

# “Testing Debt Signaling Hypothesis for Making Investment Decisions in Transitional Market: Evidence from Egypt”

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## Testing Debt Signaling Hypothesis for Making Investment Decisions in Transitional Market: Evidence from Egypt

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### Abstract

This paper examines the relationships between changes in firm's debt and its effects on firm's market value in a transitional market. The market value is considered as a measure of the investment worthiness. The signaling effect refers to the effects of debt on firm's market value. The paper examines the signaling effects of the determinants of capital structure that are relevant to a transitional market. These determinants cover the basics of tradeoff model, pecking order hypothesis and free cash flow hypothesis. The methodology begins with the determination of the relevant determinants of debt in a transitional economy. Next, the potential signaling effects of the relevant determinants of debt are examined. The robustness of the signaling effect is examined using the 'Extreme Bound Analysis.' The overall results indicate that the worthiness of the investment (market value) is determined by interest rates (macro factor) and financial flexibility (firm-specific factor). These two factors have robust and significant signaling effects.

**JEL classification:** G32

**Key words:** Capital Structure, Financial Signaling Hypothesis, Transitional Markets, Egypt.

### Introduction

The objective of this study is to show the dynamic relationships between changes in firm's capital structure and their effects on firm's market value under different systematic risk classes. When a firm changes its capital structure, it actually changes the relative position and the market values of its capital suppliers' securities holdings. Accordingly, to the extent the capital suppliers are interested in their securities' market value, the firm's market value changes. This is the basic premise of the signaling effect of capital structure. The possible link between investment worthiness and firm's capital structure can be outlined as follows. Investors are assumed to make informative investment decisions when they invest in the firms that use an amount of debt that enhances firm's market value.

The two dimensions considered in this paper are changes in firm's capital structure and its market value. By examining the relevant subfactors that can affect or determine the firm's capital structure, this study is to show the combined effects of three theories of capital structure: tradeoff theory, pecking order theory and free cash flow theory. Furthermore, this paper attempts to provide one criterion, which is the firm's market value, for making any changes in firm's capital structure.

The paper is organized as follows. Section II discusses the theoretical underpinnings of the relationship between firm's capital structure and market value. The general orientation in this section is to show that changes in capital structure have a signaling effect, which affects firm's market value. Section III outlines the research variables/proxies examined in the study. Section IV describes the nature and sources of data used in the study in addition to a description and the procedures of the econometric model used for the analysis. Section V describes the results and a discussion of the analysis respectively. Section VI concludes.

### Capital Structure, Market Value and Financial Agency- Signaling Theory

The literature on the theory and practice of capital structure is extensive. It has been trying to provide answers to what are the factors that affect the decisions to change firm's capital structure. Changes in capital structure bring about changes in the relative position and/or power of capital providers (e.g., stockholders and debtors). When they are aware enough of the effects of

changing capital structure, they presumably react accordingly. This is the focal point of the theory of signaling. Masulis (1983) studied the relationship between changes in capital structure and firm value. Masulis's results (1983) indicate that both stock prices and firm values are positively related to changes in debt level and leverage. This evidence is consistent with models of optimal capital structure and with the hypothesis that changes in debt level release information about changes in firm value.

The theory of signaling states that information asymmetry between a firm and outsiders leads the former to make certain changes in its capital structure. Ross (1977), Myers & Majluf (1984) and John (1987) have shown that under asymmetric information, firms may prefer debt to equity financing. In other cases, the asymmetric information may leave corporate insiders with a degree of residual uncertainty leading to the pecking order effect, i.e., the relative preference of equity financing (Noe, 1988). The outcome of the prevailed information asymmetry is that outsiders do not know quite enough and/or accurate information about the firm's future decisions. This may lead the firm to make certain changes in its capital structure to send certain signals to the outsiders concerning the quality of its financial decisions.

The central point in the literature is the theory of optimal capital structure. In the early beginnings, Modigliani and Miller (1958) presented their first model of firm capital structure that assumes that the market value of a firm is independent of its capital structure. They based that relationship on certain assumptions (e.g., market imperfections) that include the absence of taxes; transaction costs, and bankruptcy costs which are called the irrelevance proposition. Stiglitz (1969), Hamada (1969), Mossin (1969) and Fama and Miller (1972) have reached part of Modigliani and Miller's (1958) conclusion that the value of the firm would be invariant to its capital structure even when there is a positive probability of bankruptcy, but only as long as there are no transactions costs associated with bankruptcy. However, Miller and Modigliani (1966) presented another model as a criterion of the optimality phase of capital structure. The model has shown a positive relationship between the value of the firm and its leverage due to a debt tax shield effect. Other researchers such as Robichek and Myers, 1966; Baxter, 1967; Kraus and Litzenberger, 1973; Scott, 1976; Brennan and Schwartz, 1978; Chen, 1979 and Chen and Kim, 1979, have shown the effects of bankruptcy costs and tax deductibility of interest payments on firm's capital structure and its market value. The conclusion they have reached is that firm's capital structure will affect the value of the firm. Therefore, firms that seek to maximize value may choose optimal capital structures consisting of both debt and equity.

Some research has shown the association between changes in firm value and changes in its capital structure. Boness et al. (1974), Kim et al. (1977) and Masulis (1980) found significant relationships between leverage changes and stock price changes. Taggart (1977) developed a model of corporate financing patterns that shows the effects of the market value of firm's securities on its capital structure. He reached a conclusion that movements in the market values of long-term debt and equity are important determinants of corporate security issues. Myers (1977) found a positive association between part of firm's capital structure, e.g., debt financing, and profitability measured in terms of expected future value of the firm's assets. Harris & Raviv (1990) developed a model that incorporates the firm's market value to show that investors use information about the firm's prospects to decide whether to liquidate the firm or continue current operations. Their results show that leverage-increasing changes in capital structure are accompanied by increases in firm value. Kjellman & Hansen (1995) provided another evidence from the listed firms in Finland that they seek to maintain a target capital structure in order to maximize firm value by minimizing the costs of prevailing market imperfections.

The relationship between firm's market value and risk can be related to the agency theory and financial signaling. In corporate finance, an agency problem arises because of the existence of monitoring costs, dispersed ownership (including the free-rider problem), and conflict of interests between stockholders and bondholders (Jensen & Meckling, 1976; Fama, 1980; Fama & Jensen, 1983 a, b; Eisenhardt, 1989). The firm's decisions to change its capital structure can result in an agency problem, which may increase the degree of firm's risk. According to the agency theory, stockholders capture investment returns above those required to service debt repayments and other liabilities and at the same time have limited liabilities when returns are insufficient fully pay

debtholders. Therefore, stockholders prefer high-risk projects, in conflict with bondholders' preferences. These findings indicate that changes in capital structure affect the firm's systematic risk. This shows the necessity for examining the effects of risk levels when studying the relationship between changes in capital structure and market value in this study. In the financial signaling models, the ultimate objective of the firm's insiders is to enhance its market value to solve the agency problems (i.e., minimize the agency costs) associated with the prevailed asymmetric information. In this case, the agency problems result in *hidden information* in which firm's insiders have private information not revealed to outsiders (Arrow, 1985). Consequently, in terms of financial signaling, when insiders are trying to raise external finance by selling securities, they have to signal to outsiders the expected value of their holdings. Moreover, the firm can use its capital structure to signal the prospects of its investment decisions and growth opportunities thus support and enhance its market value. The literature implies that firm's investment decisions are one of the determinants of growth opportunities. In this sense, Myers (1977), Froot et al. (1993) and Graham (1996) indicate that investment decisions, especially among growth firms, are inversely related to the presence of long-term debt in a firm's capital structure<sup>1</sup>.

## Research Variables and Proxies

### *Dependent variable*

The dependent variable is firms' market value (MV) defined as the number of shares outstanding times the current closing price per share on the date of financial statement preparation. This variable is to measure firm's adjustment to a target value; therefore it is measured as the changes in Market value  $\Delta MV_t = (MV_t - MV_{t-1})$ .

### *Independent variables*

The change in firm's capital structure is measured by the Debt ratio (Total debt/Total Assets)<sup>2</sup>. The signaling effect of debt on firm's market value is measured by taking into account that the amount of changes in market value in a certain period  $[(t) - (t-1)]$  is affected by the amount of changes  $[(t) - (t-1)]$  in debt in the same period. The change in debt ratio is denoted to as  $\Delta TDR = (TDR_t - TDR_{t-1})$ . According to the agency theory, we test the hypothesis that under high degrees of systematic risk, there is a positive relationship between firm's debt and its market value, and the vice versa under medium and low degrees of systematic risk. The main proposition in this regard is that, under high systematic risk, debt helps to resolve the agency conflicts between firm's managers and shareholders. As for the factors that affect firm's debt policy, the relevant literature on the determinants of capital structure provides number of factors that have been examined. It has been realized that the number of factors differs from one study to another. Therefore, this study examines as a comprehensive number of determinants of capital structure as possible. These determinants cover relatively the tradeoff theory, pecking order theory and free cash flow theory. Some determinants could not be included due to the lack of relevant data. Table 1 summarizes the capital structure determinants examined in this study, the ratio(s) or proxy for each determinant, the previous studies related to each determinant, and the expected relationship between each determinants and the firms' market value.

<sup>1</sup> For example, shareholders may underinvest and pass up positive NPV projects if they perceive that the profits will be used to pay off existing debtholders. In addition, firms need to maintain financial flexibility to avoid the costs of underinvestment. In sum, these works indicate that a firm can plan and use its capital structure to exploit growth opportunities, avoid the problem of underinvestment and thus enhance its market value.

<sup>2</sup> The debt ratio is measured in book rather than market value. Two studies have presented theoretical and empirical justification for the use of book value. Myers (1977) argues that the debt book value is related to the value of assets in place. Taggart (1977) finds that there is very little to choose between the book and market value formulations.

Table 1

List of the factors examined in the study. The 'Expected Relationship' denotes to the expected sign of the formulated hypothesis. The  $\Delta$  is measured as  $(t) - (t - 1)$  for all variables except for  $\Delta DR^* = (DR^*_{t+1} - DR_t)$

Factors (Determinants of Capital structure)	Variables (Ratio/Proxy)	Theoretical/Empirical underpinnings	Expected Relationship
1	2	3	4
Target Debt Ratio <sup>1</sup>	$DE_{t+1}$	Debt-equity ratio in a next period (Marsh, 1982; Auerbach, 1985)	Negative
	$\Delta DR^*$	An indicator to the relationship between actual and optimal (target) capital structure (Castanias, 1983; Shyam-Sunder & Myers, 1999; Ozkan, 2001)	
Average Industry Leverage	$\Delta DR_{AVG}$	An indicator to the average leverage level of other firms in the same industry (Bowen et al., 1982; Castanias, 1983)	Positive
Structure of Tangible Assets	$FATA_t$ (Ratio of Fixed Assets/Total Assets)	An indicator to the structure of tangible assets (Martin & Scott, 1974; Jensen & Meckling, 1976; Schmidt, 1976; Myers, 1977; Scott, 1977; Smith & Warner, 1979; Ferri & Jones, 1979; Grossman & Hart, 1982; Myers & Majluf, 1984; Stulz & Johnson, 1985; Harris & Raviv, 1991; Rajan & Zingales, 1995; Ghosh et al., 2000)	Positive
Relative Tax Effects	$\Delta NDTAX$ [The ratio of depreciation to total assets $(DEP/A)_t$ ]	A proxy for non-debt tax shields (DeAngelo & Masulis, 1980; Bradley et al., 1984; Ross, 1985; Kim & Sorensen, 1986; Titman & Wessels, 1988; Harris & Raviv, 1991; Homaifar, 1994; Ghosh, 2000; Ozkan, 2001)	Positive
	$ECTR_t$ (The effective corporate tax rate) <sup>2</sup>	A proxy for debt tax shields (Modigliani & Miller, 1963; Toy et al., 1974; Scott, 1976; DeAngelo & Masulis, 1980; Lasfer 1995; Walsh & Ryan, 1997)	
	$\Delta(NDT/A)$	A direct estimate of non-debt tax shields over total assets (Titman and Wessels, 1988) <sup>3</sup>	
Growth	$CETA_t$ (Capital Expenditures over Total Assets)	Proxies for firm's future growth rate (Myers, 1977; Kim & Sorensen, 1986; Harris & Raviv, 1991; Ghosh et al., 2000)	Positive
	$GTA_t$ (Growth of Total Assets = percentage change in total assets)		
	$SG_t$ (Sales Growth)		
	$ASTURN_t$ (Assets Turnover)		
Investment Growth Opportunities	Market-Book Ratio $MB_t$ (Dummy variables)	Firm's growth options (Myers, 1984; Titman & Wessels, 1988; Haris & Raviv, 1990; Lasfer, 1995; Rajan & Zingales, 1995; Ozkan, 2001; Hovakimian et al., 2001)	Negative

<sup>1</sup> There are alternative approaches to calculate the target ratios such as (1) the average over certain number of years; (2) by fitting an autoregressive function; (3) by taking the maximum debt ratio in the past (Marsh, 1982). However, the three approaches result in one estimate for the target ratio which gives the impression that firms look at only one certain estimate (ratio) and plan their capital structure accordingly. The method used in this paper is based on the assumption that the firm changes its target ratio generically, then the ratio a firm could achieve is considered as if it was the target ratio. This point of view takes into account the generic aspects of planning for capital structure changes. According to the literature, flotation costs, firm's size, asset structure and the market conditions change over time which necessitate planning for capital structure generically, and the target ratios are changed accordingly. However, we experimented with the three methods plus our suggested one which utilizes the two ratios ( $DE_{t+1}$  and  $\Delta DR^*$ ). The results showed slightly significant

increase in the  $R^2$  for our suggested measures.

<sup>2</sup>  $ECTR_t = \frac{\text{Estimated taxable profits} \times \text{Corporate tax rate}}{\text{Pre-tax profits}}$

<sup>3</sup>  $NDT = OI - i - \frac{T}{CTR}$ , where : OI = Operating Income, i = Interest payments, T = Income tax payments  
CTR = Corporate tax rate

Table 1 (continuous)

1	2	3	4
Bankruptcy Risk	$BR_t$ [A direct measure of bankruptcy risk (White & Turnbull, 1974; Marsh, 1982)] <sup>1</sup>	Bankruptcy risk as a proxy for the bankruptcy costs (Warner, 1977; Myers, 1977; Castanias, 1983)	Negative
	DCR <sub>t</sub> (Debt Coverage Ratio)	A proxy for firm's failure (Castanias, 1983; Harris & Raviv, 1990)	
Agency Costs	$ER_t$ (Expense Ratio = Operating expenses scaled by annual sales <sup>2</sup> )	A measure of how effectively the firm's management controls operating costs, including excessive prerequisite consumption, and other direct agency costs (Jensen, 1986; Stulz, 1990; Ang et al., 2000)	Negative
	$AUR_t$ (Assets Utilization Ratio = Annual sales/Total assets)	A measure of how effectively the firm's management deploys its assets (Grossman & Hart, 1982; Maloney et al., 1993; Wruck, 1994; Ang et al., 2000)	
Uniqueness	$SES_t$ [Selling Expenses over Sales (Titman & Wessels, 1988)]	The relationship between specialized products and capital structure (Titman, 1984; Titman & Wessels, 1988)	Positive
Industry Classification	$IC_t$ (Dummy variables: 1-14 = 14 different types of non-financial industries)	The industry effects on firm's capital structure (Schwarz & Aronson, 1967; Gupta, 1969; Lev, 1969; Scott, 1972; Scott & Martin, 1975; Schmidt, 1976; Ferri & Jones, 1979; Titman & Wessels, 1988; Graham & Harvey, 2001).	Positive
Size	$LnAssets_t$ , the natural logarithm of total assets (Dummy variable).	The effects of firm's size on the composition of capital structure (Gupta, 1969; Toy et al., 1974; Schmidt, 1976; Scott, 1977; Ferri & Jones, 1979; Kim & Sorensen, 1986; Titman & Wessels, 1988; Chung, 1993; Homaifar et al., 1994; Rajan & Zingales, 1995; Ozkan, 2001; Ghosh et al., 2000)	Positive
	$LnSales_t$ , The natural logarithm of net sales (Dummy variable)		
Profitability	$\Delta EBITDA$ (Earnings Before Interest, Taxes, and Depreciation over Total Assets)	Firm's profitability ratios, which indicate the relationship between firm's profitability and leverage (Toy et al., 1974; Martin & Scott, 1974; Schmidt, 1976; Carleton & Silberman, 1977; Marsh, 1982; Long & Maltiz, 1985; Titman & Wessels, 1988; Harris & Raviv, 1991; Whited, 1992; Rajan & Zingales, 1995; Ghosh, 2000; Ozkan, 2001)	Positive
	$\Delta OIS$ (Operating Income over Sales)		
	$\Delta OIA$ (Operating Income over Total Assets)		
	$\Delta PM$ (Profit Margin)		
	$\Delta ROI$ (Return on Investment)		
Financial Flexibility	$REA_{t+1}$ [The expected effect of 'Retained Earnings Ratio' as a proxy for the retention rate.]	The relationship between retention ratio and target debt-equity ratio, which has its own ground in the 'pecking order theory' (Marsh, 1982; Pinegar & Wilbricht, 1989; Opler, 1999; Graham, 2000)	Negative
	$\Delta REA$ (A measure of the cumulative effect retained earnings, thus the extent of firm's financial flexibility)		

<sup>1</sup> Bankruptcy risk =  $\frac{\text{Fixed charges} - \text{Earnings before income and tax}}{\sigma \text{ of earnings}}$

<sup>2</sup> The expenses ratio is not assumed to measure all agency costs as discussed in the literature. Nevertheless, and according to the availability of data, this ratio can be considered a first-order estimate and easy-to-measure indicator of the presence of agency costs at the firm level.

Table 1 (continuous)

1	2	3	4
Liquidity Position	$\Delta QR$ (Quick Ratio)	The relationship between assets' liquidity and the use of debt (Prowse, 1990; Ozkan, 2001)	Negative
	$\Delta WCR$ (Working Capital Ratio).		
	$\Delta CashR$ (Cash Ratio)		
	$\Delta CR$ (Current Ratio)		
Interest Rate	$IR_t$ (Interest Rate on bank loans)	The relationship between market interest rate and issuing debt (Bosworth, 1971; White, 1974; Solnik & Grall, 1975; Taggart, 1977)	Negative
Timing Effect	$\Delta PE$ (Price/Earnings Ratio)	The relationship between stock prices and issuing equity (Bodenhammer, 1968; Baxter & Cragg, 1970; Bosworth, 1971; Brealey et al., 1976; Taggart, 1977; Lucas & McDonald, 1990; Hovakimian et al., 2001)	Positive
Transaction Costs	$DPR_t$ (Dividend Payout Ratio)	The effects of transaction costs of issuing or retiring debt on the choice of capital structure (Martin & Scott, 1974; Marsh, 1982; Fisher et al., 1989; Gilson, 1997)	Negative
Free Cash Flow	$FCF_t$	Jensen & Meckling, 1986	

## Data and Methodology

### Data

The data used in this paper are extracted from many sources. The data related to firms' income statement and balance sheet are obtained from Kompass Egypt Financial Year Book (Fiani & Partners). The interest rate data are published by the IMF: International Financial Statistics. The data cover seven years – 1997-2003. The total number of firms included in the study is 99. These firms cover fourteen different non-financial industries. Firms were selected based on two criteria. First, the non-financial firms amongst the 100 actively trading firms in Egypt stock market. Second, the non-financial firms amongst the 100 firms with the highest market value.

### Methodology

The methodology examines the effects of changes in firm's capital structure, and its relevant determinants, on changes in firm's market value. The general estimating equation is as follows.

$$y_{tk} = \alpha_k + \sum_{i=1}^n \beta_{nk} X_{ntk} + \varepsilon_{tk},$$

where  $t = 1, \dots, 5$

$k =$  number of firms in each group

The desired change in market value is measured as  $y_{tk} = \Delta MV_t = (MV_t - MV_{t-1})$ .

### Methodological Procedures

The methodology adopted in this paper runs in three stages: (1) testing for the issue of multicollinearity where all variables entered in the analysis have  $VIF < 5$ , (2) testing and correcting for the issue of heteroskedasticity<sup>1</sup>, and (3) testing for the issue of autocorrelation where the D-W test is employed.

<sup>1</sup> The significance of the heteroskedasticity affects the predictive power of regression models. The rationale is that the conventional OLS coefficient standard errors are incorrect, and therefore, the conventional test statistics based on them are invalid. This is the very reason of using the Heteroskedasticity-Corrected Standard Errors (HCSE) methods for correcting the estimated standard error, thus the significance of the estimates. (For more details, see Johnston and DiNardo, 1997).

### ***Robustness of the Methodology***

#### *Robustness of the measurement of time*

The measurement of the time effects for each of the variables examined in this paper varies from one variable to another. According to the literature review, it has been realized that examining the changes in the level of an explanatory variable  $\Delta X$  may address and/or result in some new generic insights. In addition, some variables are examined in lag effects in this paper to address the dynamic effects of changes in the level of the determinants of firm's capital structure on the firm's market value. This presents one of the usefulness of such studies to corporate managers when they need to plan for some changes in the capital structure and, at the same time, explore the effects of those changes on the firm's market value. To test for the robustness of the measurement of time, I experimented with the same variables twice, with and without considering the time lag effects. There were some differences realized between both cases, which indicate that the time lag has an effect to be examined thoroughly. Other variables are measured in a static form ( $X_t$ ) as they cannot be anticipated, thus, planned for, in advance. Therefore, their effects are examined like the usual pattern in the other studies in the literature.

#### *Robustness of the Estimates*

In the literature on capital structure, selective reporting is highly likely given the very large number of potential regressors. For this, a sensitivity analysis using the 'Extreme Bound Analysis' (EBA) avoids the pitfalls of selective reporting by directly incorporating prior information and following a systematic approach for testing the fragility of coefficient estimates. As indicated by Leamer (1983, 1985), Leamer and Leonard (1983) and Levine and Renelt (1992), the EBA uses equation that takes the form

$$Y = \beta_i I + \beta_m M + \beta_z Z + u,$$

where  $Y$  = The proxy for capital structure (long-term debt and short-term debt).

$I$  = Set of variables always included in the regression. These are the determinants of capital structure commonly referred to in the literature.

$M$  = The variables of interest. In this study, these variables are the statistically significant ones included in the results, which are the basic proxies for the three theories of capital structure. These variables refer to the speed of adjusting the long-term debt ratio (or short-term debt ratio) in the partial adjustment model, the relative tax effects, the bankruptcy risk, and financial flexibility.

$Z$  = Subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables that affect the dependent variable. In this study, these variables refer to assets' tangibility ( $FATA_t$ ), firm's growth ( $GTA_t$ ), and profitability ( $\Delta EBITDA_t$ ).

The EBA involves varying the subset of  $Z$  variables to find the widest range of coefficient estimates on the variable of interest  $M$  that standard hypothesis tests do not reject. The implementation goes that the first step is to choose the first  $M$  variable and run a base regression that includes only the  $I$  variables and the first  $M$  variable. Then, each  $Z$  variable is to be included in the regression equation at a time and for all possible linear combinations of the  $Z$  variables, and identify the highest and the lowest values for the coefficient on each variable of interest  $\beta_m$  that cannot be rejected at the 0.05 significance level. Thus, the extreme upper bound is defined by the group of  $Z$  variables that produces the maximum value of  $\beta_m$  plus two standard deviations. The degree of confidence that one can have in the partial correlation between the  $Y$  and  $M$  variables can be inferred from the extreme bounds on the coefficient  $\beta_m$ . If  $\beta_m$  remains significant and of the same sign at the extreme bounds, then one can maintain a fair amount of confidence in that partial correlation. In such a case, we refer to the coefficient estimate as "Robust," otherwise, it is "Fragile."

## Results and Discussion

This section is divided into three subsections. First, the results of the OLS estimates for the determinants of capital structure that are relevant to transitional market settings. These results are reported in Table 2. Second, the results of the OLS estimates of the signaling effects of the relevant determinants of capital structure are reported in Table 3. Third, the results of the sensitivity analysis (EBA) are reported in Table 4.

### *First: The Relevant Determinants of Capital Structure to Transitional Market Settings*

Table 2

Regression Coefficients for the Relevant Determinants of Capital Structure

Determinants of Capital Structure	Measure	Capital Structure Proxies			
		$\Delta TDR_t$	$DE_{t+1}$	$\Delta DR^*$	$\Delta DR_{avg}$
<i>Dependents:</i>					
<i>Independents:</i>					
Constant		0.063	0.907	0.071	-0.056
Structure of Tangible Assets	$FATA_t$	-	-	0.012 (2.72)***	-
Relative Tax Effects	$\Delta NDTAX_t$	0.239 (23.78)***	-1.12 (-11.03)***	0.021 (4.82)***	-0.014 (-1.45)
	$ECTR_t$	-	0.003 (8.47)***	-	-
Growth	$CETA_t$	0.0002 (1.97)**	-	-	-0.0003 (-1.91)**
	$GTA_t$	0.078 (7.32)***	0.156 (4.17)***	-	0.003 (3.72)***
	$SG_t$	-	-0.215 (-3.72)***	0.012 (2.77)***	-
	$ASTURN_t$	-	-	-	-0.004 (-2.78)***
Investment Growth Opportunities	High $MB_t$	-	0.694 (2.20)**	-	-
	Medium $MB_t$	0.005 (1.40)	0.289 (2.88)***	-	-
Bankruptcy Risk	$BR_t$	0.0001 (3.06)***	-	0.0001 (3.63)***	-0.0001 (-1.56)
Agency Costs	$AUR_t$	-	0.167 (1.95)**	-	-
Uniqueness	$SES_t$	0.032 (2.04)**	0.925 (2.16)**	-	-
Type of Industry	Agriculture & Fisheries	-0.025 (-2.22)**	-0.617 (-3.93)***	-	-0.05 (-4.44)***
	Gas, Oil & Mining	-	-	-	-0.048 (-3.18)***
	Food & Beverage	-	-0.652 (-4.83)***	-	-0.021 (-2.32)**
	Mills & Storages	0.007 (1.32)	0.136 (0.78)	-	0.002 (0.21)
	Textiles & Consumer Goods	-	-	-	-0.057 (-6.01)***
	Paper, Packaging & Plastics	-0.01 (-1.26)	-0.475 (-3.31)***	-	-0.024 (-2.01)**

Table 2 (continuous)

	Chemicals & Fertilizers	-0.007 (-1.12)	-	-	-
	Pharmaceuticals & Health Care	-	-	-	-0.045 (-5.14)***
	Engineering & Electrical	-0.007 (-1.16)	-0.243 (-1.36)	-	-0.025 (-2.31)**
	Housing & Real Estate	-	1.256 (5.30)***	-	-0.042 (-4.69)***
	Tourism and Leisure	-	-0.359 (-1.87)*	-	0.006 (0.39)
	Utilities and Other Services	-0.038 (-2.42)***	-0.719 (-3.88)***	-	-0.051 (-2.94)***
	Information Technology	-	0.56 (1.27)	-	-0.082 (-3.28)***
Size	Large size firms	-0.012 (-2.67)***	0.374 (2.72)***	-	-
Profitability	$\Delta OIS_t$	0.021 (2.96)***	-0.957 (-2.73)***	-	-
	$\Delta PM_t$	-	0.832 (1.85)*	0.01 (1.06)	-
	$\Delta ROI_t$	-	-	-0.021 (-3.45)***	-
Financial Flexibility	$REA_{t+1}$	0.009 (1.78)*	-3.569 (-9.01)***	-	-0.015 (-1.67)*
	$\Delta REA_t$	-0.72 (-12.96)***	0.695 (2.48)***	-	-
Liquidity Position	$\Delta CR_t$	-0.041 (-5.21)***	-	0.005 (1.51)	-
	$\Delta QR_t$	-	-	-0.004 (-1.55)	0.002 (1.46)
	$\Delta WCR_t$	-0.003 (-6.42)***	-	-	-
	$\Delta CashR_t$	-	-	-0.001 (-12.59)***	-
Interest Rates	$IR_t$	-0.513 (-4.05)***	9.16 (2.87)***	-0.517 (-3.12)***	0.489 (2.94)***
Timing Effect	$\Delta PE_t$	0.0003 (4.58)***	-	-	-
Transaction Costs	$DPR_t$	-	0.005 (6.22)***	-	0.001 (19.33)***
Free Cash Flow	$FCF_t$	-	-	-	0.0002 (1.97)**
<i>N</i>		413	442	444	435
F statistics		66.22***	21.83***	7.64***	7.34***
$\bar{R}^2$		0.76	0.53	0.13	0.24
D-W test		2.11	1.08	2.21	1.97
Theil Inequality Coefficient		0.24	0.19	0.66	0.51

Note: Stepwise regression coefficients for the proxies of capital structure. The *t*-statistics are shown in brackets. The four regression equations are free from multicollinearity ( $VIF < 5$ ). The heteroskedastic effects were corrected using the White's HCSE, which improves the significance of the OLS estimates.

\*\*\*\*D-W test significant at 2% two-sided level of significance.

\*\*\* Significant at 1% level.

\*\* Significant at 5% level.

\* Significant at 10% level.

The results in Table 2 show the determinants of capital structure using four proxies  $\Delta TDR_t$ ,  $DE_{t+1}$ ,  $\Delta DR^*$  and  $\Delta DR_{avg}$ . Overall, the results show that the determinants of capital structure cited in the literature have relatively significant effects on firms' capital structure. Moreover, the

three basic theories of capital structure are represented on a relative basis. That is, the results under the  $\Delta TDR_t$  show significant effects of the trade-off theory (relative tax effects and bankruptcy risk) and significant effects of the pecking order theory (profitability and financial flexibility). The results under  $DE_{t+1}$  show significant effects of the pecking order theory only (profitability and financial flexibility). The results under the  $\Delta DR^*$  show significant effects of the trade-off theory (relative tax effects and bankruptcy risk) and the pecking order theory (profitability). The results under the  $\Delta DR_{avg}$  show significant effects of the pecking order theory (profitability) and free cash flow theory (direct measure of free cash flow). It is worth to note that the signs of the estimates do not conform to the assumption of each theory. Thus, the significant determinants of capital structure in this study provide extended perspectives from Egypt being taken as an example of a transitional market. The focal point in this study is to examine the signaling effect of determinants of capital structure. This requires that the statistically significant estimates reported in Table 2 are to be examined regarding their relationships with firm' market value. Accordingly, a stepwise regression run is carried out for the statistically significant determinants reported in Table 2 with the firm's market value. The results of the signaling effect are reported below in Table 3.

***Second: The Signaling Effects of the Relevant Determinants of Capital Structure to Transitional Market Settings***

Table 3

Regression Coefficients for the Signaling Effects of Capital Structure

Dependent: Market Value <sub>t</sub>	$\Delta MV_t$	Determinants of Financial Signaling
Independents:		
Constant		-230487.7
Debt/Equity ratio (Proxy for target debt ratio)	$DE_{t+1}$	-4599 (-4.18)***
Optimal Debt ratio (Proxy for target debt ratio)	$\Delta DR^*$	-10201.5 (-1.32)
None-debt tax shields	$\Delta NTAX_t$	-22642.6 (-3.35)***
Agriculture and Fisheries	$IC1_t$	-24739.7 (-2.72)***
Housing & Real Estate	$IC11_t$	-15160.1 (-1.24)
Utilities	$IC13_t$	-22893.9 (-1.12)
Financial Flexibility	$REA_{t+1}$	-192466.7 (-6.19)***
Interest Rate	$IR_t$	2029553 (9.28)***
N		404
F statistics		36.78***
$\bar{R}^2$		0.42
D-W test		1.85
Theil Inequality Coefficient		0.45

Note: Regression coefficients of the significant determinants of financial signaling. The dependent variable is the firms' market value (MV). The *t*-statistics are shown in brackets. The regression equation is free from multicollinearity (VIF<5). The heteroskedastic effects were corrected using the White's HCSE, which improves the significance of the OLS estimates.

\*\*\*\*D-W test significant at 2% two-sided level of significance.

\*\*\* Significant at 1% level.

\*\* Significant at 5% level.

\* Significant at 10% level.

The results in Table 3 show significant signaling effects of firm's debt. The estimate of the  $DE_{t+1}$  is negative and statistically significant. The negative relationship conforms to the signaling assumption, e.g., the higher the amount of debt is, the higher the debt burdens are, which affects the firm's market value negatively. The tax effects are shown by the negative and statistically significant estimate of the none-debt tax shields  $\Delta NDTAX_t$ . The negative relationship indicates that the investors are not quite aware of tax shields and its effects on firm's borrowing decisions. Thus, this factor does not conform to the basic assumption of the trade-off theory. The type of industry also has a significant effect as the estimates show that firms in the Agriculture & Fisheries are associated with less market value. The effects of expected retained earnings as a proxy for financial flexibility show that the estimate of  $REA_{t+1}$  is negative and statistically significant. The negative relationship comes against the basic assumptions of the pecking order theory, which also indicates that the investors do not regard the effects of financial flexibility. Finally, the estimate of the interest rate  $IR_t$  is positive and statistically significant. This indicates that the investors are quite aware of the effects of interest rate on the borrowing decisions.

### Third: Testing the Robustness of Capital Structure Signaling Effects

The EBA sensitivity analysis (Leamer, 1983, 1985; Leamer and Leonard, 1983; Levine and Renelt, 1992) is carried out to the estimates reported in Table 3. The  $M$  variables of interest include the statistically significant estimates in Table 3. The results of the sensitivity analysis are shown in Table 4.

Table 4

Sensitivity Analysis for Determinants of Financial Signaling (Dependent Variable: Market Value)

$M$ Determinants Financial Signaling	Variables	$\beta$	SE	$t$	$N$	$\frac{-2}{R^2}$	Other Variables	Robust/ Fragile	
Debt/Equity ratio (Proxy for target debt ratio)	$DE_{t+1}$	High	3675.2	1145.9	1.21	404	0.03	$\Delta DR^*$	Fragile
		Base	1220.5	1009.1	1.21	404	0.02	-	
		Low	-1062.7	1164.9.9	1.08	404	0.02	$\Delta DR^*$ , $\Delta DR_{AVG}$	
None-debt tax shields	$\Delta NDTAX_t$	High	654.5	10836.2	-1.93	404	0.03	$DE_{t+1}$ , $\Delta DR^*$ , $\Delta DR_{AVG}$	Fragile
		Base	-20986.2	10507.9	-1.99	404	0.02	-	
		Low	-43988.7	11100.4	-1.96	404	0.03	$\Delta DR^*$	
Type of Industry	Agriculture & Fisheries	High	14433.8	7431.3	-0.05	404	0.02	$DE_{t+1}$ , $\Delta DR^*$ , $\Delta DR_{AVG}$	Fragile
		Base	-1649.7	7042	-0.23	404	0.01	-	
		Low	-16072.3	7263.3	-0.21	404	0.03	$\Delta DR^*$	
Financial Flexibility	$REA_{t+1}$	High	-94700.9	39378.4	-4.40	404	0.27	$\Delta DR_{AVG}$	Robust
		Base	-173638.3	39370.7	-4.41	404	0.27	-	
		Low	-260237	39593.9	-4.57	404	0.28	$\Delta DR^*$	
Interest Rate	$IR_t$	High	2916448	332750.9	6.76	404	0.15	$\Delta DR^*$ , $\Delta DR_{AVG}$	Robust
		Base	2095553	274615.5	7.63	404	0.14	-	
		Low	1522796	323363.5	6.71	404	0.14	$\Delta DR^*$	

Note: The base  $\beta$  is the estimate coefficient from the regression with the variables of interest ( $M$  variables) and the always-included variables ( $I$  variables). When the dependent variable is the short-term debt ratio, the  $I$  variables are,  $\text{CETA}_t$ ,  $\text{GTA}_t$ ,  $\text{SG}_t$ ,  $\text{BR}_t$ ,  $\text{SES}_t$ ,  $\text{IC3}$ ,  $\text{IC6}$ ,  $\text{IC11}$ ,  $\text{IC13}$ ,  $\text{Size}_t$ ,  $\Delta\text{OIS}_t$ ,  $\Delta\text{AREA}_t$ ,  $\text{DPR}_t$ . The high  $\beta$  is the estimate coefficient from the regression with the extreme higher bound ( $\beta_m + 2\sigma$ ). The low  $\beta$  is the coefficient from the regression with the extreme lower bound. The “Other variables” are the  $Z$  variables included in the base regression that produce the extreme bounds. The “Robust/Fragile” designation indicated whether the variable of interest is robust or fragile.

The results of the sensitivity analysis show to what extent the regression estimates (Table 3) are robust. As indicated earlier, the  $Z$  variables refer to the subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables. In this study the  $Z$  variables are chosen to be the different proxies for capital structure, thus referring to the possible effects of capital structure policy. The fragility/robustness indicate to what extent the regression estimates (Table 3) are affected by changes in the capital structure policy. The results in Table 4 show that two estimate only are robust, which are the  $\text{REA}_{t+1}$  (as a proxy for financial flexibility) and  $\text{IR}_t$  (as a proxy for timing the borrowing decision). This means that these two estimates are less likely to change their statistical significance and magnitude as the capital structure policy changes.

## Conclusion

The decision to change firm’s capital structure to affect firm’s market value is examined by focusing on the most significant determinants of capital structure that are relevant to Egypt as an example to a transitional market. The link between the debt signaling effect and investment worthiness is that investors are assumed to make informative investment decisions when they invest in the firms that use amount of debt that enhances firm’s market value.

The results show that most of the determinants of capital structure cited in the literature have significant effects. The significant determinants include the basic factors of the three theories of capital structure: trade-off, pecking order and the free cash flow. The signs of significant determinants do not conform to the basic assumption of the three theories. Therefore, the significant determinants reported in this study pertain to the settings in a transitional market, which are expected to be different from those of developed markets. Regarding the signaling effects of the significant determinants of capital structure, the overall results show that the market value (as a measure of investment worthiness) is significantly affected by two determinants, which are financial flexibility (firm-specific factor) and interest rates (macro factor), both of which have robust and significant signaling effects. Therefore, the general conclusion that can be drawn is that, for making informative investment decisions, investors should invest in firms with considerable financial flexibility and when the interest rate is favorable. These two factors enhance the firm’s market value, which is the ultimate objective for making informative investment decisions.

## References

1. Ang, James S., Jess H. Chua, and John J. McConnell. 1982. The administrative costs of corporate bankruptcy: A note. *Journal of Finance*, 37: 219-226.
2. Arrow, K. 1985. The Economics of agency. In J. Pratt and R. Zekchauser (eds.). *Principals and agents: The structure of business*. Boston, MA: Harvard Business School Press, 37-51.
3. Auerbach, A.J. 1985. Real determinants of corporate leverage. NBER, no. 616, Chicago: University of Chicago Press, pp. 301-322.
4. Baxter, Nevins D. 1967. Leverage, risk of ruin and the cost of capital. *Journal of Finance* 22: 395-403.
5. Bodenhammer, L. 1968. Th effect of the size of public offerings of common stocks upon pre-offering stock prices. Unpublished Ph.D. dissertation, Harvard Business School.

6. Boness, J., A. Chen and S. Jatusipitak. 1974. Investigations of nonstationary prices. *Journal of Business*, 47: 518-537.
7. Bosworth, B. 1971. Patterns of corporate external financing. *Brookings Papers on Economic Activity*, 2: 253-279.
8. Bowen, R.M., L.A. Daley, and C.C. Huber. 1982. Evidence on the existence and determinants of inter-industry differences of leverage. *Financial Management*, 11: 10-20.
9. Bradley, M., A. Jarrell and E. Han Kim. 1984. On the existence of an optimal capital structure: Theory and evidence. *Journal of Finance*, 39: 857-880.
10. Brealey, Richard, Hayne E. Leland, and David H. Pyle. 1977. Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*, 32: 371-387.
11. Brealey, R.A. and Myers, S.C. 1984. *Principles of corporate finance*. New York: McGraw-Hill.
12. Brennan, M. and E. Schwartz. 1978. Corporate income taxes, valuation, and the problem of optimal capital structure. *Journal of Business*, 51: 103-114.
13. Carleton, W.T. and I.H. Silberman. 1977. Joint determination of rate of return and capital structure: An econometric analysis. *Journal of Finance*, 32: 811-821.
14. Castanias, Richard. 1983. Bankruptcy risk and optimal capital structure. *Journal of Finance*, 38: 1617-1635.
15. Chen, Andrew H. 1979. A theory of corporate bankruptcy and optimal capital structure. In Bicksler, J. (Ed.) *Handbook of financial economics*. Amsterdam: North Holland, Chapter 13.
16. \_\_\_\_\_ and E. Han Kim. 1979. Theories of corporate debt policy: A synthesis. *Journal of Finance*, 34: 371-384.
17. Chung, K.H. 1993. Asset characteristics and corporate debt policy: An empirical test. *Journal of Business Finance and Accounting*, 20: 83-98.
18. DeAngelo, Harry and Ronald Masulis. 1980. Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics*, 8: 3-29.
19. Eisenhardt, K. 1989. Agency theory: an assessment and review. *Academy of Management Review*, 14: 57-74.
20. Fama, Eugene F., and Merton H. Miller. 1972. *The theory of finance*. NY: Holt, Rinehart, and Winston.
21. \_\_\_\_\_. 1980. Agency problems and the theory of the firm. *Journal of Political Economy*, 88: 288-307.
22. \_\_\_\_\_. and Michael C. Jensen. 1983a. Separation of ownership and control. *Journal of Law and Economics*, 26: 301-325.
23. \_\_\_\_\_. 1983b. Agency Problem and residuals claims. *Journal of Law and Economics*, 26: 327-349.
24. Ferri, M. and W. Jones. 1979. Determinants of financial structure: A new methodological approach. *Journal of Finance*, 34: 631-644.
25. Fischer, Edwin O., Robert Heinkel, and Josef Zechner. 1989. Dynamic capital structure choice: Theory and tests. *Journal of Finance*, 44: 19-40.
26. Fiani & Partners. *Kompass Egypt. Financial Year Book* (Cairo: Fiani & Partners).
27. Froot, Kenneth A., David S. Scharfstein, and Jeremy C. Stein. 1993. Risk management: coordinating corporate investment and financing policies. *Journal of Finance*, 48: 1629-1658.
28. Ghosh, Arvin, Cai, Francis and Li, Wenhui. 2000. The determinants of capital structure. *American Business Review*, 18: 129-132.
29. Gilson, Stuart C. 1997. Transaction costs and capital structure choice: Evidence from financially distress firms. *Journal of Finance*, 52: 111-133.
30. Graham, John R. 1996. Debt and the marginal tax rate. *Journal of Financial Economics*, 41: 41-73.
31. \_\_\_\_\_. and Campbell R. Harvey 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, 60: 187-243.

32. Greene, William H. 2000. *Econometric Analysis*. 4<sup>th</sup> edition. New Jersey: Prentice-Hall Inc.
33. Grossman, S. and Oliver Hart. 1982. Corporate financial structure and managerial incentives. In McCall, J. (Ed.), *The economics of information and uncertainty*. Chicago: University of Chicago Press.
34. Gupta, M.C. 1969. The effect of size, growth and industry on the financial structure of manufacturing companies. *Journal of Finance*, 24: 517-529.
35. Hamada, Robert S. 1969. Portfolio analysis, market equilibrium and corporation finance. *Journal of Finance*, 24: 13-31.
36. Harris, M. and A. Raviv. 1990. Capital structure and the informational role of debt. *Journal of Finance*, 45: 321-349.
37. \_\_\_\_\_ . 1991. The theory of capital structure. *Journal of Finance*, 46: 297-355.
38. Heinkel, Robert. 1982. A theory of capital structure relevance under imperfect information. *Journal of Finance*, 37: 1141-1150.
39. Homaifar, G., J. Zietz and O. Benkato. 1994. An empirical model of capital structure: Some new evidence. *Journal of Business Finance and Accounting*, 21: 1-14.
40. Hovakimian, A., Opler, Tim C., and Sheridan Titman. 2001. Debt-equity choice. *Journal of Financial and Quantitative Analysis*, 36: 1-24
41. Jensen, Michael C. and William H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3: 305-360.
42. \_\_\_\_\_ . 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76: 323-329.
43. John, K. 1987. Risk-shifting incentives and signalling through corporate capital structure. *Journal of Finance*, 42: 623-641.
44. Johnston, J. and DiNardo, J. 1997. *Econometric Methods*. 4<sup>th</sup> edition, Singapore: McGraw-Hill.
45. Kennedy, Peter. 1998. *A Guide to Econometrics*. 4<sup>th</sup> edition, Oxford: Blackwell Publishers Ltd.
46. Kjellman, A. and S. Hansen. 1995. Determinants of capital structure: Theory versus practice. *Scandinavian Journal of Management*, 11: 91-102.
47. Kim, H., J. McConnell and P. Greenwood. 1977. Capital structure rearrangements and the first rules in an efficient capital market. *Journal of Finance*, 32: 789-810.
48. Kim, W.S. and E.H. Sorensen. 1986. Evidence on the impact of the agency costs of debt on corporate debt policy. *Journal of Financial and Quantitative Analysis*, 21: 131-144.
49. Kraus, Alan and Robert H. Litzenberger. 1973. A state preference model of optimal financial leverage. *Journal of Finance*, 28: 911-922.
50. Lasfer, M.A. 1995. Agency costs, Taxes and Debt. *European Financial Management*, 1: 265-285.
51. Leamer, Edward E. 1983. Let's take the con out of econometrics. *American Economic Review*, 73: 31-43.
52. \_\_\_\_\_ . 1985. Sensitivity analysis would help. *American Economic Review*, 75: 308-313.
53. \_\_\_\_\_ and Leonard, H. 1983. Reporting the fragility of regression estimates. *Review of Economics and Statistics*, 65: 306-317.
54. Lev, B. 1969. Industry average as targets for financial ratios. *Journal of Accounting Research*, 7: 290-299.
55. Levine, R. and Renelt, D. 1992. A sensitivity analysis of cross-country growth regressions. *American Economic Review*, 82: 942-963.
56. Long, Michael and Ileen Maltiz. 1985. The investment financing nexus: Some empirical evidence. *Midland Corporate Finance Journal*, 3: 53-59.
57. Lucas, Deborah J. and Robert L. McDonald. 1990. Equity issues and stock price dynamics. *Journal of Finance*, 45: 1019-1043.

58. Maloney, M.T., R.E. McCormick and M.L. Mitchell. 1993. Managerial decision making and capital structure. *Journal of Business*, 66: 189-217.
59. Marsh, P. 1979. Equity rights issues and the efficiency of the UK stock market. *Journal of Finance*, 34: 839-862.
60. \_\_\_\_\_. 1982. The choice between equity and debt: An empirical study. *Journal of Finance*, 37: 121-144.
61. Martin, John. D., and David F. Scott, Jr. 1974. A discriminant analysis of the corporate debt-equity decision. *Financial Management*, 3: 71-79.
62. Masulis, Ronald W. 1980. The effects of capital structure change on security prices: A study of exchange offers. *Journal of Financial Economics*, 8: 139-178.
63. \_\_\_\_\_. 1983. The impact of capital structure change on firm value: Some estimates. *Journal of Finance*, 38: 107-126.
64. Modigliani, Franco and Merton H. Miller. 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48: 261-297
65. \_\_\_\_\_. 1963. Corporate income taxes and the cost of capital: A correction. *American Economic Review*, 53: 433-443.
66. Mossin, J. 1969. Security pricing and investment criteria in competitive markets. *American Economic Review*, 59: 749-756.
67. Myers, Stewart C. 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5: 147-175.
68. \_\_\_\_\_. 1984. The capital structure puzzle. *Journal of Finance*, 39: 575-592.
69. \_\_\_\_\_. and Nicholas S. Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13: 187-221.
70. Noe, Thomas H. 1988. Capital structure and signaling game equilibria. *The Review of Financial Studies*, 1: 331-355.
71. Opler, Tim, Lee Pinkowitz, René Stulz, and Rohan Willaimson. 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52: 3-46.
72. Ozkan A. 2001. Determinants of capital structure and adjustment to long-run target: Evidence from UK company panel data. *Journal of Business Finance and Accounting*, 28: 175-198.
73. Pinegar, J. Michael and Lisa Wilbricht. 1989. What managers think of capital structure theory: A survey. *Financial Management*, 18: 82-91.
74. Prowse, S.D. 1990. Institutional investment patterns and corporate financial behavior in the U.S. and Japan. *Journal of Financial Economics*, 27: 43-66.
75. Rajan, Raghuram G. and Zingales, Luigi. 1995. What do we know about capital structure? Some evidence from international data. *Journal of Finance*, 50: 1421-1460.
76. Robichek, A. and Stewart C. Myers. 1966. Problems in the theory of optimal capital structure. *Journal of Financial and Quantitative Analysis*, 1: 16-19.
77. Ross, Stephen A. 1977. The determination of financial structure: The incentive-signalling approach. *Bell Journal of Economics*, 8: 23-40.
78. \_\_\_\_\_. 1985. Debt and taxes and uncertainty. *Journal of Finance*, 40: 637-657.
79. Scott Jr., David F. 1972. Evidence on the importance of financial structure. *Financial Management*, 1: 45-50.
80. \_\_\_\_\_. and John D. Martin. 1975. Industry influence on financial structure. *Financial Management*, 4: 67-73.
81. Scott Jr., James H. 1976. A theory of optimal capital structure. *Bell Journal of Economics*, 7: 33-54.
82. \_\_\_\_\_. 1977. Bankruptcy, secured debt, and optimal capital structure. *Journal of Finance*, 32: 1-20
83. Sheard, Paul. 1989. The main bank system and corporate monitoring and control in Japan. *Journal of Economic Behaviour and Organization*, 11: 399-422,
84. Shyam-Sunder, L. and Stewart C. Myers. 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, 51: 219-244.

85. Schmidt, Reinhard H. 1976. Determinants of corporate debt ratios in Germany. European Finance Association Proceedings, Amsterdam: North Holland.
86. Schwarz, E. and J.R. Aronson. 1967. Some surrogate evidence in support of the concept of optimal capital structure. *Journal of Finance*, 22: 10-18.
87. Smith, Clifford W. and Jerold B. Warner. 1979. Bankruptcy, secured debt, and optimal capital structure: Comments. *Journal of Finance*, 34: 247-251.
88. Solnik, Bruno H. and Jean Grall. 1974/5. Eurobonds: Determining the demand for capital and the international interest rate structure. *Journal of Bank Research*, 5: 218-230.
89. Stiglitz, Joseph. 1969. A reexamination of the Modigliani-Miller Theorem. *American Economic Review*, 59: 784-793.
90. Stulz, René M. and H. Johnson. 1985. An analysis of secured debt. *Journal of Financial Economics*, 14: 501-521.
91. \_\_\_\_\_. 1990. Managerial discretion and optimal financing policies. *Journal of Financial Economics*, 26: 3-28.
92. Taggart Jr., Robert A. 1977. A model of corporate financing decisions. *Journal of Finance*, 32:1467-1484.
93. Titman, S. and Wessels, R. 1988. The determinants of capital structure choice. *Journal of Finance*, 43: 1-19.
94. Toy, N., A. Stonehill, L. Remmers, R. Wright, and T. Beekhuisen. 1974. A comparative international study of growth, profitability, and risk as determinants of corporate debt ratios in the manufacturing sector. *Journal of Financial and Quantitative Analysis*, 9: 875-886.
95. Walsh, E.J. and J. Ryan. 1997. Agency and tax explanations of security issuance decisions. *Journal of Business Finance and Accounting*, 24: 943-961.
96. Warner, J. 1977. Bankruptcy costs: Some evidence. *Journal of Finance*, 32: 337-347.
97. White, W.L. 1974. Debt management and the form of business financing. *Journal of Finance*, 29:565-577.
98. Wruck, K.P. 1994. Financial policy, internal control and performance: Sealed Air Corporation's leverage special dividends. *Journal of Financial Economics*, 36: 157-192.

## Appendix

Table A

### Summary Statistics

Summary statistics of the variables used for testing the signaling effect of capital structure. The market value ( $\Delta MV_t$ ) is the dependent variable, and the other variables are the independents. The  $\Delta$  is measured as  $(t) - (t - 1)$  for all variables except for  $\Delta DR^* = (DR^*_{t+1} - DR_t)$ . The data cover the period from 1997 to 2003. The sample consists of 99 non-financial firms.

Variables	Ratio/Proxy	Mean	Median	SD	Min	Max
Market Value	$\Delta MV$	40149.2	2278.11	347696.5	-1134977	2896463
Total Debt Ratio	$\Delta TDR$	-0.02	-0.009	0.57	-7.54	6.13
Target Debt Ratio	$DE_{t+1}$	2.62	1.65	2.74	0	17.14
	$\Delta DR^*$	-0.01	0.0006	0.38	-6.13	4.52
Average Industry Leverage	$\Delta DR_{AVG}$	-0.01	-0.01	0.14	-0.54	0.48
Structure of Tangible Assets	$FATA_t$	0.24	0.18	0.29	0.002	5.33
Relative Tax Effects	$\Delta NDTAX_t$	-0.02	0	0.22	-4.37	0.24
	$ECTR_t$	2.002	0.0005	41.9	0	932.49
	$\Delta NDTA_t$	-0.002	0	0.08	-0.90	0.79
Growth	$CETA_t$	5.48	1.01	12.14	0	123.27
	$GTA_t$	0.21	0.05	1.12	-0.91	15.05
	$SG_t$	0.08	0.02	0.93	-0.95	8.58
	$ASTURN_t$	0.74	0.56	0.85	0.01	13.52
Investment Growth Opportunities	High $MB_t$	0.05	0	0.21	0	1
	Medium $MB_t$	0.27	0	0.44	0	1
	Low $MB_t$	0.67	1	0.46	0	1
Bankruptcy Risk	$BR_t$	-61068.7	-14851.5	211041.6	-3692500	18485.7
	$DCR_t$	79.6	3.008	1146.35	-8.81	25342.5
Agency Costs	$ER_t$	0.15	0.11	0.16	0.006	1.84
	$AUR_t$	0.74	0.56	0.85	0.01	13.52
Uniqueness	$SES_t$	0.08	0.05	0.13	0	1
Industry Classification	$IC_1$	0.03	0	0.17	0	1
	$IC_2$	0.01	0.01	0	0.10	0
	$IC_3$	0.09	0	0.28	0	1
	$IC_4$	0.08	0	0.27	0	1
	$IC_5$	0.06	0	0.23	0	1
	$IC_6$	0.06	0	0.23	0	1

Table A (continuous)

Variables	Ratio/Proxy	Mean	Median	SD	Min	Max
	IC <sub>7</sub>	0.07	0	0.25	0	1
	IC <sub>8</sub>	0.12	0	0.32	0	1
	IC <sub>9</sub>	0.21	0	0.41	0	1
	IC <sub>10</sub>	0.07	0	0.25	0	1
	IC <sub>11</sub>	0.10	0	0.30	0	1
	IC <sub>12</sub>	0.03	0	0.17	0	1
	IC <sub>13</sub>	0.03	0	0.17	0	1
	IC <sub>14</sub>	0.03	0	0.17	0	1
Size $LnAssets_t$	Large Size	0.30	0	0.46	0	1
	Medium Size	0.34	0	0.47	0	1
	Small Size	0.35	0	0.47	0	1
Profitability	$\Delta EBITDA_t$	-0.02	-0.006	0.80	-12.25	12.25
	$\Delta OIS_t$	-0.003	0.003	0.27	-3.36	3.43
	$\Delta OIA_t$	-0.02	-0.006	0.79	-12.24	12.28
	$\Delta PM_t$	0.0003	0.004	0.26	-3.12	2.30
	$\Delta ROI_t$	-0.01	-0.002	0.79	-12.42	12.43
Financial Flexibility	$REA_{t+1}$	0.21	0.16	0.24	0	4.13
	$\Delta REA_t$	-0.007	0.007	0.28	-3.73	3.72
Liquidity Position	$\Delta QR_t$	-0.03	0.02	0.99	-18.38	2.33
	$\Delta WCR_t$	0.29	0.01	3.40	-35.21	43.46
	$\Delta CashR_t$	-0.31	-0.0001	6.21	-137.95	1.97
	$\Delta CR_t$	-0.01	0.01	0.99	-18.08	6.13
Interest Rate	$IR_t$	0.14	0.13	0.01	0.12	0.16
Timing Effect	$\Delta PE_t$	6.86	0.02	107.9	-415.08	2056.9
Transaction Costs	$DPR_t$	0.93	0.34	11.31	0	251.6
Free Cash Flow	$FCF_t$	-2118.6	-7713	216753.5	-1294370	1702655
Time Effects	$t$	3	3	1.42	1	5
Observations		495	495	495	495	495