Financial Decision of Tunisian Firms in the Context of Market Timing Theory

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ABSTRACT: This work focuses on the study of the determinants of capital structure in the context of the "Market Timing" theory in a sample of 20 Tunisian firms listed on the Tunis Stock Exchange during the period 2004-2010. The empirical analysis shows that the results are inconclusive regarding the relevance of certain variables from this theoretical framework due to various reasons including market inefficiency. We can also invoke the behavioral dimension of Tunisian companies insofar as direct finance is not often the preferred alternative by the agents as well as to those in need financing capacity.

1. Introduction

The theory of "trade-off"[1] and the theory of "Pecking Order"[2] have often been both theoretical frameworks of reference to study the behavior of financial firms. Following the work of Baker and Wurgler (2002), several studies have focused on the study of the determinants of capital structure in the context of Market Timing. According to this "new" theoretical framework, firms issue equity when market conditions are favorable and bought otherwise.

Baker and Wurgler (2002) suggest that firms rely less on debt during favorable periods marked by a good value on the market, especially when the MTB ratios are high. Their results show that capital structure is the result of the willingness of successive 'timer' market (select the appropriate time). Still in the work of Baker and Wurgler (2002) and those of Welch (2004), Kayhan and Titman (2005), Lemmon and Zender (2003), Alti (2003) and Bruinshoofd and De Haan (2012), the purpose of this article is to answer the question to what extent is the choice of corporate finance guided by considerations of timing?

By adopting the methodology of Hovakimian (2005) and Frank and Goyal (2004), empirical validation on a sample of 20 Tunisian firms listed during the period 2004-2010. We'll see against the work of Baker and Wurgler (2002), if our results are conclusive to corroborate the thesis relevant variables from the theory of Market Timing for our sample of Tunisian companies.

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[1] The trade-off theory of capital structure refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits.

[2] The pecking order theory states that companies prioritize their sources of financing (from internal financing to equity) according to the cost of financing, preferring to raise equity as a financing means of last resort. Hence, internal funds are used first, and when that is depleted, debt is issued, and when it is not sensible to issue any more debt, equity is issued (Myers and Majluf, 1984).

2.   Theoretical Framework

There are two versions about the behavior of Timing. According to the first one, economic agents are rational. Assuming that the costs of adverse selection varies over time, several studies propose to explain the theory of market timing as a dynamic model of the hierarchical theory (Lucas and McDonald (1990), Dierkens (1991), Helwege and Liang (1996) and De Haan and Hinloopen (2003). Such work highlights the relevance of information asymmetry problems (and their variations over time) in the process of issuing shares.

The second version of the theory of market timing implies that economic agents are irrational and that firms issue equity when stock prices are high and bought otherwise. Baker and Wurgler (2002) show that the structure of a company's financial results, not a conscious choice of a target ratio, but the accumulation of decisions made in the past in terms of market environment:
- Issue of shares when valuations are high and / or the market environment is favorable;
- Issuance of debt and redemption of shares when prices are low and / or exchange is depressed.
The results show that 70% of the current financial structure is explained by the historical Market To Book (MTB) ratio. Baker and Wurgler (2002) conclude, then, that the capital structure is the result of mechanical control of successive "timer" in the market.

A study based on a survey conducted by Graham and Harvey (2001) led to the same conclusions: the leaders seize the "window of opportunity" on the stock markets to achieve equity issues. According to the authors, the decision to issue equity is guided by the search for financial flexibility. It helps to have a debt capacity that can be used in case of poor market conditions. Similarly, Hovakimian et al. (2001) were able to show that firms issue equity after increasing their courses and conclude in favor of the theory of Market Timing.

Following the work of Baker and Wugler (2002), several studies have focused on the question: to what extent do considerations of Market Timing influence the decisions of corporate finance? (Huang and Ritter (2005), Welch (2004). Results obtained by these authors will be discussed in three parts: the relevance of theory Market timing, persistence over time, and finally, through that affect proxies.

According to the first aspect, Huang and Ritter (2005) examine the time-series models to test the determinants of financing during the period 1964-2001. According to the predictions of the theory of market timing, they conclude that U.S. firms finance a significant portion of their financing deficit by external equity when the cost of capital is low. Those with low growth opportunities favor debt financing but when the cost of capital is low, they seize the opportunity and issue shares.
Frank and Goyal (2004) show that high MTB ratio and have a negative impact on short-term debt. However, their results can not conclude in favor of the relationship overvalued-equity issues. In the long term, the authors believe that the behavior of financial firms is guided by considerations from the theory of trade-off. Fama and French (2002) suggest that the variable measuring the behavior of Timing namely the weighted average of the history of the MTB ratio is negatively correlated with debt ratio measured at market value. This result confirms the findings of Baker and Wurgler (2002).

According to the second part, Baker and Wurgler (2002) raise the issue of persistence in time of the behavior of Timing. They conclude that the impact of market timing on capital structure is significantly persistent, insofar as the will of successive "timer" the market held up to ten years. The impact of timing on capital structure raises an obvious question, namely: what is the persistence of the effect of timing on capital structure? In this context, Alti (2003) suggests that "a question of research which has recently received considerable attention is the impact of long-term Market Timing on Capital Structure. The importance of this problem cannot be overstated. If this is true, the high persistence of the effects of market timing will result in loosening of the optimal debt, suggesting a minimal role for traditional determinants of capital structure. "

The persistence of the effect of timing on capital structure has notably been raised to confront the explanatory power of the two theoretical frameworks of market timing and trade-off. Indeed, if we assume that considerations Timing persist over time, this implies that firms are not concerned with adjusting their debt ratios to target levels in subsequent years. As a result, capital structures observed are the cumulative result of past temptations of "timer" the stock market. This view is supported primarily by Baker and Wurgler (2002).

However, recent empirical work suggests the relevance of behavioral adjustment to target leverage levels (De Bie and De Hann, 2004; Kayhan and Titman (2007), Hovakimian (2005), Frank and Goyal (2009) and Leary and Roberts (2005). Frank and Goyal (2009) use a vector autoregressive model (VAR) to examine the speed of adjustment of firms over the period 1950 to 2003. Predictions of trade-off theory are compared to those of Market Timing theory and the theory of "Inertia" Welch (2004).The results argue that higher MTB ratios do not have a significant effect on the dynamics of capital structure. Alti (2003), Hovakimian (2005) and Leary and Roberts (2005) suggest the empirical behavior of rapid adjustment to the target debt despite the predictions of the theory of Market Timing. It's relevant to note that these authors find that the financing by issuing shares coincides with favorable periods; however, they argue that the effect of the latter on the financing behavior of firms is significantly low and on the short term.

The third part focuses on the biases affecting selected proxies. Baker and Wurgler (2002) hold as far as timing behavior of a variable that captures the interaction between MTB ratio and deficit financing (External Finance Weighted MTB: EFWMTB). According to these authors, the funding gap will be filled by issuing shares when firms realize higher MTB ratios.

Too much criticism have been leveled at this position (Lemmon and Zender, 2003; Kayhan and Titman, 2005; De Bie and De Haan, 2004; Hovakimian, 2005). Indeed, the variation of market to book ratio may indicate that the values of shares on the market or that are high growth opportunities are important. Similarly, Hennessy and Whited (2004) suggest that firms finance their growth opportunities through equity when the MTB ratios are high, and in order to avoid the risk of financial distress. In the same vein, Hovakimian (2005) notes "the results show that the effect of EFWAMB remains significantly negative, implying that it is due to the presence of factors other than market timing, such as opportunities for growth".

Kayhan and Titman (2005) and De Haan and De Bie (2004) decompose the measure of Baker and Wurgler (2002) into two entities. The first entity of the expression (the covariance between deficit financing and the market to book ratio divided by the average level of external funding) presents a measure of market timing behavior. But, the second entity represents the average level of market-to-book ratios during the study period represents no measurement timing. Indeed, the latter is often associated with a significant level of growth opportunities (Marsh 1982, Myers 1977 and Flannery and Rangan (2006)).

Alti (2003) argues that the relationship between the decision to issue shares and evaluations of these is influenced by other factors that affect the funding policy. For example, companies with significant growth opportunities and higher ratios MTB can use relatively more equity financing in order to maintain financial flexibility.

3. Empirical Studies of the Market Timing Theory

Working on a sample of U.S. firms for the period 1950-2000, Frank and Goyal (2004) explained the debt ratio by 39 explanatory factors from the theoretical frameworks of trade off of Pecking order, Market Timing and agency theory. The main results are summarized as follows:
- Firms with ratios market-to-book rates tend to reduce their debt levels.
- The most profitable firms have low debt ratios.
- Large size firms have higher debt ratios.
- There is a positive relationship between debt and inflation.

The results of Alti (2003) over the period 1971-1999, show evidence of market timing theory. Firms issue equity and reduce debt during periods of "high" (periods marked by a good valuation on the stock market, especially when the MTB ratios are high). However, the effect of timing becomes very small dice the second year following the IPO.

Chen and Zhao (2005) worked on a sample of U.S. companies during the study period 1971-2002, conducted three tests. Their results confirm the Trade Off theory and contradict the findings of Baker and Wurgler (2002). Their findings are similar to those of Leary and Roberts (2005).

Welch (2004) follows the idea of Baker and Wurgler and concludes that the ratios of capital structure (at market value) are strongly influenced by past prices of shares. Welch concludes that firms do not compensate for the effects of share prices on the capital structure. From his point of view,

changes in debt are not caused by the effects of market timing, but are the result of the reluctance of companies to counteract the effects of changes in share prices on the capital structure. According to the theory of inertia " Welch, the reasons for firms to issue shares remain a mystery. Proxy variables such as the ratio market-to-book, profitability and market timing do not explain the market based on the capital structure dynamics. Watching market movements based on ratios of capital structure, the effects of share price are key determinants and account for 40% of the ratio of capital structure dynamics.

Hovakimian (2003) notes the importance of the ratio of market-to-book regressions historical average debt is not due to increased synchronization of the award. He noted that only the issuance of shares may be "timer" conditions on the exchange, but they do not have significant lasting effects on capital structure. Other transactions (purchases of equity, debt issuance and debt reduction) show timing models which are unlikely to induce a negative relationship between the ratio of market-to-book and debt.

Kayhan and Titman (2005) have analytically divided measuring market timing BW into two components, a measure of short-term timing and other long-term. They confirm that the changes are driven by the debt market timing (next to the pecking-order and trade-off behavior). However, unlike BW, they do not support the long-term persistence of the effects of market timing.

Hovakimian (2005) examines the argument of Baker and Wurgler that market timing has a persistent impact on capital structure. While the results suggest that equity issues are "timées" periods ratios market-to-book levels, it also found that the effect of emissions actions on the debt is economically small and of short duration. He noted that the redemption of shares and their impact on the debt are even lower. It also notes that debt issues have a significant lasting effect on the capital structure, but their timing is unlikely to induce a negative relationship between the market-to-book and debt ratio. Debt reduction also has a significant effect on the debt.

In conclusion, O'Brien et al. (2007) examine the conventional rule that a company can increase the intrinsic richness of long-term shareholders by issuing overvalued stocks and restricted debt outstanding, or redeem shares undervalued with the amount of new debt. They show that this may not work when the debt and equities are undervalued and the company should make a share exchange with debt while the shares are undervalued.

4. Model Specification
4.1. Data Source and Sample

Our sample consists of 20 Tunisian companies belonging particularly to industrial, commercial and service. Financial institutions were excluded because their funding policies are very different from those of non-financial firms. The main data source for this study is the Tunis stock exchange. The information used accounting data (comprising mainly the balance sheets and income statements) and exchanges. Our study period runs from 2004 until 2010.

4.2. Model

Like Baker and Wurgler (2002) and Hovakimian (2005), our model aims to test the relevance of the theoretical predictions of the theory of market timing to explain the level of indebtedness of Tunisian firms. It is as follows:

$$DF_t = \alpha_0 + \alpha_1 RENT_{t-1} + \alpha_2 TANG_{t-1} + \alpha_3 SIZE_{t-1} + \alpha_4 MTB_{t-1} + \alpha_5 EFWMB_{t-1} + \alpha_6 PRICE_{t-1} + \alpha_7 ITUNX_{t-1} + \xi_t \quad (1)$$

- **DF**: ratio of total financial liabilities measured at book value (DFVC) and market value (DFVM); Table 1 presents dependent variables (Debt ratio), and their measures adopted by the theory.
- **RENT**: the profitability of the firm measured by the ratio of EBIT[3] / Total Assets;
- **TANG**: the structure of the assets of the firm measured by the ratio of net tangible assets plus stocks / total assets;

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[3] Earnings before interest and taxes.

- **SIZE**: the size of the firm measured by the Log total assets;
- **MTB**: Market To Book ratio measured by the ratio (market capitalization + debt) / total assets.
- **EFWMB**: weighted average of the past MTB ratios, starting with the first observation available in our sample, up to the MTB ratio (T-1). The weighting for each year is the funding deficit of the year (1) to (T-1).

Table 1. Summary of dependent variables *(Debt ratio)*

Dependent variable	measures adopted	Authors reference
Debt ratio (book value)	(DLT + bank loans) / Total Assets	Flannery and Rangan (2006)
Debt ratio (market value)	(+ DLT Overdrafts) / book value of total debt + market capitalization	Grullon and Kanatas (2001)

This variable is measured by the following expression:

$$EFWAMB_t = \sum_{s=1}^{t-1} \frac{e_s + d_s}{\sum_{r=1}^{t-1} e_r + d_r} \times MB_s$$

(2)

- **e**: indicates equity = Net change in shareholders own - undistributed profits
- **d**: change in debt accounting
- **Price**: the rate of change in the share price of the firm;
- **ITUNX**: the index of the performance of the Securities Exchange Tunis in year t is the TUNINDEX
- **ξt**: an error term

5. Empirical Results

Table 2 reports the Pearson correlation coefficients between the dependent variable and the independent variables: SIZE, RENT, TANG, MTB, PRICE, ITUNX and EFWMB.

Table 2. Pearson correlation coefficient matrix

e(V)	SIZE	RENT	TANG	MTB	PRICE	ITUNX	EFWMB
SIZE	1.0000						
RENT	0.0989	1.0000					
TANG	0.0850	0.1103	1.0000				
MTB	0.1211	0.0413	-0.2876	1.0000			
PRICE	0.0275	-0.0321	0.1502	-0.4136	1.0000		
ITUNX	-0.1617	-0.0124	0.0536	0.0266	-0.4273	1.0000	
EFWMB	0.1570	-0.0103	0.0693	-0.0561	0.1911	-0.1542	1.0000

As it can be seen in Table 2, the correlation coefficient matrix shows that the correlation between variables is generally low. The results of the regressions[4] on the model (1) are summarized in Table 3. As can be seen from Table 3 (see R^2), the explanatory power of the model tested varies between 0.12 and 0.11, depending on whether the regression of the debt ratio measured at book value

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[4] To perform the estimation of our model, we used STATA version 9.

or market value (See Table 1 for more details on the measures adopted for the debt ratios), and depending on the model chosen (Within). In comparison, our model is confused with the work of Hovakimian (2005) ($R^2 = 0.176$) and Baker and Wurgler (2002) ($R^2 = 0.20$), as our relatively low R^2 is equal to R^2 of these authors. The tests carried lead to retain the fixed effects model (Within)[5].

Table 3. Comparison Fixed-Effects Model Results

Variables	DFVC	DFVM
	Fixed effects	**Fixed effects**
Const	0.311	0.468
	(0.64)	(0.69)
Rent	-0.02	-0.023
	(-0.27)	(-0.21)
Tang	0.312	0.291
	(2.54)**	(1.72)*
Size	0.025	0.39
	(0.40)	(3.64)**
MTB	0.0344	-0.044
	(2.38)**	(-2.12)**
Price	-0.03	-0.08
	(-0.48)	(-2.006)**
EFWMB	-0.0023	-0.012
	(-0.28)	(-0.96)
ITUNX	-0.086	-0.121
	(-1.23)	(-1.75)*
R²	0.1296	0.1145
N	120	120
t-values are in parentheses; ** Significant at 5%, * Significant at 10%		

An examination of the coefficients of variables EFWMB, Price and ITUNX, we can deduce that the results are inconclusive as to the relevance of variables from the Market Timing theory. Contrary work of Baker and Wurgler (2002) who found a negative and significant coefficient at the 5% ratio between EFWMB and debt level, the regressions shows that the coefficients of this variable are not significant (as it can be seen in Table 3), although they have the expected sign (negative). These results are similar to those found by De Bie and De Haan (2004) in the Dutch context. Baker and Wurgler (2002) explain this negative relationship that firms finance their deficit financing by issuing shares during favorable periods characterized by historic Market to book ratio high.

The coefficient of the variable (Price), which measures the increase in action, is significant with a negative sign in the regression on merchant debt. This result is consistent with the approach of Welch (2004) known as the "Inertia Theory" which predicts a negative relationship between the increase in share price and the debt ratio measured value. Frank and Goyal (2004) find that leverage is negatively related to changes in share prices. However, these authors argue that this variable is a simple measure of risk. According to the trade-off theory, firms reduce their indebtedness to minimize their risk. They add that the Pecking Order theory and the theory of market timing are silent regarding the risk-indebtedness. However, when debt is measured at book value, the coefficient of the variable (Price) is no longer significant. Such a finding confirms the relevance of market values compared to accounting measures (Baker and Wurgler (2002)).

The coefficient of the variable (ITUNX) which measures the performance of the stock market is very small and insignificant in both regressions. The result contradicts the prediction of the theory of Market Timing, which according to Frank and Goyal (2003 and 2005) suggests a negative relationship between stock market performance and leverage.

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[5] We speak here of the Hausman test.

The ratio Market-to-Book is negatively related to debt. This result is usually interpreted as resulting from growth opportunities. This interpretation is based on the trade-off theory (see Table 1 in Appendix for more details on the signs of the key variables in the capital structure). Under the assumption of Pecking Order Theory, more profitable firms use less debt. Most profitable firms should also have a higher market value. According to the theory of market timing, good value on the market is interpreted by a low debt. In the regression where debt is measured in market value, the result confirms the evidence found theoretically and empirically. However, in the regression where debt is measured at book value, the coefficient of the MTB ratio changes sign and becomes positive.

Level control variables, the size and structure of the assets are statistically significant and carry the expected signs. On the one hand, the size variable is positively and significantly related to debt as it is expressed in value or market value (Rajan and Zingales (1995), Hovakimian (2005) and Huang and Ritter (2005)). On the other hand, the coefficient associated with the variable structure of the business assets (TANG) is positive and significant. This result supports the hypothesis that tangible assets are used as collateral for creditors (Rajan and Zingales (1995), Kremp et al (1999) and Ghazouani (2013)). Finally, the negative coefficient associated with the variable (RENT) measuring the profitability of the company supports the assumptions of the Pecking order theory of Myers and Majluf (1984). This result confirms the empirical results obtained by Titman and Wessels (1988), Rajan and Zingales (1995) and Hovakimian (2005) and Ghazouani (2013).

6. Conclusion

This article is part of the work aimed at testing the empirical relevance of certain factors from the Market timing theory as determinants of capital structure of firms (Baker and Wurgler, 2002; Hovakimian, 2005; Frank and Goyal, 2004). In particular, we sought to explain the observed level of debt based on the valuation of the firm in the market, the stock market performance and rising share prices. The introduced control variables are those used by Rajin and Zingales (1995), namely the level of profitability of the firm size, growth opportunities and asset structure of the firm.

Contrary to the work of Baker and Wurgler (2002), our empirical results are inconclusive regarding the relevance of certain variables from the theoretical framework of the Market Timing. While the reasons are varied they are particularly apparent in the market inefficiency since the characteristics of an emerging market do not seem to allow stakeholders to identify windows of opportunity in the market. One can also invoke behavioral dimension insofar as direct finance is not often the preferred alternative by the agents as well as to those in need for financing capacity

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Appendix

Table 1. Key predictors of capital structure

Variables	Market Timing	Pecking Order	Trade off	Reference works
Profitability (Rent)	.	-	+	Bayless and Diltz (1994), Graham (2000), Booth et al. (2001)
Asset structure (Struc)	.	+	+	Frank and Goyal (2003), Kremp et al. (1999), and Hovakimian et al. (2001)
Size	.	+/-	+	Warner (1977), Booth et al. (2001), Titaman and Wessels (1988), Rajin and Zingales (1995), and Hesmati (2001).
Growth opportunities (MTB)	.	+	-	Booth et al. (2001), Titaman and Wessels (1988), Rajin and Zingales (1995), and Garham (2000).
Changes in equity (Price)	-	.	.	Welch (2004)
Performance stock market (ITUNX)	-	.	.	Frank and Goyal (2003), Frank and Goyal (2005)

Notes: (+/-) signs of the independent variables of capital structure, predicted by the references theories.