure is the cumulative outcome of attempts to time the equity market. This is a simple theory of capital structure. To our knowledge, it has not been articulated before*".

Indeed, Frank and Goyal (2004) ask the relevance of these findings by examining annual data of non-financial US firms over the period from 1952 to 2000. A Vector Autoregressive model is used and stock market conditions are proxied by the market-to-book ratio. Accordingly, the authors report that deviations from a long-run equilibrium of financial leverage affect debt adjustments rather than equity adjustments. This evidence supports not only the predictions of the market timing theory, but also those of the tradeoff theory. Hennessy and Whited (2005) underline the importance of understanding corporate financial decisions in dynamic settings and show that dynamic tradeoff model is totally capable of explaining the observed relationship between firm's market-to-book ratio and the leverage. Firms with high market valuations tend, de factor, to finance their growth by issuing new equity in order to avoid financial distresses. The results of Leary and Roberts (2005) indicate that firms do respond to stock price movements by appropriately rebalancing their leverage, but their reaction might not be immediate and persistent. It can be only the case when there is presence of adjustment costs such as bankruptcy costs and information asymmetries. In addition, the adjustment process whose aims are to keep financial leverage in an optimal range can take from one to four years. In a related study, Alti (2006) also questions the relevance of explanatory variables used by Baker and Wurgler (2002) in capturing the influence of market timing and propose to detect market timing effects in IPO markets. The author defines market timers as the firms that go public in the '*hot issue market*' (i.e., high market valuations and high IPO volume in terms of number of issuers) more significantly than the cold firms do. However, the timing behavior of hot-market firms generally reverses two years after their IPOs as they raise more debts and less equity than cold-market firms. These results lead the author to conclude that market timing effects on leverage ratios are present in the short term and corporate financial policies appear to be consistent with the existence of leverage targets.

Finally, Kayhan and Titman (2007) document strong influences of historical changes in firm's stock prices and financial deficits on their capital structure, but their findings contrast previous studies and particularly Baker and Wurgler (2002) in that these market timing effects are at least partially reversed afterwards. Just like Alti (2006), Kayhan and Titman (2007) argue that firms manage their dynamic financing choices according to the predictions of tradeoff theory.

Our study will contribute to this intriguing debate and add more insights on the effects of market timing theory on firm's capital structure choices through drawing empirical evidences from an emerging market. For this purpose, the next section develops our empirical models.

3. Empirical study

We develop three time-series cross-sectional models to test the market timing theory in Tunisian context, of which the first attempts to examine the market timing effects in the short term by introducing the commonly used market-to-book variable (MTB). We then employ a weighted average MTB variable in the second model, as in Baker and Wurgler (2002), to investigate whether the detected effects are persistent over time. The third model, which is derived from the second model by adding the MTB variable, allows for robust checking of our conclusions.

We perform our analysis based on a sample of twenty-five non-financial listed firms. Annual data used for dependent and independent variables we present below are taken from the BVMT (*Stock Exchanges of Tunis*) and the study period is comprised between 1998 and 2006.

3.1 Summary measures of dependent and independent variables

Two main measures are commonly used in finance literature as proxies of firm's leverage: ratio of total debts to total assets and ratio of long-term debts to total assets (see, for example, Fama and French, 2002; Frank and Goyal, 2003; and Kayhan and Titman, 2007). The majority of past studies consider both the accounting and market value of debts to compute the debt ratio, but in some cases, only accounting value is used due essentially to the non-availability of market data (see, e.g., Miguel and Pindado, 2001). Throughout this research, we construct these two summary measures from the accounting value of the debts due to the lack of debt market data. They are referred to as total debt ratio and long-term debt ratio.

In what follows, we define all independent variables used in this study which include market-timing indicators and control variables such as firm fundamentals and performance measure of local stock market.

Firm Size (FS): Rajan and Zingales (1995) report the existence of a positive relation between debt ratio and firm size. That is, large firms have an easier access to capital markets and a greater debt capacity than small firms. The reason stems from the greater diversification degree and the resulting smaller default probability of large firms. Some recent studies document the similar relationship (see, e.g., Ozkan, 2001; Fama and French, 2002; and Zou and Xiao, 2006). In contrast with these studies, Heshmati (2001) and Chen (2004) find a negative relation between these two variables in the context of Swedish and Chinese firms respectively. They explain this phenomenon by the fact that large firms, being perceived by investors as highly creditworthy, often issue equity to finance their projects. In light of past studies, we propose to gauge the effect of this variable by taking the natural log of the firm's total assets, as follows:

$$\text{Firm Size (FS)} = Ln\ (firm's\ total\ assets)$$

Asset Tangibility (AT): As similar as the firm size variable, asset tangibility can be positively or negatively correlated with the debt ratio. Results and their interpretations therefore vary with studies. A positive correlation is predicted by agency theory as tangible assets will lose less value than intangible assets and provide greater protection (or guarantees) for the firm's lenders in case of default. Moreover, the risk of moral hazard resulting from debt financing is considerably reduced when firms are able to offer real guarantees to protect debt claims. Inversely, firms with high asset tangibility are less exposed to information asymmetries and often take advantage of this situation to issue more equity, leading to a negative correlation between the said variables. Following Rajan and Zingales (1995), Miguel and Pindado (2001), and Delcoure (2007), we measure asset tangibility by:

$$\text{Asset Tangibility (AT)} = \frac{\text{Tangible assets} + \text{inventories}}{\text{Total assets}}$$

Profitability (PROFIT): The empirical relationship between firm's profitability levels and leverage is unclear according to previous findings. Theoretically, the majority of researchers agree to say that these variables can be only positively linked because profitable firms usually suffer from problems associated with the efficient use of free cash flows and debt financing is the best way to eliminate these undesired effects due to the disciplinary role of debt contracts. In addition, the fact that debt issue is widely seen as a way for profitable firms to benefit from tax savings equally strengthens this positive correlation. This theoretical view is shared among proponents of both tradeoff and pecking order theories. We handle this relationship using the following ratio:

$$\text{Profitability (PROFIT)} = \frac{\text{Earnings before interests and coporate taxes}}{\text{Total assets}}$$

Performance of local stock exchange (IBVMT): We measure the local market performance using Tunis stock exchange BVMT index, which is a price-weighted index created on September 30th, 1990 and adjusted on April 1st, 1998. Such variable was used in the empirical model developed by Frank and Goyal (2005).

Market-to-book ratio (MTB): This ratio helps to identify market timers in Tunisian stock exchange. In theory, firms seek to time the stock market (or equivalently issue more equity) when their market-to-book ratio is high. As discussed previously, such operation lowers the firm's cost of capital compared with alternative financing means. This variable is measured as:

$$\text{Market} - \text{to} - \text{book ratio (MTB)} = \frac{\text{Market capitalization} + \text{debts}}{\text{Total assets}}$$

Weighted average market-to-book ratio (MTB^{wa}): The use of this ratio aims at testing the persistence of the market timing effects on capital structure of Tunisian listed firms. The idea behind this ratio is that it takes into account the historical variations in market valuations. Following Baker and Wurgler (2002), we define this variable for a given year as follows:

$$\mathrm{MTB}^{\mathrm{wa}}_{\mathrm{t-1}} = \sum_{s=0}^{s=t-1} \frac{e_s + d_s}{\sum_{r=0}^{r=t-1}(e_r + d_r)} \times MTB_s$$

In this formula, $\mathrm{MTB}^{\mathrm{wa}}_{\mathrm{t-1}}$ refers to the external finance weighted average MTB ratio for the year (*t-1*). The sum of e_s and d_s indicates the total amount of net equity and debt issues during the year (*s*). MTB_s is the market-to-book ratio of the year (*s*). The summations $\sum_{r=0}^{r=t-1}(e_r + d_r)$ correspond to the total sum of net equity and debt issues over the period from the first year of the study period to the year (*t-1*).

3.2 Empirical models

We now turn to presenting our empirical models. We first test whether capital structure choices of studied firms are driven by market timing theory in the short term. To this end, we estimate a model similar to Baker and Wurgler (2002) by regressing the firm's leverage (either the total debt ratio or the long-term debt ratio) on a set of explanatory variables, but it further allows for the impact of local market performance on leverage ratio (Model 1).

$$\textit{Model 1:}\ y_{it} = \alpha_0 + \beta_1 MTB_{it} + \beta_2 AT_{it} + \beta_3 PROFIT_{it} + \beta_4 FS_{it} + \beta_5 IBVMT_t + \varepsilon_{it}$$

where y_{it} represents the ratio of total debts to total assets or the ratio of long-term debts to total assets for the firm *i* (*i* = 1, 2,…, 25) at the time *t*. If the effects of market timing on capital structure really exist in the short term (i.e., β_1 is negative and significantly different from zero), we then test their persistence over time by replacing the MTB_{it} variable by MTB^{wa}_{it-1} variable (Model 2). By construction, the later is lagged one time period in order to capture the effects of historical market valuations on the firm's leverage. A negative and significant impact of MTB^{wa}_{it-1} on y_{it} is expected to confirm the dominance of market timing theory. Otherwise, changes in leverage are explained by the tradeoff theory according to which firms make the most of good market valuations to adjust their capital structure towards targets.

$$\textit{Model 2:}\ y_{it} = \alpha_0 + \beta_1 MTB^{wa}_{it-1} + \beta_2 AT_{it} + \beta_3 PROFIT_{it} + \beta_4 FS_{it} + \beta_5 IBVMT_t + \varepsilon_{it}$$

Model 3 presented below is used to check for the robustness of the results obtained from the test of persistent effects of market timing. In effect, we add into Model 2 the MTB variable in order to control for both current and historical variations in the market-to-book ratio. This inclusion is of great importance because we can separate the short-term and long-term impacts of market timing. In this schema of things, the predictions of market timing theory are entirely valid only if the MTB^{wa}_{it-1} variable continues to exert a negative and significant impact on firm's leverage.

$$Model\ 3:\ y_{it} = \alpha_0 + \beta_1 MTB^{wa}_{it-1} + \beta_2 AT_{it} + \beta_3 PROFIT_{it} + \beta_4 FS_{it} + \beta_5 IBVMT_t + \beta_6 MTB_{it} + \varepsilon_{it}$$

All the regressions are performed using STATA Data Analysis and Statistical Software. Our estimation procedure provides Generalized Least Squares (GLS), fixed-effect and random-effect estimators with robust standard errors and clustering to allow for any serial correlation of errors. Indeed, the fixed-effects estimation enables to control for omitted independent variables that differ between studied firms, but are constant over time, while the random-effects estimation is used to take into account the impact of any omitted independent variables that may be constant over time, but vary between studied firms, and any others that may be fixed between firms, but vary over time. The Hausman test, which empirically compares the consistent fixed-effects model with the efficient random-effects model, is also carried out. The testing hypothesis is that differences in the estimated coefficients of the said models are not systematic.

4. Results and interpretations

Before interpreting the results, it is worth notifying that the empirical statistics (χ^2) of the Hausman specification test is very low and insignificant for all time-series cross-sectional regressions we performed (*cf.*, Table 1 to Table 6). This is informative of the fact that the random-effects estimation provides the best linear unbiased estimators of the model coefficients, compared with the GLS and fixed-effects estimations. The validity of this assessment holds for both measurements of the capital structure. Consequently, the following discussions are intentionally based on the results of the random-effects estimation.

Table 1

Estimation results of Model 1 with the total debt ratio as dependent variable

Independent variables	**GLS estimates**	**Fixed-effects estimates**	**Random-effects estimates**
Constant	-1.215*** (-5.08)	-2.005*** (-4.15)	-1.741*** (-4.59)
Market-to-Book ($\times10^{-5}$)	-0.625*** (-4.16)	-0.281*** (-3.26)	-0.299*** (-3.47)
Asset tangibility	0.093 (1.51)	0.104* (1.77)	0.106* (1.90)
Profitability	-1.195*** (-6.46)	-0.553*** (-3.38)	-0.637*** (-4.11)
Firm size	0.095*** (7.17)	0.137*** (4.95)	0.122*** (5.65)
IBVMT ($\times10^{-4}$)	0.365 (0.92)	0.191 (0.86)	0.240 (1.11)
Adjusted R^2	0.4315		
R^2 (*within*)		0.3493	
R^2 (*overall*)			0.3982
Chi-squared statistics of the Hausman test			3.25
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Numbers in parenthesis represent the robust standard errors of the corresponding coefficients. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Table 2

Estimation results of Model 1 with the long-term debt ratio as dependent variable

Independent variables	GLS estimates	Fixed-effects estimates	Random-effects estimates
Constant	-0.831*** (-5.13)	-1.313*** (-3.36)	-1.085*** (-3.83)
Market-to-Book (×10^{-5})	-0.128 (-1.25)	-0.120* (-1.73)	-0.122* (-1.79)
Asset tangibility	0.133*** (3.17)	0.032 (0.67)	0.053 (1.22)
Profitability	-0.649*** (-5.18)	-0.502*** (-3.79)	-0.549*** (-4.53)
Firm size	0.052*** (5.82)	0.083*** (3.72)	0.069*** (4.29)
IBVMT (×10^{-4})	0.076 (0.28)	-0.062 (-0.35)	-0.008 (-0.05)
Adjusted R^2	0.3633		
R^2 (*within*)		0.2542	
R^2 (*overall*)			0.3391
Chi-squared statistics of the Hausman test			1.76
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Numbers in parenthesis represent the robust standard errors of the corresponding coefficients. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Tables 1 and 2 report the estimation results of Model 1. At the first sight, we can notice that the considered model explains only a small portion of the variations in the firm's capital structure, as shown by R-squared (*overall*) coefficients. Indeed, the later reaches 39.82% when the total debt ratio is used as dependent variable, and 33.91% in the case of the long-term debt ratio.

Regarding the estimated coefficients, the firm's size and profitability measures are highly significant in all cases as expected. This finding reinforces their relevance among the empirical determinants of the capital structure of the Tunisian firms. The asset tangibility variable appears, however, to be less important in explaining the capital structure in the Tunisian context because its impact on the long-term debt ratio is insignificant, and becomes felt and significant at the 10% level when the total debt ratio is used. The impacts from the local stock market index (IBVMT) on capital structure are insignificant in both random-effects estimation, leading to think that trends in Tunis stock exchange do not affect the financing behavior of Tunisian firms. This result is in contradiction with the findings revealed by the majority of previous studies including for example Frank and Goyal (2005), which show the existence of a negative relation between stock market performance and debt ratio.

As for the short-term market timing effects represented by the actual market-to-book ratios, the associated coefficient is statistically significant at the 1% level when the dependant variable is the total debt ratio and at the 10% level when it is about the long-term debt ratio. The fact that this ratio is negatively correlated with two measures of capital structure is typically coherent with the basic ideas of the market timing theory according to which firms issue more equity when their valuations are high, and by doing so reduce their leverage. Besides, it is important to underline that, albeit significant, the impact of market timing on the leverage of Tunisian firms is relatively small.

Table 3
Estimation results of Model 2 with the total debt ratio as dependent variable

Independent variables	**GLS estimates**	**Fixed-effects estimates**	**Random-effects estimates**
Constant	-1.211*** (-4.89)	-2.108*** (-4.26)	-1.782*** (-4.64)
Weighted Average Market-to-Book ($\times 10^{-5}$)	-2.640* (-1.75)	-0.949 (-1.23)	-1.020 (-1.30)
Asset tangibility	0.080 (1.25)	0.102* (1.68)	0.103* (1.79)
Profitability	-1.207*** (-6.30)	-0.587*** (-3.51)	-0.683*** (-4.30)
Firm size	0.096*** (6.99)	0.143*** (5.07)	0.125*** (5.72)
IBVMT ($\times 10^{-4}$)	0.287 (0.70)	0.136 (0.60)	0.193 (0.86)
Adjusted R^2	0.3903		
R^2 (*within*)		0.3145	
R^2 (*overall*)			0.3701
Chi-squared statistics of the Hausman test			4.55
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Numbers in parenthesis represent the robust standard errors of the corresponding coefficients. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Table 4
Estimation results of Model 2 with the long-term debt ratio as dependent variable

Independent variables	**GLS estimates**	**Fixed-effects estimates**	**Random-effects estimates**
Constant	-0.830*** (- 5.10)	-1.354*** (-3.44)	-1.101*** (-3.88)
Weighted Average Market-to-Book ($\times 10^{-5}$)	-0.236 (-0.24)	-0.008 (-0.01)	-0.015 (-0.02)
Asset tangibility	0.129*** (3.09)	0.031 (0.64)	0.052 (1.18)
Profitability	-0.654*** (-5.19)	-0.522*** (-3.92)	-0.570*** (-4.68)
Firm size	0.052*** (5.82)	0.086*** (3.81)	0.070*** (4.35)
IBVMT ($\times 10^{-4}$)	0.063 (0.23)	-0.080 (0.44)	-0.023 (- 0.13)
Adjusted R^2	0.3417		
R^2 (*within*)		0.2410	
R^2 (*overall*)			0.3349
Chi-squared statistics of the Hausman test			1.84
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Robust standard errors are in parenthesis. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Some authors argue that the observed effects of market timing that we document in Model 1 is only temporary because firms might take advantage of the good conditions of the market to issue equities with lower costs, but they only do that when they need to adjust their capital structure towards a target leverage ratio. Further, firms do not behave the same over time as predicted by the theory of market timing. We now examine this purpose on the basis of the estimation results of Models 2 and 3. The goal is to show whether the market timing effects reported in Tables 1 and 2 persist over time.

First, Model 2 is estimated and results are reported in Tables 3 and 4. The variable of great interest is none other than the weighted average book-to-market ratio reflecting the past market valuations of the studied firms instead of the current book-to-market ratio we use in Model 1. Globally, the explanatory power of Model 2 with random-effects is not much different from that of Model 1 (37.01% and 33.49%). The firm size and profitability variables continue to exert significant impacts on the firm's financing decisions, while the asset tangibility and stock market performance have practically no effects. In regard to the weighted average market-to-book ratio, this variable is not significant at all for our sample firms. These results contrast the findings of Baker and Wurgler (2002), and Huang and Ritter (2006), who found negative and significant effects of historical valuations on the firm's debt ratio. They rather strengthen the findings of Leary and Roberts (2005), Flannery and Rangan (2006), Alti (2006), Hovakimian (2006), and Kayhan and Titman (2007) who do not find persistent effects of market timing on capital structure based on various sample data.

Table 5

Estimation results of Model 3 with the total debt ratio as dependent variable

Independent variables	**GLS estimates**	**Fixed-effects estimates**	**Random-effects estimates**
Constant	-1.215^{***} (-5.08)	-1.981^{***} (-4.09)	-1.726^{***} (-4.54)
Weighted Average Market-to-Book ($\times10^{-5}$)	1.500 (0.83)	0.787 (0.84)	0.849 (0.90)
Asset tangibility	0.095 (1.53)	0.105^{*} (1.78)	0.107^{*} (1.91)
Profitability	-1.199^{***} (-6.48)	-0.555^{***} (-3.39)	-0.638^{***} (-4.12)
Firm size	0.095^{***} (7.15)	0.135^{***} (4.89)	0.121^{***} (5.59)
IBVMT ($\times10^{-4}$)	0.389 (0.98)	0.209 (0.94)	0.257 (1.19)
Market-to-Book ($\times10^{-5}$)	-0.718^{***} (-3.83)	-0.335^{***} (-3.12)	-0.356^{***} (-3.33)
Adjusted R^2	0.4306		
R^2 (*within*)		0.3521	
R^2 (*overall*)			0.4007
Chi-squared statistics of the Hausman test			3.16
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Numbers in parenthesis represent the robust standard errors of the corresponding coefficients. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Table 6
Estimation results of Model 3 with the total long-term debt ratio as dependent variable

Independent variables	**GLS estimates**	**Fixed-effects estimates**	**Random-effects estimates**
Constant	-0.831*** (-5.12)	-1.284*** (-3.28)	-1.076*** (-3.77)
Weighted Average Market-to-Book ($\times 10^{-5}$)	0.778 (0.63)	0.956 (1.27)	0.966 (1.30)
Asset tangibility	0.133*** (3.18)	0.033 (0.69)	0.053 (1.22)
Profitability	-0.652*** (-5.19)	-0.504*** (-3.82)	-0.549*** (-4.53)
Firm size	0.052*** (5.80)	0.081*** (3.63)	0.068*** (4.21)
IBVMT ($\times 10^{-4}$)	0.088 (0.33)	-0.039 (-0.22)	0.010 (0.06)
Market-to-Book ($\times 10^{-5}$)	-0.176 (-1.38)	-0.186** (-2.15)	-0.188** (-2.21)
Adjusted R^2	0.3448		
R^2 (*within*)		0.2613	
R^2 (*overall*)			0.3403
Chi-squared statistics of the Hausman test			1.61
Number of observations	199	199	199

Notes: Adjusted R^2, R^2 (within) and R^2 (overall) express the overall explanatory power of the GLS model, the fixed-effects model and the random-effects model respectively. Numbers in parenthesis represent the robust standard errors of the corresponding coefficients. ***, ** and * indicate that estimated coefficients are significant at 1%, 5% and 10% respectively.

Second, as a checking step, the effect of the current market-to-book and the weighted average market-to-book ratios is simultaneously analyzed in Model 3. As discussed in the previous section, this test allows us to reassess the persistent effects of the firm's valuation histories on the debt ratio once the short-term influences are controlled. Concretely, the estimation results, reported in Tables 5 and 6, do not permit to bring out the persistent effect in keeping with the requirements of the market timing theory, meanwhile they confirm the results of Model 2. Indeed, we can observe the strong significance of the short-term effects represented by the current market-to-book ratio, at the 1% level when firm's leverage is measured by the total debt ratio and at the 5% level for the long-term debt ratio, and the expected relationship between these variables.

5. Concluding remarks

Baker and Wurgler (2002) show that changes in market valuations have large effects on the firm's capital financing choices that persist over time. The efforts to time the market are thereby associated with the reduction of the leverage ratio because firms tend to issue equity when their market values are high. In this article, we provide empirical evidence on the validity of the market timing theory in explaining dynamic variations in capital structure of twenty-five non-financial Tunisian firms.

In summary, main findings of our study are as follows. First, the market valuations have only slight effects on the observed fluctuations of the debt ratios of our sample firms in the short-term. Second, the aforementioned effects are insignificant and not persistent over time. Third, firm size and profitability appear to be the most preeminent determinants of the capital structure decisions in the Tunisian context whereas the influence of stock market performance and asset tangibility is almost insignificant.

Globally, our results corroborate with those of the majority of empirical works in related field like Flannery and Ranjan (2006), and Kayhan and Titman (2007), but are not in line with those of Baker and Wurgler (2002). We then think that the market timing theory is not capable of fully explaining the firm's actual financing behavior.

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