

Capital Structure Adjustment, Speed of Adjustment and Optimal Target Leverage among Firms Quoted on the Nairobi Stock Exchange

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Abstract

The literature provides conflicting assessments about how firms choose their capital structures, with the trade off, pecking order and market timing hypothesis all receiving some empirical support. The study's objectives were to determine whether firms in Kenya have an optimal target leverage, whether an adjustment towards this target takes place and finally to ascertain the speed of adjustment towards this target leverage. Secondary data was collected from the records maintained at NSE. From these records financial statements for 12 years starting from the year 1999 to 2010, were extracted. Out of the 30 firms targeted, only 23 firms met the criteria of having complete data for at least ten years. Analysis was done using descriptive statistics together with a partial regression model. Estimations from the model established that firms in Kenya do have target capital structure. On average however, a typical firm closes about 5.3% of the gap between the current and the desired leverage within one year. At this rate it takes about 10 years to close half of the gap between a typical firm's current and the desired leverage ratios. The slow adjustment is consistent with the hypothesis that other considerations such as market timing or pecking order outweigh the costs of deviating from the optimal leverage.

Key words: Capital Structure, Adjustment, Speed, Target Leverage, Quoted Firms, Nairobi Stock Exchange

Introduction

Capital structure is arguably the core of modern corporate finance (Drobtz and Wanzenried, 2006). While Modigliani and Miller (1958) derived conditions under which capital structure is irrelevant for firm valuation, the subsequent theoretical literature has shown that a firm can influence its value and improve its future prospects by varying its optimal ratio between debt and equity. Fama and French (2002) argue that the two competing models of financing decisions are the trade off theory and the pecking order theory. The trade off theory model is whereby firms identify their optimal leverage by weighing the costs and benefits of an additional dollar of debt. The alternative model is the pecking order model of financing decisions which was developed by Myers (1984).

Brealey and Myers (2003) define capital structure as the firm's mix of different securities used in financing its investments. They observe that a firm can issue dozens of distinct securities in countless combinations, but it tries to find the particular combination that maximizes its overall market value. When a firm is financed entirely by common stock then all the cash flow from investments belong to the stockholders. However when it issues both debt and equity securities, it undertakes to split up the cash flows into streams such that a relatively safe stream goes to the debt-holders whereas a more risky one goes to the stockholders. An adjustment towards target capital structure stems from the trade off theories of capital structure. According to Hovakimian, Hovakimian and Tehranian (2004), trade off theories of corporate capital structure are built around the concept of target capital structure, which balances various costs and benefits of debt and equity.

The benefits of debt include, for example, the tax deductibility of interest and the reduction of free cash flow problems whereas the costs of debt include potential bankruptcy costs and agency conflicts between stockholders and bondholders (Fama and French, 2002). At the optimum leverage, the benefit of using debt finance just offsets the cost. Dynamic versions of the trade off theories posit that companies would undo the effects that random shocks have on their capital structures by actively re-adjusting them towards their target levels (Reinhard & Li, 2010). A survey by Graham and Harvey (2001) shows that 81% of firms consider a target debt ratio or a target range when making their financing options. Other studies have empirically analyzed how long it takes companies that try to adjust their capital structures towards their desired capital structure target levels (Antoniou, Guney, & Paudyal, 2008; Fama & French, 2002; Flannery & Rangan, 2006). Depending on the regression model and technique used, these studies typically find that companies adjust their capital structures and with a speed of around 10-30 per cent per year towards their capital structure targets.

Using Generalized Method of Moments (GMM) estimation procedure, Ozkan (2001) finds that firms have target leverage ratios and they adjust to the target ratio relatively fast implying that the costs of being away from their target ratios and the cost of adjustments are both important for firms. Antoniou et al. (2008) use a panel of data and a two-step system-GMM procedure. They show that firms appear to have target leverage ratios but the speed at which they adjust their capital structure towards the target varies by country, with French being fastest and Japanese slowest.

The trade off theory suggests that firms have a target capital structure and managers adjust the ratios towards this target. The speed of adjustment depends on the cost of adjustment relative to the cost of being off target (Hovakimian, Opler and Titman, 2001). According to Antoniou et al. (2008) an examination of the effect of a one period lagged leverage on the current leverage should shed light on whether firms have a target capital structure and if so, what their speed of adjustment is. A positive and below unity coefficient would suggest that firms have a target leverage ratio and revise their capital structure over time. A coefficient greater than one, implies that firms do not have any target debt-equity ratio.

Studies exist in the literatures which focus on the determinants of adjustment to financial targets as well as providing more direct evidence that firms adjust toward a target debt ratio. These studies also shed some light on the likely determinants of speeds of adjustment toward target debt ratios. Taggart (1977) for instance provides evidence that the speeds of adjustment to the long-term capital targets are relatively slow and that liquid assets and short-term debt play an important role in the adjustment process. Marsh (1982) using a logit model, analyses the choice of financing instrument of companies and argues that this choice depends on the difference between the company's current and target debt ratios. His results suggest that companies try to maintain their long-term target debt levels, although they deviate from these targets in the short run in response to capital market conditions. The study also provides evidence that long-term target debt levels are influenced by operating risk, company size and asset composition.

Jalilvand and Harris (1984) look at the determinants of speeds of adjustment to long term financial targets where the speed of adjustment is allowed to vary across companies and over time. Their results suggest that firm size, interest rates and stock price levels affect speeds of adjustment. In a related work, Shyam-Sunder and Myers (1999) test a benchmark target-adjustment model against a pecking order model and report that the target adjustment model appears to be superior. In a more recent study Drobetz and Wanzenried (2006) use a sample of 90 Swiss firms over the years from 1991 to 2001. Using a dynamic capital structure model, they conclude that faster growing firms and those that are further away from their optimal capital structure adjust more readily.

The two major theories of capital structure that have been widely studied are the trade off and the pecking order theories. Target adjustment behavior has been used in support for the trade off theory and against the pecking order theory. Essentially therefore the two theories appear to have what Reinhard and Li (2010) refer to as "horse race". Unsatisfied with the empirical evidence for both the pecking order theory and the traditional trade off theory of capital structure, Fama and French (2005) conclude that it is time to stop running horse races between the two theories as stand-alone stories for capital structure. It is best to regard the two models as stable mates with each other having elements of truth that help explain some aspects of financing decisions. The Nairobi Stock Exchange (NSE) has a long history that can be traced to the 1920s when it started trading in shares while Kenya was still a British Colony (Ngugi & Njiru, 2005). The NSE was constituted in 1954 as a voluntary association of stockbrokers registered under societies Act (NSE, 1997).

The newly established stock exchange was charged with responsibility of developing the stock market and regulating trading activities. According to Ngugi and Njiru (2005) the stock market is yet to make significant contribution in the development process. However NSE plays a big role by facilitating the mobilization of capital for development. It provides savers in Kenya with an alternative saving tool. Funds that would otherwise have been consumed or deposited in the banks accounts are redirected to promote growth in various sectors of the economy as people invest in securities. Long term savings are mobilized for financing long term ventures through competitive pricing mechanisms.

Problem of Research

The concept of target capital structure plays an important role in many models of corporate financing. Hovakimian et al. (2001) defines target leverage ratio as the ratio that firms would choose in the absence of information asymmetries, transaction costs and other adjustment costs. According to the static trade-off theory (Modigliani & Miller, 1963), for instance, firms optimize their structure by trading off the tax benefit of debt financing against the costs of financial distress. In the agency theoretical models (e.g., Jensen & Meckling, 1976; Stulz, 1990), target leverage minimizes the sum of the agency costs of managerial discretion associated with equity financing and the agency costs of debts, such as the cost of underinvestment (Myers, 1977) and asset substitution (Jensen & Meckling, 1976). In a signaling model (e.g., Ross, 1977), target leverage is determined by trade-off between the benefits associated with a higher market value and the cost of credibly signaling to the market that the value is high.

Besides the significance of target capital structure, it is well documented (Marsh, 1982; Fama & French, 2002; Flannery & Rangan, 2006) that firms deviate from their target leverage ratios, and that they do not rapidly adjust back to their target. The rate at which firms adjust depends on the relative costs of being away from their target compared to the cost of adjustment. One such cost of adjustment is the degree to which the firm's equity is over or undervalued in the market place.

The concept of target capital structure plays an important role in many models of corporate financing. Hovakimian et al. (2001) has defined target leverage ratio as the ratio that firms would choose in the absence of information asymmetries, transaction costs and other adjustment costs. According to the static trade off theory (Modigliani & Miller, 1963; Myers, 1984) firms optimize their structure by trading off the tax benefit of debt financing against the costs of financial distress. In the agency theoretical models (e.g., Jensen & Meckling, 1976; Stulz, 1990), target leverage minimizes the sum of the agency costs of managerial discretion associated with equity financing and the agency costs of debts, such as the cost of underinvestment (Myers, 1977) and asset substitution (Jensen & Meckling, 1976). In a signaling model (e.g., Ross, 1977), target leverage is determined by trade-off between the benefits associated with a higher market value and the cost of credibly signaling to the market that the value is high.

In spite of the significance of target capital structure, it is well documented (e.g., Marsh, 1982; Leary and Roberts, 2005; Flannery & Rangan, 2006) that firms deviate from their target leverage ratios, and that they do not rapidly adjust back to their target. The rate at which firms adjust depends on the relative costs of being away from their target compared to the cost of adjustment. One such cost of adjustment is the degree to which the firm's equity is over or undervalued in the market place. Myers (1984) contrasted the trade off theory of capital structure. He came up with the "pecking order" theory, under which information asymmetries lead managers to perceive that the market generally under prices their shares. In view of that, investments are financed first with internally generated funds, after which the firm will issue safe debt if internal funds prove insufficient. Equity is only used as a last resort. Accordingly, as far as pecking order is concerned, observed leverage reflects primarily a firm's historical profitability and investment opportunities. Meaning firms have no strong preference about their leverage ratios and therefore do not reverse changes caused by financing needs or earnings growth.

In addition there are two theories that further reject the notion of adjustment towards a target leverage ratio. Firstly, Baker and Wurgler (2002) argue that a firm's capital structure reflects cumulative ability to sell overpriced equity shares. They further argue that share prices normally fluctuate around "true" values, and managers tend to issue shares when firm's market to book ratio is high (the market timing theory). Unlike the pecking order hypothesis the market timing theory asserts that managers routinely exploit information asymmetries to benefit the current shareholders. Similar to the pecking order hypothesis, there should be no reversion to a target capital ratio if market timing is dominant influence on a firm's leverage.

Secondly Welch (2004) argues that managerial inertia permits stock changes to have a prominent effect on market-valued debt ratios. He posits that over reasonably long time frames, the stock price effects are considerably more important in explaining debt-equity ratio than all previously identified proxies together. Trade off theory maintains that market imperfections cause a link between leverage and firm value, thereby making firms to take positive steps to offset deviations from their optimal debt ratio (Flannery and Rangan, 2006). The speed with which firms reverse deviations from target debt ratios depends on the cost of adjusting leverage. With zero adjustment costs, the trade off theory implies that firms should never deviate from their optimal leverage.

The existing literature provides mixed results on the speed of adjustment towards target financial leverage. Fama and French (2002) estimate a speed of adjustment of 7-18% per year. Lemon, Roberts and Zender (2008) find that capital structure is so persistence that cross-sectional distribution of leverage in the year prior to the initial public offering predicts leverage twenty years later, yet they estimate a relatively rapid speed of adjustment of 25% per year for book leverage. Furthermore both Leary and Roberts (2005) and Alti (2006) find that the effect of equity issuance on leverage completely vanishes within two to four years, suggesting fast adjustment toward target leverage. Flannery and Rangan (2006) show that firms do target a long run capital structure and estimate an even faster speed of adjustment that is 35.5% per year using market leverage and 34.4% per year using book leverage, suggesting that it takes about 1.6 years for a firm to remove half of the effect of a shock on its leverage. This adjustment speed is roughly faster than existing estimates in the literature thereby affording targeting behavior an empirically important effect on firms observed capital structures. Furthermore when they (Flannery and Rangan, 2006) added market timing or pecking order variables to their base specification, they found some support for these theories. However, they also found out that more than half of the observed changes in capital structures can be attributed to targeting behavior while market timing and pecking order considerations explain less than 10%.

Drobetz and Wanzenried (2006) use dynamic adjustment model and panel data methodology to investigate the determinants of time varying target capital structure. Their sample comprises a panel of 90 Swiss firms over the years 1991 to 2001. They observe that faster growing firms and those that are further away from their target optimal capital structure adjust more readily. Finally, Antoniou et al. (2008) who analyze the financing decisions of companies from the USA, UK, Germany, France and Japan over the years from 1987 to 2000 find also some support for consideration that companies adjust their capital structures towards target levels. Local studies (Kamere, 1997; Omondi, 1996; Odinga, 2003) constitute important steps towards more realistic tests of determinants of capital structure. However, these studies have not captured the concept of target leverage and the adjusting process towards target leverage. Some studies have focused more on testing the pecking order hypothesis. Kiogora (2000) for instance using regression model finds a negative relationship between returns of firms quoted on the Nairobi Stock Exchange and their level of leverage; consistent with the pecking order prediction. Omondi (1996) on the other hand finds that firms with high return on investment use relatively high debt. Gachoki (2005) finds that firms listed on the NSE follow the pecking order theory of capital structure.

A more recent study carried out by Ngugi (2008) investigated capital financing behaviour of firms listed on the Nairobi Stock Exchange. The results show that a pecking order model with an adjustment process cannot be rejected. Specifically, the study finds that the main determinants of capital financing behaviour consist of information asymmetries, non-debt tax shields and local capital market infrastructure. This study extended the empirical research on the subject of target capital structure by focusing on the dynamics of capital structure decisions and the nature of adjustment process. A study by Flannery and Rangan (2006) show that more than half of the observed changes in capital structures can be attributed to targeting behaviour whereas market timing and pecking order considerations explain less than 10%. More studies needed to be done locally to test whether firms in Kenya have an optimal target debt ratio and whether adjustment process towards this target is supported. Local studies have somewhat ignored the testing of an adjustment towards a target leverage. It is this gap that the study sought to fill.

Research Focus

While studies that have been done locally (Kamere, 1997; Omondi, 1996; Odinga, 2003) constitute important steps towards more realistic tests of determinants of capital structure, they still remain silent on concept of target leverage and the adjusting process towards target leverage by firms operating in Kenya. Some studies have focused more on testing the pecking order hypothesis.

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The study therefore undertook to answer the following research questions; to what extent is targeting behavior an empirically important effect on Kenyan firms' observed capital structures? How apparent do these firms deviate from their optimal debt ratio and then adjust back to it? What is the speed of adjustment?

The objective of the study was to test whether firms quoted on the Nairobi stock exchange adjust their capital structure towards a target. The study would thus help in establishing whether the trade off theory has an explanatory power of capital structure choices in Kenya and whether the empirical evidence suggested by studies carried out outside Kenya hold locally. The specific objectives were;

- i) To determine whether firms quoted on the Nairobi stock exchange have optimal target leverage.
- ii) To test whether an adjustment towards target capital structure takes place among firms quoted on the Nairobi stock exchange.
- iii) To ascertain the speed of adjustment to the target capital structure among firms quoted on the Nairobi stock exchange.

Methodology of Research

General Background of Research

Descriptive research design was used to test whether companies quoted on the NSE adjust towards a target capital structure. Descriptive research design is concerned with finding out "what is" and can either be quantitative or qualitative since it involves gathering data that describes events and then organizes, tabulates, depicts and describe the data collection. The study involved gathering financial statements of firms quoted on the NSE for a period of twelve years from 1999 to 2010. The use of descriptive statistics allowed the application of dynamic capital structure model as applied by Drobetz and Wanzeried (2006), Flannery and Rangan (2006) and Ozkan (2001). Dynamic capital structure model captures at least two important features of corporate borrowing behavior. First, firms have a long run optimal target debt ratio which is assumed to be a function of several firm specific characteristics that vary over time, over firms, or both over time and firms. Second, an adjustment process takes place which involves a lag in adjusting to changes in the optimal target debt ratio.

Sample of Research

The population of the study consisted of all the 47 companies listed on the NSE between years 1999 to 2010 (see Appendix 1). The period was chosen in order to capture the most current data since the earlier related studies (Ngugi, 2008) captured data from year 1990 to 1999 and the capital financing behavior may have changed over the years. The sample size was 30 firms, constructed from 47 companies quoted on the NSE. Judgmental sampling was used to select the sample. Following the previous studies (Ozkan, 2001; Flannery & Rangan, 2006) all the 15 firms in the financial and investment sector were excluded. This is because capital structures of these firms are not comparable to those of non financial sectors. Besides the capital structures of financial sectors are highly regulated. The 15 firms are banks, insurance and investment companies. It was also assumed that there might be lack of continuous data for Uchumi Supermarket and Hutchings Biemer Ltd. since they were on suspension. The two firms were therefore also excluded. See details in table 2 below.

Table 1: Firms Sampled

Name of Firm	Targeted Years	No. of Years	Cumulative Years	Remarks
Agricultural Sector				
Kakuzi	1999- 2010	12	12	Included
Sasini	1999- 2010	12	12	"
Commercials & Services				
Cmc Holdings	1999- 2010	12	12	"
Kenya Airways	1999- 2010	12	12	"
Marshals	1999- 2010	12	12	"
Nation Media Group	1999- 2010	12	12	"
Safaricom	1999- 2010	12	3	Excluded
Standard Group Ltd	1999- 2010	12	9	"
Tps Serena	1999- 2010	12	12	Included
Scan Group	1999- 2010	12	5	Excluded
Access Kenya	1999- 2010	12	4	"
Car & General	1999- 2010	12	12	Included
Industrial and Allied				
Athi River Mining	1999- 2010	12	12	Included
Bamburi	1999- 2010	12	12	"
Boc	1999- 2010	12	12	"
Cabacid	1999- 2010	12	6	excluded
Bat	1999- 2010	12	12	Included
Crown Berger	1999- 2010	12	12	"
East African Cables	1999- 2010	12	12	"
E.A.Portland	1999- 2010	12	12	"
E.A.B.L	1999- 2010	12	12	"
Eveready	1999- 2010	12	6	excluded
Sameer Africa	1999- 2010	12	12	Included
Kennol	1999- 2010	12	12	"
Mumias	1999- 2010	12	10	"
Kplc	1999- 2010	12	12	"
Kengen	1999- 2010	12	12	"
Total	1999- 2010	12	12	"
Unga	1999- 2010	12	10	"

Source: Research Data (2012)

Instrument and Procedures

Data was collected using secondary data from annual reports of the quoted companies and records maintained at the NSE. The data extracted included profit before tax (EBIT), market to book value, total debt, and total equity among others. See details in table 2 below.

Table 2: Data Collection Form

Variable	Source-Financial Statements (Records Maintained at NSE)
Profit before tax (EBIT)	Income statement
Market price to book value (Kshs)	Market information section, Balance sheet/Statement of Financial Position, Financial Ratios
Ratio of total assets to total assets	Balance sheet/Statement of Financial position
	Market capitalization / Net asset value
Total debt financing	Non-Current liabilities in the balance sheet
Total market equity financing	Market information section , market capitalization
Total assets	Balance sheet/Statement of Financial position
Net Assets	Balance sheet/Statement of Financial position

Data Analysis

In order to meet the objectives, data was analyzed and tested so as to draw conclusion on whether firms in Kenya consider target leverage and whether an adjustment process towards this target is supported. Both statistical package for the social sciences (SPSS) for windows version 17 and Ms Excel were used to help in data analysis.

To test whether firms quoted on the NSE have target leverage and bearing in mind the possibility that target leverage might differ across firms or over time, it was modeled by specifying a target capital structure ratio. The regression equation was of the form; $MDR_{i,t+1} = \beta X_{i,t}$ which was discussed in chapter two. Secondly to test whether adjustment process takes place, the partial adjustment model as highlighted in chapter two was used. It was of the form $MDR_{i,t+1} - MDR_{i,t} = \lambda(MDR_{i,t+1}^* - MDR_{i,t}) + \delta_{i,t+1}$. The equation can be re written as; $MDR_{i,t+1} = (\lambda \beta)X_{i,t} + (1-\lambda)MDR_{i,t} + \delta_{i,t+1}$.

The symbol λ was used as the adjustment parameter representing the magnitude of adjustment during one period (also termed the speed of adjustment) hence achieving the objective of estimating the speed of adjustment. As explained in chapter two if λ equals one, full adjustment is achieved within one period and actual leverage at the end of the period will equal the target as set out at the beginning of that period. The adjustment parameter provides a proxy for the adjustment costs that the firm faces.

The estimation crucially depended on the correct specification of the target capital structure. Regression and correlation analysis were used to provide preliminary evidence.

Results of Research and Discussions

The study was conducted on a target of 30 firms listed on the NSE. The data used was extracted from these firms' financial statements for a period of 12 years starting from 1999 to 2010. Various analyses were conducted as stipulated in the research methodology. The findings of the study are presented below.

The period targeted for the research study was from 1999 to 2010. The sample was based on the firms with continuous data for at least 10 years. Appendix 3 shows the summary of the firms selected. The missing values for firms selected were set at zero to avoid losing many observations. Out of the 30 firms targeted, 23 firms met the criteria for selection which was set at selecting only firms which had the required data for at least ten years. From the research data, firms categorized under the industrial and allied sector constituted the bulk of the firms sampled which translated to 57%. Next was commercial and services sector at 33% followed by agricultural sector at 10%.

Analysis of Primary Leverage Measure ($MDR_{i,t}$)

The study applied the capital structure adjustments model as set out by Flannery and Rangan (2006). From the model the firm's market debt ratio was computed and used as the primary leverage measure. The values are shown in 3 below.

Table 3: Individual Firm's Market Debt Ratio from 1999 to 2010 ($MDR_{i,t} = (D_{i,t}) / (D_{i,t} + S_{i,t} * P_{i,t})$).

	FIRM	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Average
1	Kakuzi	0.28	0.49	0.6	0.49	0.44	0.36	0.47	0.7	0.71	0.39	0.32	0.25	0.46
2	Rea Vipingo	0.21	0.24	0.17	0.12	0.1	0.13	0.26	0.38	0.57	0.5	0.42	0.04	0.26
3	Sasini	0.4	0.58	0.49	0.16	0.19	0.26	0.43	0.32	0.19	0.08	0.06	0.06	0.27
4	Marshals	0.61	0.49	0.62	0.36	0.4	0.45	0	0.01	0	0.14	0.11	0.02	0.27
5	Car & General	0.21	0.19	0.17	0.13	0.14	0.16	0.08	0.02	0.11	0.11	0.09	0.17	0.13
6	Kenya Airways	0.54	0.8	0.61	0.48	0.43	0.63	0.75	0.79	0.68	0.71	0.7	0.62	0.64
7	CMC	0.05	0.05	0.02	0.03	0.07	0.14	0.14	0.19	0.39	0.6	0.56	0.12	0.2
8	NMG	0	0.01	0.01	0.01	0.02	0	0	0	0.01	0.05	0.12	0.04	0.02
9	TPS	0.21	0.29	0.24	0.23	0.21	0.23	0.15	0.27	0.35	0.41	0.36	0.33	0.27
10	ARM	0.32	0.3	0.21	0.15	0.19	0.29	0.19	0.14	0.29	0.3	0.32	0.3	0.25
11	BOC	0	0.13	0.16	0.02	0.02	0.02	0.02	0.03	0.08	0.07	0.05	0.03	0.05
12	EA Cables	0.21	0.13	0.08	0.07	0.03	0.02	0.02	0.08	0.11	0.11	0.02	0.02	0.07
13	EA Breweries	0.02	0.02	0.01	0.02	0.02	0.02	0.03	0.05	0.12	0.13	0.12	0.13	0.06
14	Sameer Africa	0.31	0.3	0.32	0.35	0.42	0.34	0.29	0.29	0.37	0.34	0.32	0.43	0.34
15	Kenya Oil	0.04	0.07	0.05	0.06	0.04	0.02	0.05	0.08	0.24	0.23	0.08	0.14	0.09
16	Mumias	0.17	0.29	0.08	0.13	0.06	0.13	0.29	0.51	0.6	0.4	0	0	0.22
17	Unga	0	0.31	0.23	0.05	0.07	0.07	0.13	0.2	0.26	0.18	0.14	0.14	0.15
18	Bamburi	0.06	0.1	0.09	0.03	0.03	0.04	0.06	0.05	0.13	0.32	0.19	0.19	0.11
19	Crown Berger	0.08	0.15	0.14	0.08	0.1	0.08	0.07	0.07	0.31	0.38	0.26	0.25	0.16
20	EA Portland	0.3	0.41	0.35	0.28	0.28	0.34	0.52	0.51	0.81	0.83	0.84	0.78	0.52
21	KPLC	0.67	0.64	0.51	0.3	0.31	0.42	0.47	0.88	0.96	0.7	0.58	0.21	0.55
22	Total Kenya	0.4	0.44	0	0	0	0	0	0	0	0	0	0.01	0.07
23	Bat	0.07	0.07	0.07	0.07	0.04	0.03	0.03	0.02	0.1	0.1	0.09	0.12	0.07

Source: Computed from NSE Data (2011)

The above table demonstrates that the market debt ratio ($MDR_{i,t}$) for firms listed on the NSE ranged between an average of 2% to 64% from the lowest to the highest respectively when considering individual firm average for the 12 year period. However the overall mean market debt ratio for the entire period was found to be 23% with a standard deviation of 0.22 as shown in Table 4 below. This is quite an improvement from the findings of Ngugi (2008) which found the debt ratio to be very low by international standards. According Ngugi 2008 the debt ratio declined from 9% to 2% between the first and the second halves of 1990s.

Table 3: Summary of the Overall Descriptive Statistics for the Variables

	No. Of Observations	Mean	Standard Error	Median	Standard Deviation	Sample Variance	Kurtosis	Skewness	Range	Minimum	Maximum	Sum
$MDR_{i,t}$	276	0.23	0.01	0.15	0.22	0.05	0.56	1.10	0.96	0.00	0.96	62.96
Growth (M To B)	253	17.13	1.92	6.50	30.60	936.17	23.92	4.32	252.00	0.00	252.00	4332.70
Tangibility	253	0.74	0.02	0.80	0.33	0.11	1.41	-0.16	2.12	0.00	2.12	187.98
Profitability	253	0.11	0.01	0.11	0.17	0.03	7.28	-1.39	1.43	-0.90	0.53	28.77
Size	253	14.64	0.14	14.67	2.23	4.97	27.46	-4.39	17.95	0.00	17.95	3702.99
$Mdr_{i,t+1}^*$	253	0.23	0.13	0.17	0.21	0.04	0.29	1.00	0.99	-0.13	0.86	57.85
Growth Coef (Mb)	23	-0.02	0.01	-0.01	0.03	0.00	4.33	-1.93	0.13	-0.11	0.02	-0.40
Tangibility Coef	23	0.16	0.14	0.07	0.68	0.46	3.15	1.13	3.37	-1.15	2.21	3.62
Profitability Coef	23	-0.35	0.13	-0.21	0.62	0.39	2.12	-1.46	2.66	-2.08	0.59	-7.99
Size Coef	23	0.11	0.05	0.06	0.23	0.05	1.48	1.11	0.93	-0.25	0.69	2.49

Source: Computed from NSE Data (2011)
Estimation of Target Debt Ratio ($MDR_{i,t+1}^*$)

In the second part of the analysis target debt ratio ($MDR_{i,t+1*}$), which is an estimate of firm's target leverage ratio was estimated. Target debt ratio has been defined by Hovakimian et al. (2001) as the ratio that firms would choose in the absence of information asymmetries, transaction costs and other adjustment costs. The regression model in the form; $MDR_{i,t+1*} = \beta X_{i,t}$, where the $X_{i,t}$ is vector of firm characteristics related to the costs and benefit of operating with various leverage ratios and β is a coefficient vector, was used. Firm specific variables used were growth which was proxied by the ratio of market value to book value of equity, tangibility of which the net fixed tangible assets as a proportion of total asset was used as a proxy, profitability which was proxied by earnings before tax as a proportion of total assets and size of the firm which was proxied by the natural log of total assets.

Table 4 below shows an analysis of target debt ratio, $MDR_{i,t+1*}$ as estimated by the use of firm specific variables explained above.

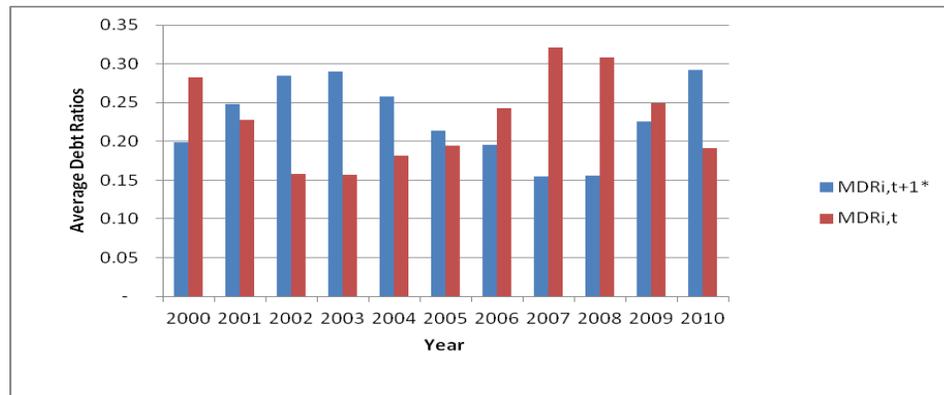
Table 4: Estimated Target Debt Ratio for Individual Firms from 2000 to 2010

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
1	Kakuzi	0.18	0.35	0.47	0.63	0.63	0.49	0.42	0.45	0.5	0.58	0.56	0.48
2	Rea Vipingo	0.07	0.46	0.43	0.46	0.47	0.26	0.15	0.04	0.16	0.18	0.3	0.27
3	Sasini	0.03	0.11	0.13	0.16	0.27	0.42	0.29	0.21	0.11	0.47	0.58	0.25
4	Marshals	0.09	0.02	0.25	0.14	0.06	-0.12	0.4	0.42	0.41	0.57	0.54	0.25
5	Car & General	0.14	0.12	0.11	0.11	0.01	0.09	0.16	0.14	0.14	0.18	0.19	0.12
6	Kenya Airways	0.69	0.67	0.7	0.71	0.73	0.7	0.65	0.41	0.47	0.62	0.79	0.65
7	CMC	0.33	0.42	0.42	0.3	0.26	0.23	0.2	0.14	-0.01	-0.13	0.08	0.2
8	NMG	0.05	0.08	0.06	0.02	0	0.02	0.02	0.02	-0.02	-0.01	0.03	0.02
9	TPS	0.32	0.36	0.31	0.29	0.32	0.27	0.23	0.18	0.25	0.27	0.24	0.28
10	ARM	0.3	0.29	0.29	0.25	0.22	0.2	0.27	0.22	0.12	0.19	0.32	0.24
11	BOC	0.05	0.08	0.05	0.04	0.05	0.05	0.03	0	0.01	0.15	0.12	0.06
12	EA Cables	0.05	0.06	0.08	0.08	0.07	-0.01	0.02	0.02	0.08	0.1	0.14	0.06
13	EABL	0.14	0.12	0.1	0.1	0.08	0.05	0.02	0.02	0.01	0	0.02	0.06
14	Sameer	0.41	0.36	0.31	0.36	0.32	0.31	0.35	0.41	0.31	0.33	0.29	0.34
15	Kennol	0.12	0.12	0.18	0.19	0.14	0.12	0.02	0.03	0.02	0.07	0.07	0.1
16	Mumias	0	0	0.31	0.46	0.58	0.23	0.06	0.05	0.15	0.2	0.34	0.22
17	Unga	0.06	0.18	0.2	0.21	0.16	0.15	0.12	0.14	0.17	0.18	0.23	0.16
18	Bamburi	0.2	0.2	0.23	0.17	0.09	0.1	0.05	-0.02	0	0.1	0.1	0.11
19	Crown Berger	0.25	0.27	0.3	0.3	0.1	0.15	0.11	0.06	0	0.17	0.17	0.17
20	EA Portland	0.8	0.76	0.79	0.75	0.59	0.57	0.33	0.18	0.3	0.44	0.46	0.54
21	KPLC	0.13	0.6	0.72	0.86	0.81	0.61	0.54	0.37	0.31	0.42	0.68	0.55
22	Total	0.02	0.03	0.02	-0.01	0.04	0.01	0.02	0.01	0	0.02	0.41	0.04
23	Bat	0.12	0.1	0.09	0.09	0.02	0.03	0.03	0.04	0.08	0.08	0.06	0.07

Source: Computed from NSE data (20110)

For all the firms sampled the target debt ratio estimated was not the same as the actual debt ratio. For instance in the year 2010 Kakuzi Ltd's actual debt ratio was 28% whereas the estimated target debt ratio was 56%. For the same period Marshals Ltd had an actual debt ratio of 61% while the estimated target was 54%. The overall estimated target debt ratio averaged 22.8% with a standard deviation of 21% (Table 3), which is not far from the actual cross sectional averages.

Table 4 therefore confirms that firms listed on the Nairobi Stock Exchange have target debt ratio which is different from the actual observed debt ratio at any point in time. It is however important to note that on average the estimated target debt ratios do not vary significantly from the reported market debt ratio at time t ($MDR_{i,t}$). As is illustrated in figure 1 below, the average estimated debt ratios, $MDR_{i,t+1*}$ and the average reported debt ratios at time t, ($MDR_{i,t}$) were within the same range of not more than 35%.

Figure 1: Cross Sectional Averages of Debt Ratios

Source: Research Data (2011)

Analysis of Coefficient of Firm Specific Variables

Table 5 below shows an analysis of coefficients of firm specific variables used in estimating target debt ratio. Mean values together with the corresponding t statistics have been shown.

Table 5: Coefficients for the Firm Specific Variables

	Intercept	Growth Coef	Tangibility Coef	Profitability Coef	Size Coef
Kakuzi	5.004	-0.030	-0.677	-0.156	-0.246
Rea Vipingo	2.773	-0.067	-1.153	-0.833	-0.092
Sasini	-6.387	-0.027	2.213	0.116	0.322
Marshals	-7.229	-0.112	-0.030	-0.046	0.612
Car & General	-1.487	-0.008	0.134	0.067	0.115
Kenya Airways	0.048	-0.017	-0.049	-0.413	0.046
Cmc Holdings Ltd	1.972	0.000	0.618	-1.551	-0.124
Nation Media Group	-0.975	0.000	0.074	-0.380	0.072
Tps (Serena)	-0.567	-0.002	0.632	-0.422	0.022
Athi River Mining	-1.131	-0.006	-0.021	-1.531	0.110
Boc	-0.001	0.001	-0.520	-0.515	0.028
Ea Cables	-0.987	-0.001	-0.112	-0.211	0.088
Ea Breweries	0.492	-0.001	0.114	0.039	-0.029
Sammeer Africa	-10.264	0.022	1.243	-0.339	0.686
Kenya Oil	-0.279	-0.001	0.179	0.291	0.017
Mumias	0.005	-0.002	-0.449	-2.079	0.056
Unga	-0.004	-0.027	-0.116	-0.158	0.024
Bamburi	-2.678	-0.006	0.170	-0.213	0.170
Crown Berger	0.274	-0.031	-0.145	-0.097	0.011
Ea Portland	3.293	-0.020	0.701	0.173	-0.196
Kplc	-5.445	-0.061	0.165	-0.316	0.364
Total Kenya	-5.145	0.003	0.722	0.585	0.300
Bat	-1.863	-0.003	-0.074	-0.004	0.132
Mean		-0.0172	0.1574	-0.3475	0.108
t statistics		2.062	0.3877	0.688	2.346

Source: Research Data (2011)

The coefficient of growth opportunities as proxied by market to book ratio of equity is negative (-0.0172). It was established that 20 out of 23 firms translating to 87% of the total firms sampled had growth coefficients below zero. Only 3 firms representing 13% had coefficients slightly above zero. The negative impact of growth opportunities on leverage might reveal several features of borrowing behavior of firms listed on the NSE. It may give support to the prediction that firms which have a relatively large proportion of intangible assets cannot support a high leverage ratio.

This evidence is also consistent with the view that firms with greater growth opportunities might have lower leverage ratios due to underinvestment and asset substitution problems that may arise with risky debt. It should however be noted that there may be other potential reasons for the negative coefficient of the market to book ratio. For instance, this may stem from the tendency of firms to issue stock when their stock price is high relative to their earnings or book value. This would imply that the negative correlation between leverage and the market to book ratio is driven by firms that issue significant amount of equity (Rajan and Zingales, 1995).

Table 5 also shows that current profitability of firms exerts a negative influence on firms' borrowing. The negative sign of profitability is consistent with the pecking order hypothesis that predicts preference for internal finance rather than external finance.

For firm size, the study revealed a positive relationship with leverage (+0.108). This is consistent with the earlier studies such as Titman and Wessels (1988) as well Flannery and Rangan (2006). The finding is also consistent with the trade off theory but against the pecking order theory which predicts a negative relationship between leverage and size, with larger firms exhibiting increasing preference for equity relative to debt.

Asset Tangibility which was proxied by the ratio of fixed assets to total assets has revealed a positive relationship with leverage (+0.1574). Previous studies such as Fama and French (2002) argue that the ratio of fixed asset to total assets is an important determinant of capital structure.

Estimation of the Speed of Adjustment

In order to determine the speed of adjustment to target leverage, the study used a model that permitted partial adjustment of the firm's capital ratio towards its target within each time period. The standard adjustment model used and which was elaborated in chapter two was; $MDR_{i,t+1} - MDR_{i,t} = \lambda(MDR_{i,t+1}^* - MDR_{i,t}) + \delta_{i,t+1}$

Where λ obtained is the speed of adjustment to the target debt ratio starting from time t . The distance $(MDR_{i,t+1}^* - MDR_{i,t})$ is the total amount that the debt ratio must change to bring the firm back to its target debt ratio. The Table 6 below shows detailed results for the estimation of adjustment speed for the firms listed on the NSE.

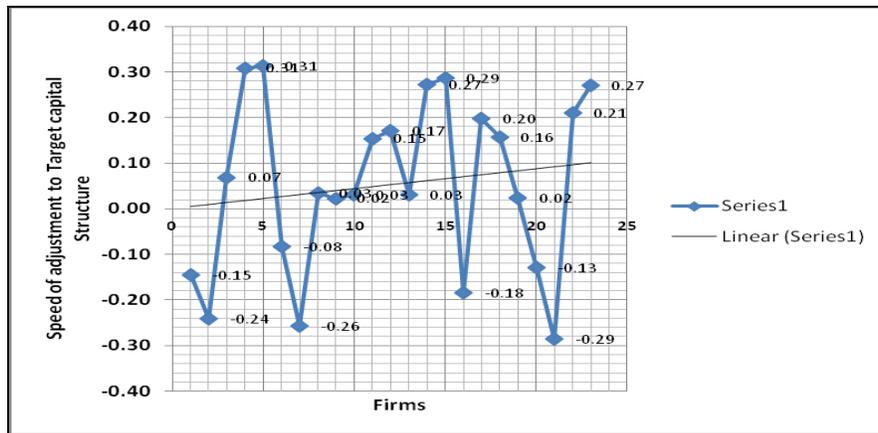
Table 6: Regression Results for Estimating the Speed of Adjustment (λ)

			<i>Coefficients</i>	<i>Standard Error</i>	<i>T Stat</i>	<i>P-Value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
1	Kakuzi	X Variable 1	-0.15	0.47	-0.31	0.77	-1.24	0.95	-1.24	0.95
2	Rea Vipingo	X Variable 1	-0.24	0.21	-1.18	0.27	-0.71	0.23	-0.71	0.23
3	Sasini	X Variable 1	0.07	0.35	0.20	0.85	-0.74	0.88	-0.74	0.88
4	Marshals	X Variable 1	0.31	0.25	1.25	0.24	-0.25	0.87	-0.25	0.87
5	Car & General	X Variable 1	0.31	0.23	1.36	0.21	-0.21	0.83	-0.21	0.83
6	Kenya Airways	X Variable 1	-0.08	0.22	-0.37	0.72	-0.59	0.42	-0.59	0.42
7	Cmc Holding	X Variable 1	-0.26	0.40	-0.64	0.54	-1.16	0.64	-1.16	0.64
8	Nation Media	X Variable 1	0.03	0.36	0.09	0.93	-0.77	0.84	-0.77	0.84
9	Tps Serena	X Variable 1	0.02	0.18	0.12	0.90	-0.39	0.43	-0.39	0.43
10	ARM	X Variable 1	0.03	0.23	0.14	0.89	-0.48	0.54	-0.48	0.54
11	Boc	X Variable 1	0.15	0.33	0.47	0.65	-0.60	0.91	-0.60	0.91
12	Ea Cables	X Variable 1	0.17	0.45	0.38	0.71	-0.84	1.18	-0.84	1.18
13	Ea Breweries	X Variable 1	0.03	0.14	0.22	0.83	-0.28	0.35	-0.28	0.35
14	Sameer Africa	X Variable 1	0.27	0.10	2.68	0.03	0.04	0.50	0.04	0.50
15	Kenya Oil	X Variable 1	0.29	0.29	1.00	0.34	-0.36	0.94	-0.36	0.94
16	Mumias	X Variable 1	-0.18	0.36	-0.52	0.62	-1.01	0.64	-1.01	0.64
17	Unga	X Variable 1	0.20	0.36	0.56	0.59	-0.62	1.02	-0.62	1.02
18	Bamburi	X Variable 1	0.16	0.28	0.55	0.59	-0.48	0.80	-0.48	0.80
19	Crown Berger	X Variable 1	0.02	0.25	0.10	0.93	-0.54	0.59	-0.54	0.59
20	Ea Portland	X Variable 1	-0.13	0.13	-0.98	0.35	-0.43	0.17	-0.43	0.17
21	Kplc	X Variable 1	-0.29	0.28	-1.03	0.33	-0.91	0.34	-0.91	0.34
22	Total	X Variable 1	0.21	0.35	0.61	0.56	-0.58	1.00	-0.58	1.00
23	Bat	X Variable 1	0.27	0.19	1.40	0.19	-0.17	0.71	-0.17	0.71

Source: Computed from NSE Data (2011)

The study found that the value of λ for firm listed in the NSE ranged between -0.29 and 0.31 as shown in Table 6. Some firms were found to have positive value of λ while others had negative value of λ , but in all the firms, the value for the speed of adjustment (λ), was less than one indicating that firms listed on the NSE partially adjust to the target debt ratio. There was no case of instantaneous adjustments or over adjustment since there were no values that equaled to 1 or greater than 1. Figure 2 shows an overview of speed of adjustment for the 23 firms.

Figure 2: Overview of Speed of Adjustment



Source: Research Data (2011)

Ignoring the extremes of negative signs witnessed on some seven firms, on average, the adjustment speed was estimated at a mean of 16%. On overall however when the seven firms were included the rate dropped to 5.3%. This implies that firms quoted at the NSE close about 5.3% of the gap between the current and desired leverage within one year. At this rate it takes about 10 years to close half of the gap between a typical firms’ current and the desired leverage ratios.

The slow adjustment is consistent with the hypothesis that other considerations such as market timing or pecking order outweigh the costs of deviating from the optimal leverage. With such a low estimated speed, converges towards a long run target seems unlikely to explain the bulk of variations in firms debt ratio.

As explained in chapter two, rewriting the target adjustment model in equation $MDR_{i,t+1} - MDR_{i,t} = \lambda(MDR_{i,t+1}^* - MDR_{i,t}) + \delta_{i,t+1}$ and treating target leverage $MDR_{i,t+1}^*$ as linearly dependent on the capital structure determinants as specified in equation yields the following expression for leverage at time t+1; $MDR_{i,t+1} = (\lambda\beta)X_{i,t} + (1-\lambda)MDR_{i,t} + \delta_{i,t+1}$. The equation implies that managers take actions to close the gap between where they are ($MDR_{i,t}$) and where they wish to be ($\beta X_{i,t}$). This therefore implies that the coefficient of lagged leverage, $MDR_{i,t}$ is equal to $(1-\lambda)$ that is $1-0.053=0.947$. According to Antoniou et al. (2008) a positive and below unity coefficient of one period lagged leverage suggest that firms have a target leverage and revise their capital structure over time. A coefficient that is greater than one implies that firms do not have any target debt ratio.

The estimation results have also revealed that the cost of off target (disequilibrium) for firms listed on the NSE are much lower than the costs of adjustments. The speed of adjustment would be close to one if the costs of being in disequilibrium were much higher than the costs of adjustments. Alternatively it would be close to zero if the cost of adjustments were lower than the cost of being off target. The latter is the case for the firms listed in NSE.

Table 7: T Statistic for Market Debt Ratio (MDR_{i,t})

	t	Std. Deviation	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
2010	5.796	0.19453	0	0.24605	0.1575	0.3346
2009	6.32	0.21435	0	0.28248	0.1898	0.3752
2008	5.308	0.20614	0	0.22814	0.139	0.3173
2007	5.033	0.15028	0	0.1577	0.0927	0.2227
2006	4.991	0.1507	0	0.15684	0.0917	0.222
2005	4.964	0.17556	0	0.18171	0.1058	0.2576
2004	4.501	0.20747	0	0.1947	0.105	0.2844
2003	4.338	0.26792	0	0.24234	0.1265	0.3582
2002	5.563	0.27649	0	0.32074	0.2012	0.4403
2001	6.297	0.23448	0	0.30788	0.2065	0.4093
2000	5.239	0.23284	0	0.26005	0.1568	0.3633
1999	4.737	0.1983	0	0.20029	0.1124	0.2882

Source: Research Data (2011)

From the result shown in table 7 above, the t- statistics for the firm listed in NSE ranged between 4.338 and 6.320, the significance value were found to be less than 0.05 which shows that the data was statistically significant to make conclusion, the standard deviation was low an indication that MDR for listed in the NSE was within the same range as there were no major deviation. The mean difference was found to very low.

Conclusions

The study established that firm specific variables used in the estimation of target debt ratio revealed coefficients which were consistent with the earlier studies in determining target capital structure. The study revealed that the current profitability of firms exerts a negative influence on firms borrowing decisions. The estimated coefficients were significant at the level of 5%. The negative sign of profitability is however consistent with the pecking order hypothesis that predicts preference for internal finance rather than external finance. For firm size, the study revealed a positive relationship with leverage. This is consistent with the earlier studies such as Titman and Wessels (1988) as well Flannery and Ragan (2006). The finding is also consistent with the trade off theory but against the pecking order theory which predicts a negative relationship between leverage and size, with larger firms exhibiting increasing preference for equity relative to debt. Asset Tangibility which was proxied by the ratio of fixed assets to total assets revealed a positive relationship with leverage. Previous studies such as Fama and French (2002) argue that the ratio of fixed asset to total assets is an important determinant of capital structure.

The coefficient of growth opportunities as proxied by market to book ratio of equity was negative. The negative impact of growth opportunities on leverage might give support to the prediction that firms which have a relatively large proportion of intangible assets cannot support a high leverage ratio. This evidence is also consistent with the view that firms with greater growth opportunities might have lower leverage ratios due to the fear of debt-holders to whom firms might pass up valuable investment opportunities. This supports the targeting behavior by managers.

On the estimation of the speed of adjustment the study found that the value of λ for firm listed in the NSE ranged between -0.29 and 0.31. Some firms were found to have positive value of λ while others had negative value of λ , but in all the firms the value for the speed of adjustment (λ) was less than one indicating that firms listed in the NSE have a target capital structure which they partially adjust to. There was no case of instantaneous adjustments or over adjustment since there were no values that equaled to 1 or greater than 1. The study analyzed the adjustment towards capital structure by listed companies in NSE. The Key findings were that, there is evidence of an adjustment process in firm's use of debt thereby supporting the targeting behaviour by managers. However the speed of adjustment is somewhat low and therefore not commensurate with major industrial countries.

The latter result could be attributable to the fact that debt ratio of Kenyan firms are comparatively low such that many firms do not depart so much from their target.

Secondly the use of debt was found to be negatively related to firms' profitability which is in support of the pecking order theory implying that pecking order theory and some targeting behaviour cannot be ignored. The firms' growth opportunities were also found to exert a negative impact on leverage. The negative impact of growth opportunities on leverage could reveal several features of borrowing behavior of listed companies at the NSE. It may give support to the prediction that firms which have a relatively large proportion of intangible assets cannot support a high leverage ratio. This evidence is also consistent with the view that firms with greater growth opportunities might have lower leverage ratios due to the fear of debt-holders that firms might pass up valuable investment opportunities to.

Other reasons for this for instance may stem from the tendency of firms to issue stock when their stock price is high relative to their earnings or book value; consistent with market timing theory. This would imply that the negative correlation between leverage and the market to book ratio is driven by firms that issue significant amount of equity (Rajan and Zingales, 1995). The study has therefore established that targeting behavior which is consistent with the trade off theory is applied by firms in making their financial decisions. However, it may not explain the bulk of the observed capital structure changes as other characteristics of market timing and pecking order theories have featured. Nonetheless the former must not be ignored.

Recommendations for Further Studies

The study used the market debt ratio as the primary leverage measure. A similar study could be carried out in the future using book debt ratio as a measure for leverage. Secondly, the study applied a simple linear regression method (ordinary least square) in which case unobservable firm-specific effects that capture the impact of inter-temporally constant, but unmeasured effects on leverage were excluded. A similar study may therefore be done by including the firms fixed effects that affect leverage and also applying superior analytical tools.

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