

## **Trade-Off Theory of Optimal Capital Structure and Adjustment towards Long Run Target: Adynamic Panel Approach**

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**Abstract:** This paper examines the speed and costs of adjustment towards target capital structure choice of Nigerian firms based on the data of 115 Nigerian non-financial firms listed on the Nigerian stock exchange, for the period 1998-2012. The study employed two step system Generalized method of moment in a dynamic panel framework. The main finding of the study indicates that negative relationships exist between speed and costs of adjustment of firms in Nigeria. The study therefore concludes that firms in emerging market like Nigeria adjust relatively faster towards their target debt position.

**Keywords:** capital structure; agency theory; generalized method of moment; dynamic panel

**JEL Classification:** G31; G32

### **1. Introduction**

Trade-off theory affirms that optimal debt ratio is estimated by balancing the benefits (i. e. interest tax shield) and weaknesses (i. e. cost of financial distress) of debt finance. While leverage rises, the marginal tax shield from each currency unit of extra debt plunges. It is due to the high likelihood that the corporations would be exempt from tax payments because of not having positive taxable incomes. Therefore the trade-off theory refuted the irrelevance theory of Modigliani and Miller (1958) that capital structure does not matter for firm value. The theory relaxed the MM (1958) perfect market assumptions that firms do not pay taxes, no transaction costs, symmetric of information among others. The trade-off theory posits that firms behave as if they have optimal debt position they strive to achieve. They tend to trade off the tax advantage of using debt with the agency cost and bankruptcy cost that may arise due to the use of debt in their capital structure.

Firms financing choice vary with time and space therefore their transaction costs and speed of adjustments towards the optimal target as contained in the trade-off theory may also vary with time and space. The theoretical prediction of the trade-off theory is that inverse relationship exists between cost and speed of adjustments towards optimal debt target. Empirical evidences suggest that firms in developed economies incur more costs and adjust relatively slowly in attaining their optimal target position (Fama & French, 2002; Flannery & Rajan, 2005).

However, studies that have used samples of firms from developing economies have found firms to adjust relatively faster with lower costs to achieve their target debt position (Ramjee & Gwartidzo (2012; Haron et al., 2013). Contrary to the faster adjustment speed towards target optimal capital structure reported by most studies in developing economies, Matemilola, Bani- Arifin and Azman-

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Saini (2011) found South African firms adjust slowly towards optimal debt target. Surprisingly, De Miguel and Dindado (2001) reported that Spanish firms incur low adjustment costs and high speed of adjustments which is similar to what is obtainable in most developing markets. They related that the underdeveloped bond market in Spain makes most firms in Spain that rely on private debt. The use of private debt makes Spanish firms adjustment speed to be very fast and incur cost lower than most developed economies in Western Europe and the United States. The various findings in the capital structure literature suggest that the issue of costs and speed of adjustment of firms towards optimal debt is mixed and inconclusive.

The empirical irregularities and inconclusiveness among the various studies particularly from the perspective of developing and emerging economies and Africa suggest that there is need for further country level test of the portability and plausibility of the trade-off theory in emerging market in Africa (Mukhtar & Ahmad, 2015). It is against this backdrop that this current paper provides fresh country level evidence from the perspective of firms operating in Nigeria. Nigeria provide an institutional setting characterise with underdeveloped financial system pervaded with information asymmetries that may make cost of debt expensive. It is against the foregoing that this paper examines the plausibility of the trade-off theory in Nigeria context. The findings of this paper signify that the speed of adjustment of firms in Nigeria towards optimal debt target is relatively fast and the cost of adjustment is low. This finding supports the negative theoretical predictions of the trade-off theory of capital structure. The findings connotes that the adjustment costs for short term, long term and total leverage of firms to achieve optimal debt target in Nigeria is low and the speed of adjustment is relatively high. Apart from the introduction, the paper is divided into four other sections. Section two is the review of literature. Data and methodology of the study is presented in section three. Section four presents the findings of the study while section five centres on the conclusion of the study.

## **2. Literature Review**

The Classical version of the tradeoff theory was provided by Kraus & Litzenberger (1973) and later popularised by Myers (1984) and Frank & Goyal (2005). The tradeoff theory relaxed some of the assumptions of the MM (1958) theory particularly the assumptions of no taxes, no transaction cost, distress cost, agency cost. The trade off theory posited that firms balance the tax benefit of debts with potential bankruptcy costs to achieve an optimal debt level. The theory implies that local tax levels and bankruptcy codes matters to firm when making capital structure decisions (Joeveer, 2006). Firms choose debt level that can maximize their value. This contradicted the view of MM (1963) that firms should employ 100 percent debt inorder to maximize value.

The tradeoff theory is regarded as the optimal view of capital structure. Ismail (2006) noted that the optimal view describes financing decisions of firms involves adjusting existing debt and equity levels towards some value maximising target. The tradeoff theory assumed that when firms are selecting between debt and equity they behave as if they have some target levels in mind (Marsh, 1982). The theory stressed the tax advantage of using debt in the capital structure of firms. Debt reduces the tax payable by the firm as the fixed interest on debt is first deducted before the profit is tax thereby reduces the size of profit available for taxation and increase the available profit to the firm. One major strength of the tradeoff theory is the assumptions of the existence of transaction or distress cost and taxes paid by firms which are use to shield the profit of the firms. This serves as advantage of using debt by firm. These assumptions of the trade off theory conforms with reality rather than being

idealistic as the MM theory that assumed no taxes and no transaction or distress cost. The trade off theory generally implies that firms capital structure can change across firms and across time and firms would likely incur adjustment cost to achieve the optimal leverage level and the changes towards the optimal debt level may not be instantaneous, it can be very fast or slow depending on certain internal and external factors such as size of the firm, imperfections in the capital market among others.

The theoretical expectation of the trade-off theory is that inverse relationship exists between adjustment costs and speed of adjustment towards the optimal target debt position of firm. (Fama & French, 2002; Flannery & Rajan, 2005; Muktar & Ahmad, 2015). A recent paper in the capital structure literature by Muktar and Ahmad (2015) suggests that firms in developing and emerging markets of Africa incur low adjustment costs and move very fast to reach their target debt position. This finding run contrary to aprior expectations particularly for firms in Africa that are expected to incur high transaction costs due to inefficiencies that pervaded most emerging markets that make adjustment cost very expensive thereby create slow speed of adjustment. The reported low cost of adjustment and fast speed towards debt position documented in the work of Muktar and Ahmad (2015) is similar to previous findings in the work of Haron et al (2013) for Malaysian firms and that of Ramjee and Gwartidzo (2012) for South Africa firms. One important reason adduced by these studies about this unusual outcome is that public debt is not available and accessible to most firms because of the underdeveloped bond market in most developing and emerging markets. This makes firms to rely more on banks for cheaper short term debt financing compare to more expensive unavailable bond (Ncube, 2007).

Surprisingly, De Miguel and Dindado (2001) reported that Spanish firms incur low adjustment costs and high speed of adjustments similar to what is obtainable in most emerging markets. They related that the underdeveloped bond market that makes most firms in Spain to rely on private debt makes speed of adjustment very fast and cost lower that most developed economies in Western Europe and United States. The findings in the paper of De Miguel and Dindado (2001) contradicts findings of most studies from developed markets such as Fama and French (2002) that reported that firms in developed markets have high adjustment costs and slow speed of adjustment. This is similar to the findings of Flannery and Rajan (2005) and Lemman et al (2008) that equally reported high adjustment costs and slow speed of adjustment of firms towards their optimal debt position in developed markets. Antonian et al (2008) also documented similar findings about firms operating in countries such as France, Spain, the United Kingdom and the United States. Contrary to the high speed and low adjustment costs of other studies in developing and emerging markets, Getzmann et al (2010) and Ariouglu and Tuan (2014) documented high costs and slow speed of adjustment towards the optimal debt position for Tunisia firms. Similar finding was reported by Matemilola et al (2011) for South African firms

Muktar and Ahmad (2015) that used samples of pooled Africa firms made general conclusion that firms in Africa adjust very fast towards their optimal debt position and incur low cost. The study failed to account for the specificity of each country used in the study thereby makes it difficult to account for the heterogeneous nature of firms from different countries. Each country in Africa are not experiencing the same level of growth and development. The financial development as well as financing opportunities in the various countries in Africa also differs. These are pointers to the fact that the submission of Muktar and Ahmad (2015) that firms in Africa adjust very fast with low adjustment cost to their target debt position may be bias to some extent and may not be generalizable to all firms in Africa.

Tarek (2013) considered capital structure through the Trade-Off Theory: Evidence from Tunisian Firm. The author tested two complementary successive models, the first is a static, while the second is a dynamic model that incorporates transaction costs variable to see how we can talk about a speed adjustment allowing firms to get closer to the target ratio. The static model revealed that the profitability and asset structure are the main explanatory variables of the level of leverage of Tunisian firms. While the dynamic model shows a remarkable result at the level of adjustment costs that are relatively high which engendered a slow adjustment towards the optimal. Tatre (2015) investigated determinants of optimal capital structural of ASEAN (Indonesia, Philippines, Malaysia, Singapore, and Thailand) corporations using panel data from 2000-2013. The result revealed that the trade-off theory and the pecking order theory seem to be fitted well for Singapore and Thailand while the pecking-order theory can be applied in Indonesia, Malaysia and Philippines.

### 3. Data and Methodology

The study employed unbalanced panel data consisting of 115 Nigerian firms listed on the Nigerian Stock Exchange (NSE) from the period 1998 to 2012 available from the Facts Book of the NSE and the annual Reports and Accounts of the companies. Every non-financial firm with three or more years of consecutive observations was included in the study sample. The listed firms in Nigeria were classified into 13 new industrial classifications by the NSE as at 2012. The sample firms excluded firms from the financial services and investment Industry. The sectors comprise of firms in Banking, Insurance and Investment trust. The study uses an unbalanced panel data consisting of 115 Nigerian out of 184 non-financial firms listed on the NSE from the period of 1998-2012. Data availability is the main criteria employed in selecting the sample. Every non-financial firm with three or more years of consecutive observation was included therefore 67 non-financial firms that do meet the criteria were excluded.

### 4. Empirical Model

The study examines the plausibility of the dynamic trade-off theory with specific focus on the speed and cost of adjustment towards optimal target capital structure position of firms. The formalization of the theory into empirical model borrows largely from the specifications of Qian and Wirjanto (2009). Assuming optimal leverage ratio for firm  $i$  at time  $t$  is denoted as  $L_{it}^*$ . This optimal leverage is allowed to vary across firms and over time. The factors that influence the firm's capital structure may change over time, the optimal debt ratio itself would also change over time for the same firm. This reflects clearly the dynamic nature of the capital structure of firms. Normally, the expectation would be that the change in actual leverage of firm  $i$  at time  $t - 1$  to time  $t$  would be equal to the change required to achieve the target level at time  $t$ . This can be depicted as  $L_{it} - L_{it-1} = L_{it}^* - L_{it}$ . Adjustment to achieve  $L_{it}^*$  may not be automatic and instantaneous. Therefore there would be speed and cost of adjustment especially when external finance is involved. This implies that the adjustment may be partial. This adjustment process can be formulated as,

$$L_{it} - L_{it-1} = \lambda (L_{it}^* - L_{it-1}) \quad (1)$$

$\lambda$  is the adjustment parameter. This depicts the degree of the desired adjustment between two subsequent periods or the rate at which  $L_{it}$  converge to its target level;  $L_{it}^*$  if  $\lambda_i = 1$  then  $L_{it} = L_{it}^*$ . This

implies that the adjustment costs is zero and firms adjust instantaneous and automatically to their target level.  $\lambda_0 = 0$  implies that there is prohibitive adjustment cost and firms do not adjust to their target at all. If  $\lambda < 1$  it implies that firms adjust slowly to the target. If  $\lambda > 1$  it implies firm over – adjust its debt level above the target leverage. To avoid potential specification error, equation (1) is expressed to incorporate other factors that are relevant to target capital structure of firm. Therefore equation (1) is stated as

$$Y_{it} = \lambda y_{it}^* + (1 - \lambda)y_{it-1} \quad (2)$$

Where  $Y_{it}^*$  ( $\equiv L_{it}^*$  in equation (1)) is the target leverage ratio of firm  $i$  at time  $t$ .

Equation (2) can be incorporated into an empirical model that account for the firm specific factors and country factors that affect capital structure to accommodate the role of external factors alongside firm specific factors as determinants of capital structure of firms in a developing country specifically in Nigeria. The external factors are crucial and their role cannot be overlooked in the dynamic analysis of the determinants of capital structure of firms in a country like Nigeria that is pervaded with macroeconomic imbalances and poor institutional quality that affect the various decisions of firms. Therefore the empirical model can be stated as:

$$Y_{it}^* = a + \chi_{it}^1 \beta + V_t + u_{it} \quad (3)$$

Where  $Y_{it}^*$  is the leverage of firm  $i$  in year  $t$ ,  $\chi_{it}^1$  consist of the following firm-specific determinants: profitability, Asset tangibility, size, growth opportunities and risk.  $V_t$  is the time specific effect for a given year over firm  $i$ . It captures the effects of economic factors such as inflation, interest rate, macroeconomic conditions, financial development which vary across time but remain the same for all firms in a given year.

Next, equation (3) is substituted into equation (2). This yield the final form of the model estimated:

$$Y_{it} = a\lambda + \lambda X_{it}^1 \beta + (1 - \lambda)y_{it-1} + \lambda V_t + u_{it} \quad (4)$$

Where;

$$(1 - \lambda) = \phi_0 \quad a\lambda = \gamma_0$$

Therefore, equation (4) becomes:

$$Y_{it} = \gamma_0 + \lambda X_{it}^1 \beta + \phi y_{it-1} + \lambda V_t + U_{it} \quad (5)$$

## 5. Results and Discussion

The estimated result of determinants of capital structure is presented below:

Table 1. Two step Dynamic GMM Results

Short term leverage ratio		Long term leverage ratio		Total leverage ratio	
Stlrt-1	0. 6888 (0. 000)***	Ltlr t-1	1. 3321 (0. 000)***	Tlr t-1	0. 5008 (0. 000)***
Roe	-0. 1281 (0. 000)***		-0. 0042 (0. 003)**		-0. 0030 (0. 098)
Roet-1	-0. 2165 (0. 000)***		-4. 6200 (0. 995)***		0. 0011 (0. 447)
Risk	-2. 2778 (0. 001)***		-0. 0174 (0. 513)***		-0. 1417 (0. 001)***
Age	0. 0483 (0. 000)***		-0. 0040 (0. 000)***		0. 0079 (0. 000)***
Size	0. 7925 (0. 000)***		0. 0056 (0. 003)***		0. 0070 (0. 006)
Indiv_own	-0. 1030 (0. 000)***		0. 0007 (0. 054)		0. 0007 (0. 296)
Corp_own	-0. 0786 (0. 000)***		0. 0002 (0. 351)		0. 0017 (0. 008)*
Foreign_own	-0. 0699 (0. 000)***		0. 0021 (0. 001)***		-0. 0015 (0. 0061)
Tangibility	-0. 0073 (0. 000)***		-0. 0930 (0. 128)		-0. 2067 (0. 026)
Inflation	-1. 7328 (0. 000)***		-0. 0064 (0. 000)***		-0. 0039 (0. 000)***
Institutions	-0. 0928 (0. 000)***		-0. 0064 (0. 000)***		0. 0057 (0. 183)***
Interest rates	-1. 7328 (0. 000)***		-0. 01290 (0. 000)**		0. 0072 (0. 024)
Grgdp	-11. 1692 (0. 313)		-0. 0410 (0. 0001)***		0. 0181 (0. 020)
Cps_gdp	0. 4234 (0. 000)***		0. 0175 (0. 000)***		-0. 0286 (0. 000)***
Prof	0. 4280 (0. 000)***		-0. 4502 (0. 000)		-0. 8819 (0. 022)***
AR(2)	0. 324		0. 451		0. 578
Hansen test	1. 000		0. 649		0. 482

Note: Significant level 10\* 5%\*\*1%\*\*\* Number in Parentheses represent probability Z values. Numbers without parentheses represent the coefficient of the variables. Stlr (short term leverage ratio); Ltlr(long term leverage);Tlr (total leverage ratio) intr (interest rate); stk (stock market capitalization as percentage of GDP); grgdp (Growth rate of gross domestic product); infr(inflation);GO(Growth opportunities);Tang(Tangibility of Asset).

Table 1 above shows that the relationships between the first lag leverage ratio (short term, long term and total leverage) and current leverage is positive and significant for all three measures of leverage. This indicates that immediate year financing choice of firms influence their current leverage choice. The results in Table 1 shows that listed firms on the Nigerian Stock exchange close on average (1-coefficient of the lag leverage ratios) 32% of the gap between previous year's short term leverage and the target short term leverage for the current year. Equally, firms close on average 33% of the gap between previous year's long term leverage and the target long term leverage for the current year



while 50% of the gap between previous year's total leverage and the target total leverage for the current year would be close by the firm. These results signify that the speed of adjustment of firms towards optimal debt target is relatively fast and the cost of adjustment is low. This finding supports the theoretical inverse relationship that is expected between cost of adjustment and speed of adjustment of firms in the trade-off theory and the agency cost theory of capital structure. The findings connote that the adjustment costs for short term, long term and total leverage of firms to achieve optimal debt target in Nigeria is low and the speed of adjustment is relatively high.

The relative high speed of adjustment signifies that firms in Nigeria do adjust swiftly towards achieving their optimal leverage position. This is expected because of the facts that financial markets for long term public debt and equity are still not well developed in Nigeria. Most firms rely on private debt particularly short term debt from commercial banks as major source of debt financing which is cheaper and easy to access in Nigeria when compare to public debt and equity. The findings contradicts most of the reported findings by previous studies on cost and speed of adjustment in developed economies such as US, UK France, Germany and Japan. The adjustment costs in most of these economies is around 74% and the speed is approximately around 25% (Antonia et. al., 2008). Other studies such as Fama and French (2002); Flannery and Rajan (2005); Lemmon et al (2008) have reported speed of adjustment of between 15%-34% for US firms. Arioughu and Tuan (2014) and Getzmann et al (2010) reported speed of adjustment between 29%-39% for Turkish firms. Based on the reported speed of adjustment in the developed economies, the study contend that that the speed of adjustment of firms in Nigeria may be term to be relatively faster than that of developed economies. This relatively fast speed of adjustment of Nigerian firms conforms to the findings reported in several studies in emerging economies. Studies such as Haron et al (2013) reported speed of adjustment of 57% for Malaysian firms, Ramjee and Gwartidzo (2012) reported 66% to 80% for South African firms. A more recent finding of 43% for African firms by Mukhtar and Ahmad (2015) signals the high speed of adjustment for listed African firms thereby implies that the cost of adjustment is low when compared to firms in several developed markets. One important reason adduced by these studies on emerging market firms is the fact that the low adjustment costs and the high speed of adjustment of firms may be as a result of underdeveloped bond markets in emerging countries. This makes firms in emerging markets to rely on private debt which is a major source of debt financing especially in Africa (Ncube, 2007). This equally connote that Banks in emerging markets provide lower transaction cost than public debt and equity markets.

## **6. Conclusion**

This paper presents an analysis of the costs and speed of adjustment of firms towards optimal target position based on the data of 115 Nigerian non-financial firms listed on the Nigerian Stock Exchange, for the period 1998-2012 in a dynamic panel framework. Based on the findings of the study that signifies that the speed of adjustment of firms in Nigeria towards optimal debt target is relatively fast and the cost of adjustment is low. This finding supports the negative theoretical predictions of the trade-off and agency cost theories of capital structure. The findings connote that the adjustment costs for short term, long term and total leverage of firms to achieve optimal debt target in Nigeria is low and the speed of adjustment is relatively high. Based on these findings, the paper concludes that firms in Nigeria adjust relative faster to attain their target debt position and incur lower costs compare to their counterparts in developed economies that adjust slowly and incur more cost to achieve their optimal debt position. The paper therefore make case for the development of both the money and

capital market in Nigeria especially the bond market such that they can help with better firm financing on a long term basis.

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