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## Article

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Pakistan Journal of Commerce and Social Sciences (PJCSS)

## Provided in Cooperation with:

Johar Education Society, Pakistan (JESPK)

*Suggested Citation:* Amjed, Sohail; Shah, S. M Amir (2016) : The impact of volatile economic conditions on corporate capital structure adjustment towards dynamic target in Pakistan, Pakistan Journal of Commerce and Social Sciences (PJCSS), ISSN 2309-8619, Johar Education Society, Pakistan (JESPK), Lahore, Vol. 10, Iss. 2, pp. 296-315

This Version is available at:

<https://hdl.handle.net/10419/188254>

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## **The Impact of Volatile Economic Conditions on Corporate Capital Structure Adjustment towards Dynamic Target in Pakistan**

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### **Abstract**

This paper aims to empirically investigate the impact of macroeconomic conditions such as banking sector performance, economic growth, inflation rate, interest rates and market capitalization on the adjustment speed towards dynamic capital structure targets in Pakistan for the period 1999 to 2013. The study also assesses the effect of adjustment speed on the financial performance of the firm. The annual adjustment speed of five industrial sectors was estimated separately by using a modified partial adjustment approach. The direction of causality between financial performance and annual capital structure adjustment speed was examined through the Granger causality test.

The empirical results favor the presence of dynamic capital structure targets in Pakistan for all five industrial groups. We found that the capital structure adjustment speed significantly varies across industrial sectors and over time. The firms in Pakistan adjust their capital structure toward dynamic targets ranging from 23% to 46% annually depending on the country's macroeconomic conditions such as banking sector performance, economic growth, and interest rates. The deviation from the target capital structure also plays an important role in the capital structure adjustment speed. However, the empirical results fail to validate the effect of the inflation and market capitalization on the capital structure adjustment speed. The Granger causality test results show that a unidirectional causality runs from the capital structure adjustment speed to financial performance.

The research finding may assist the non-financial corporate sector of Pakistan to structure an optimal mix of debt and equity capital to finance their operations and growth opportunities cost effectively. The study also provides insights that how to make adjustments in capital structure in response to changing economic conditions in order to reduce the financial cost of business. Scope of this study is limited to non-financial corporate sector of Pakistan.

**Keywords:** dynamic leverage targets, capital structure adjustment speed, partial adjustment model, macroeconomic conditions

## 1. Introduction

The seminal work of Modigliani and Miller (1958) has effectively contributed to the modern capital structure theory. In their initial supposition, the researchers postulated that in a perfect market firm's value is indifferent to its capital mix provided there are no taxes, no transaction cost, availability of unlimited funds to borrow at zero incremental cost and symmetry of information. Beside all skepticism about the unrealistic assumptions, the theory has played an effective role in shaping modern finance theory. Most prestigious and well-recognized capital structure theories such as tradeoff theory, market signaling theory, agency theory, and pecking order theory are directly or indirectly induced by Modigliani and Miller's irrelevance principal.

It is debatable that particular forms of business organization across countries face similar financial problems. The economic challenges of developing countries like volatile inflation, incomplete and inefficient capital markets, weak banking system, financial uncertainties and fragile economic growth may force firm to frame the financial problems differently and use peculiar approaches to resolving the issues (Graham and Leary, 2011). This aspect of financial leverage requires scholars' attention to research it meritoriously.

It is an established fact that a firm needs to deploy an optimal proportion of debt and equity in their capital for the efficient and effective use of equity resources. Though, optimality of capital mix is still an abstract which cannot be objectively measured. Only optimal ranges of capital structure can be marked through firm's indigenous and exogenous factors (see, for example, Miao, 2005; Chen, 2010; Öztekin, 2015). The extant literature suggests that firm's certain attributes shape its financial policy (see, for example, Jõeveer, 2013; Mokhova and Zinecker, 2014; Alzomaia, 2014). Financial attributes of firms change as a result of business transactions or in response to changes in the financial environment, consequently, the optimality ranges also change. Therefore, the optimal capital structure is not a single point, static leverage ratio rather a range of ratios resulting from the delicate balance of various indigenous and exogenous factors (Bhamra et al., 2010).

Firms need actualization of optimal leverage to reduce the financial cost of business. Any material change in firm's own attributes or market dynamics due to random economic shocks shifts leverage optimality to a new level. In normal discourse, the shift in optimality makes the actual capital structure suboptimal (Titman et al., 2012). The difference between actual and target (optimal) capital structure is unfavorable leverage variance. The deviations from the optimal leverage increase the cost of capital and deployment of costly capital in business inversely affect the financial performance. Volatile economic conditions affect the firm's ability to deploy optimal capital structure in two different ways; first, by shifting the leverage targets upward or downward and second by impeding the adjustment process. The financial inefficiencies stemming from suboptimal use of financial resources undermine the performance of the firm. Like other developing economies, Pakistan is a volatile economy and the capital markets are incomplete and inefficient, which make it difficult for firms to maintain an optimal capital structure over time. Therefore it is important for firms to understand that how macroeconomic conditions induce the adjustment speed and how adjustment speed towards target capital structure contributes to financial performance. By maintaining an optimal proportion of debt and equity capital the firms may financially outperform.

The volatile financial environment makes optimal leverage more dynamic and difficult to actualize (Fan et al., 2012; Fernández and Gulan, 2015). This economic challenge also brings an opportunity for firms in developing countries to financially outperform by the formulation of effective financial policy and vigorous pursuance of dynamic leverage targets (Margaritis and Psillaki, 2007). This study offers solution to capital structure problem by clearly stating the firm specific factors which are reliably important to form the dynamic target capital structure and estimation of adjustment speed towards that target. This study may also assist decision makers to adjust capital structure in response to the changing economic conditions and improve the financial performance.

Methodologically, this study has four articulated levels to unfold the implications of firm's ability to realize the dynamic leverage targets in Pakistan. The first level, in accordance with the dynamic trade-off theory, estimates the parameter coefficients of target capital structure. The second level is an estimation of the adjustment speed towards the dynamic target. At the third level, we investigated the impact of various macroeconomic factors on the capital structure adjustment speed. In the fourth level, we have investigated the direction of causality between capital structure adjustment speed and financial performance of the firms in Pakistan.

The current issue in the capital structure research is estimation of the adjustment speed (Elsas and Florysiak, 2015). Hovakimian and Li (2011) argued that the adjustment speed estimated through the full sample fixed effect models produce spurious results. In this paper, we have applied a modified partial adjustment model for unbiased estimation of the capital structure adjustment speed. Very little is known about the implications of the corporate leverage adjustment speed for the financial performance of the firms. The investigation into the direction of causality may improve our understanding about the role of capital structure adjustment speed in financial performance (Striewe, 2016).

The first contribution of this study to the economics and finance literature is the application of modified partial adjustment model to estimate the yearly adjustment speed. We restrict the time effect and allow the cross-sectional variations in the capital structure of individual firms in an industrial sector to estimate the adjustment speed. This small modification has great practical implications. It helps in comparison of adjustment speed across industries and over time. It also helps in studying the variation in adjustment speed and causes of the variation.

The second contribution of our research is the investigation into the causal relationship between capital structure adjustment speed and financial performance. The direction of causality has great policy implications. For instance, if the causality is running from the adjustment speed to financial performance, it indicates that the liberal financial policies and stable economic conditions may greatly contribute to the financial performance of corporate sector by enabling firms to structure their capital optimally. If the causality is running from the financial performance to adjustment speed, it indicates that profitability contributes towards structuring optimal capital.

The third contribution of this study is that this study is a pioneering attempt, with reference to Pakistan's nonfinancial corporate sector, to use a comprehensive set of determinants of target capital structure for unbiased estimation of the adjustment speed. The existing research about the capital structure is mostly framed with reference to the developed countries where capital markets are efficient and nearly complete unlike developing

economies. This study will enhance our understanding about the capital structure decisions in case of inefficient and incomplete capital markets which is a common attribute of almost all developing economies.

Rest of the paper is organized as follows; section 2 is a brief account of capital structure theories and justification of selection of variables, section 3 presents the data collection methods and specification of the empirical model, in section 4 we have presented and discussed the results and section 5 concludes the study.

## 2. Literature Review

Modigliani and Miller (1958) proposed the first formal theory on capitals structure which is known as "Capital Structure Irrelevance Principle" or simply M &M theorem. Seminal work of Modigliani and Miller effectively provoked finance scholars to address this very critical issue. Donaldson (1961) advanced another very convincing theory, which later on known as Pecking Order Theory, about the preferences of firms for a particular source of funding over others. In response to this development, in 1963 Modigliani and Miller revisited the irrelevance principle and relaxed some assumptions which set the stage for "Trade-Off Theory". *Kraus and Litzenberger* (1973) introduced bankruptcy cost to the revised version of Modigliani and Millers tax advantage of debt financing and came up with tradeoff theory. The Trade-Off Theory was one of the most debated theories of capital structure. Many scholars have developed their career by testing, refuting and challenging this theory which enhanced our understanding of capital structure issue. Jensen and Mackeling (1976) proposed "Agency Theory" and described the possible effects of conflict between shareholders and managers on the financing decision. Brealey et al. (1977) based on the "Michael Spence's job-market signaling model" developed a market signaling model for financing decisions. The model describes how equity issues create signals in the market and how the issuance of new securities is perceived in the market. Myers and Majluf (1984) advanced on Donaldson's supposition and proposed a formal model about how firms structure their capital based on the rank of preference. Their adverse selection model, later on, was called, "Pecking Order Theory".

Two competing theories of capital structure (i) pecking order theory and (ii) tradeoff theory got considerable attention of the academia and practitioners. Contrary to the claims of tradeoff theory the pecking order theory stipulates that firms follow a pecking order of preference for certain sources of finance. According to pecking order theorists, internally generated funds are preferred over the debt financing and issuance of equity is the last resort and there is no optimal capital structure it's all about availability of the funds (see e.g., Singh, P., & Kumar, B. 2012; Serrasqueiro and Caetano, 2015). Whereas the tradeoff theory predicts that financing decisions are driven by the adjustments in the proportion of debt and equity financing for balancing the cost and benefit of debt. The balancing and rebalancing of the proportion of debt and equity is done with a view to reduce the financial cost of business. As a matter of fact, the tradeoff theory has more empirical support than tradeoff theory.

### 2.1. *Dynamic Target Leverage and the Adjustment Speed*

The Tradeoff Theory is most celebrated and substantial theory of capital structure in finance circles. It is not a standalone theory, rather a group of theories to delineate the tradeoffs between various costs and benefits of debt financing. This cohort of theories

implies the existence of an optimal level of capital structure. The optimality is attributed to the equilibrium of marginal cost and benefits associated with debt financing.

Modigliani and Miller (1963) relaxed the tax assumption and signified the benefit of debt financing as a shield against the cost of the tax. Kraus and Litzberger (1973) added the dead weight cost of debt and added the corrective notion that the marginal benefit of additional debt is a decreasing function and firms strive to strike a balance between the cost and benefit of tax. It implies the existence of an optimal capital structure where the marginal benefit of debt equals the marginal cost of debt. Scott (1976) proposed a static tradeoff model. In this model, the researcher assumed that in the presence of market imperfections and bankruptcy costs firms have unique optimal capital structure. The proposed optimality is still an abstract and no model could quantify this hypothetical optimality.

In contrast to the static tradeoff theory, dynamic tradeoff model is more realistic and convincing. The dynamic version of tradeoff model specifies that optimality is a time variant phenomenon. Due to changes in the macroeconomic conditions of a country, the dynamics of optimality also changes and firms deviate from their optimal capital structure over time. Fischer et al. (1989) identified the impact of market imperfections on financing decisions and reported that firm-specific factors were the determinant of leverage ranges. Shyam-Sunder and Myers (1999) applied the dynamic tradeoff model and concluded that firms which adjusted their capital structure in response to environmental changes financially outperformed their counterparts. Hovakimian et al. (2001) studied the impact of the capital structure deviation from the optimal level on refinancing strategies and reported that capital structure deviation results in more repurchasing rather than issuance of new securities for correcting the deviations. Ghosh and Cai (1999) studied the speed of capital structure adjustment by taking the average industry leverage as a benchmark and concluded that over leveraged firms adjust their capitals more quickly than under leveraged firms. Flannery and Rangan (2006) in an empirical study proved that firms have capital structure targets. Firms strive to achieve their targets and they can achieve one-third of their desired adjustment level. Flannery and Hankin (2007) concluded that adjustment of the capital structure was a function of the cost of being off target. They referred upward deviation as the cost of financial distress. Zhao and Susmel (2008) empirically investigated the dynamic tradeoff theory and concluded that firms do adjust their capital structure but the parameters of decision-making vary significantly across firms.

Numerous studies applied partial adjustment model to estimate the adjustment speed towards target capital structure (e.g., Huang and Ritter, 2009; Cook and Tang, 2010; Öztekin and Flannery, 2012; Elsas and Florysiak, 2015). The existing partial adjustment model estimates the average speed of adjustment over the time span of study. This limitation restricts the researcher to explore the causes and effects of adjustment speed. Therefore, very little is known about the effect of untoward economic conditions and uncongenial financial environment, some very common attributes of developing economies, on the adjustments towards dynamic target leverage. The financial implication of adjustments toward target leverage for firms is also unclear. It is needed to explore whether leverage adjustments are induced by economic conditions or a deliberate choice of firms. The supply of capital in developing economies is unstable due to peculiar political, social and economic conditions. No, any significant research study found which empirically explore the relationship between leverage adjustments, incited by

macroeconomic conditions, and financial performance of firms. This study establishes the relationship with the help of more robust methodology.

## 2.2 Variables

### 2.2.1 Determinants of Target Leverage

*The size of the firm (SIZE)*: Rajan and Zingales (1995) specified that size of the firm as a proxy for asymmetric information has a significant effect on firm's capital structure. The symmetry of information reduces the cost of capital thus has a positive impact on the leverage of the firm. Lee and Kwok (1988) compared the capital structure of multinational companies (MNCs) with the domestic companies (DCs) and found a significant difference between the capital structure of MNCs (large companies) and DCs (Small companies). Baker and Wurgler (2002) also attest that size play an important role in the capital structure decisions of the firms. There are numerous empirical studies which studied impact of size on the capital structure (see, for example, Shah and Khan, 2007; Frank and Goyal, 2009; Getzmann et al., 2010; Lemmon and Zender, 2010; Sheikh and Wang 2011)

*Profitability (PROF)*: Both pecking order theory and static tradeoff theory cogitates profitability as a significant determinant of financial leverage. However the disagreement persists on the nature of the relationship between these two competing theories (Shah and Khan, 2007). The relationship of profitability and capital structure is explained from diverse perspectives (e.g., Bennett and Donnelly, 1993; Ozkan, 2001; Deesomsak et al., 2004; Hall et al., 2004; Shah et al., 2004; Huang and Song, 2006; Haas, and Peeters, 2006; Delcoure, 2007; Frank and Goyal, 2009; Lemmon and Zender, 2010; Getzmann et al., 2010).

*Collateral Value of Assets (CVA)*: Tangible assets of the firm are considered a security against the debt covenants (Frank and Goyal, 2009). Literature suggests that the proportion of fixed assets in the asset structure of the firm increases the chances that firms can raise more debt than the firms having low fixed asset ratio. Morellec (2001) established that the relationship between the asset structure and financing decision is significant. Many studies have tested collateral value of assets as a determinant of capital structure and found significant results (e.g., Ozkan, 2001; Morellec, 2001; Shah et al., 2004; Deesomsak et al., 2004; Hall et al., 2004; Huang and Song, 2006; Delcoure, 2007; Lemmon and Zender 2010; Getzmann et al., 2010).

*Growth Opportunities (GRTH)*: Conventional wisdom postulates that growing firms need more capital than firm at maturity level or having fewer growth opportunities (Shah et al., 2004). For meeting their capital requirements firms raise capital from diverse sources, by this logic a positive relationship between growth opportunities and capital structure is expected (e.g., Ozkan, 2001; Hall et al., 2004; Deesomsak et al., 2004; Low and Chen 2004; Haas and Peeters, 2006; Delcoure, 2007; Shah and Khan, 2007).

*Non-Debt Tax Shield (NDS)*: Interest is a tax deductible expense. Therefore, use of debt reduces the tax expenses of the firm. The tax deductibility dilutes the overall cost of capital and resultantly increases the value of the firm (Delcoure, 2007). Depreciation, amortization, and depletion like interest are also tax deductible expenses and provide tax shield parallel to the interest (Huang and Song, 2006). If the firm has ample non-cash expenses which can reduce the tax burden of the firm, the firms find debt financing less attractive if other things remain the same (e.g., Bennett and Donnelly, 1993; Ozkan, 2001; Haas and Peeters, 2006; Shah and Khan, 2007; Getzmann et al., 2010).

*Firm Specific Interest Rate (FSIR):* Interest as the cost of debt play important role in the debt financing (Huang and Song, 2006). Prevailing market interest rate and the risk-return profile of the debt securities, nature of debt covenants and time to maturity determine the cost of debt of a specific firm (Shah and Khan, 2007). Over time, the real cost of debt may change in response to random shocks and changing capital market settings (Wald, 1999). The real interest rate of the firm if turns unfavorable over time; firms have several options to correct the situation by readjusting capital structure as a part of a hedging strategy. Theoretical and logical arguments can be found in the finance literature in favor of this supposition (Jalilvand and Harris, 1984; Ooi, 1999; Deesomsak et al., 2004; Haas and Peeters, 2006).

*Spontaneous Financing (SPTF):* Normally accruals have no substantial cost. In connection with capital structure decisions, two different arguments found in the literature. First, firms having more spontaneous financing would not depend heavily on the negotiated financing and will reduce the cost of capital (Van-Auken, 2015). Second, firms already having enough spontaneous finance would have already reached the saturation point and would go for negotiated financing (Haas and Peeters, 2006). Deesomsak et al. (2004) considered the role of spontaneous financing in capital structure decisions and found a significant relationship between two.

#### 2.2.2 Determinants of Firm's Ability to Realize Leverage Targets (Resilience)

Firms may deviate from the target leverage (optimal leverage) due to indigenous or/and exogenous factors (Dudley, 2007). Firms strive to revert to the optimality by making changes into the capital structure which is referred to as financial resilience for this research purpose. The resilience is affected by various exogenous and endogenous factors (Drobtz and Wanzenried, 2006).

*Volatile Inflation:* Volatile inflation affects the capital structure in several ways. Lending during high inflation period reduces the real returns on debt investment thus makes debt investment less lucrative. Lenders during high inflationary periods require higher interest rates to bring real returns to the risk acceptable level (Gaud et al., 2005). As a result borrowing during high inflation period increases the cost of debt. Thus, firms prefer to stick with their existing debt covenants. Frank and Goyal (2009) also indicated the role of expected inflation in market leverage. Despite the fact that their methodology and research objectives were different but one can easily infer the relationship between the inflation and the borrowing and lending decisions.

*GDP Growth:* GDP growth as a proxy for the economic conditions of the country plays an important role in shaping the financial policy of the firms. Levy and Hennessy (2007) gave a comprehensive description that why capital structure choices vary in different economic conditions. They reported that in expansion firms substitute debt with equity and in contraction period they tend to decrease the debt in their mix of capital. Hackbarth et al. (2006) specified the role of macroeconomic conditions on the financial policy of the firms in their model. Korajczyk and Levy (2003) hypothesized that capital structure adjustment speed is a function of macroeconomic conditions. Firms in economically good periods have more availability of funds compared to the bad economic conditions (Cook and Tang 2010).

*Market Interest Rate:* It is well documented in the finance literature that interest rate volatility affects the term structure of the debt securities (see, for example, Cox et al., 2005;



Dieffenbach, 1975; Richard, 1978). Interest rate volatility affects the borrowing options of the firms in different ways. For instance, it affects the asset pricing, interest rate risk and cost of borrowing for the borrowers.

*Banking sector performance:* Debt market of Pakistan, like other developing economies, is not developed enough to cater the financing needs of the firms. Nishat (2012) attributed this inefficiency to the regulatory framework. Debt instruments are not very popular in Pakistan; therefore, firms have to rely on the banking sector for their short-term and long-term debt requirements (Arif, 2007). The well-functioning banking sector is essential for the industrial development of any economy but for the developing economies where bank performs the very critical role as financial intermediary, the role of banks is crucial (Haque, 1997).

*Distance from the target:* Deviation from the target capital structure is a costlier variance and firms strive to revert to the optimal level by making adjustments in the proportion of debt and equity. Drobetz and Wanzenried (2006) found that in the presence of adjustment cost firms may not fully revert to the desired level of capital structure. Flannery and Rangan (2006) applied partial adjustment model to observe how firms reconcile the gap between target and actual capital structure. Faulkender et al. (2008) also found that the deviation from the target level initializes the adjustment process. If the firms have actual capital structure just equal to the desired level there is no reason to change it.

### **3. Data and Methodology**

#### *3.1 Data and Sampling*

The data set consists of Pakistan's non-financial sector data of five major industrial sectors such as textile, sugar, chemical, engineering and others over a period of fifteen years starting from 1999 to 2013. During the period of study, the economy of Pakistan passed through various sociopolitical phases thus provides an exciting opportunity to study the implications of capital structure adjustment speed in a volatile economy.

The State Bank of Pakistan periodically publishes a comprehensive analysis of audited financial statements of non-financial listed companies entitled "Balance Sheet Analysis". The data of the corporate sector is collected from the Balance Sheet Analysis (various issues). Data of selected macroeconomic indicators was collected from the World Development Indicators (WDI-CD-2015). The data of all public companies listed on the stock exchanges of Pakistan and remained listed throughout the period of the study are included in this empirical study. The scope of the study is kept limited to the non-financial sector because the nature and character of the capital structure of financial companies are significantly different (Wald, 1999; Shah et al., 2004). Therefore, financing decisions of the financial firms cannot be directly compared with non-financial firms. By the end of the financial year 2013, there were total 616 listed companies on the three stock exchanges of Pakistan namely Karachi Stock Exchange, Lahore Stock Exchange, and Islamabad Stock Exchange. The year 2013 Balance Sheet Analysis contained financial data of 399 companies, out of which 200 companies of five non-financial industries were included in the dataset. The economic measurement and data symbols are as follows:

**Table 1: Variables and their Measurement Scheme**

Variable	Symbol	Measurement Scheme
<b>Size</b>	SIZE	Natural Log of total assets
<b>Profitability</b>	ROA	Net profit after taxes over Total Assets
<b>Collateral value of Assets</b>	CVA	Net fix assets over total assets
<b>Firm Specific Interest Rate</b>	FSIR	Financial charges over sum of fix liabilities and negotiated finance
<b>Growth opportunities</b>	GRTH	Percentage change in sales from previous year
<b>Non-debt tax shield</b>	NDTS	Non-cash expenses over sum of net fixed assets
<b>Trade credits</b>	SPTF	Spontaneous finance over total liabilities
<b>Short term solvency</b>	STS	Current Assets over current liabilities
<b>Total debt to Assets</b>	TDA	Total debt over total assets

Over fifteen years, the non-financial corporate sector of Pakistan depicts an average 16.65 percent growth. During this period, the corporate sector realized average 7.11 percent per annum returns on total assets. The variation in the rate of return is considerably high as shown by the corresponding value of standard deviation of ROA. The apparent cause of this variation is the volatile economic environment of Pakistan. The summary statistics also reveal that approximately 34 percent of the assets of firms are financed by long-term debt.

**Table 2: Descriptive Statistics**

Variables	Mean	Std. Error	Median	Std. Dev	Range
<b>SIZE</b>	3.0156	0.0115	2.9895	0.6046	5.9546
<b>ROA</b>	7.1178	0.6774	7.3000	6.5059	56.2450
<b>CVA</b>	0.5172	0.0040	0.5252	0.2118	1.2138
<b>FSIR</b>	13.1894	0.6082	9.4467	5.6540	24.0000
<b>GRTH</b>	16.6489	4.1750	12.9000	18.8201	422.2536
<b>NDTS</b>	4.1635	0.0908	3.7181	4.7603	106.5214
<b>STS</b>	1.1599	0.0280	0.9347	1.4699	2.0629
<b>TDA</b>	0.3412	0.0041	0.5448	0.2123	1.0842

### 3.2 Model Specifications

The target capital structure is not directly observable it can only be estimated. In accordance with BHW model parameters coefficients of target leverage were estimated with one period lagged determinants (Banerjee et al., 1999). As a standard practice

Generalized Method of Moments (GMM) regression was applied for parameter estimation. GMM is pragmatic for its greater value in estimation when the distribution of the population is unknown. The Ordinary Least Square (OLS) and Maximum Likelihood (ML) regressions have restrictive assumptions, which panel data rarely fulfill. GMM allows finding closer to true model parameters by processing the sample conditions movement with maximum possible accuracy. The empirical model is specified as follows;

$$TCS_{i,t}^* = \lambda_0 + \lambda_1 SIZE_{i,t-1} + \lambda_2 ROA_{i,t-1} + \lambda_3 CVA_{i,t-1} + \lambda_4 FSIR_{i,t-1} + \lambda_5 GRTH_{i,t-1} + \lambda_6 NDTS_{i,t-1} + \lambda_7 SPTF_{i,t-1} + \lambda_8 STS_{i,t-1} + \omega_{i,t} \quad (1)$$

Where:

$$\omega_{i,t} = \varepsilon_i + \mu_{i,t} \quad \text{and}$$

$TCS_{i,t}^*$	Target Capital Structure	$ROA$	Return on assets
$\lambda_0$	Mean constant coefficient	$CVA$	Collateral value of assets
$\lambda_1$ to $\lambda_8$	Slop coefficient	$FSIR$	Firm-specific interest rate
$I$	$i$ th cross section observation	$GRTH$	Growth opportunities
$T$	$t$ period observation	$NDTS$	Non-debt tax shield
$\omega_{i,t}$	Composite Error Term	$SPTF$	Spontaneous finance
$SIZE$	Size of firm		

Parameters are estimated with the help of a larger pool of data. All variables are various ratios calculated through the accounting data extracted from the audited financial statements of listed public companies.

### 3.3 Estimation of Adjustment Speed

To estimate the speed of adjustment towards target capital structure, a modified partial adjustment model is applied to capture the per annum adjustment speed towards the target capital structure. We restrict the time effect and allow variation across firms in a particular year. The estimation of yearly adjustment speed would help to study the variation in adjustment speed over time and across the industrial sector. This innovation in the use of partial adjustment model has a number of advantages. The estimation of cross-sectional yearly adjustment speed helps to study the impact of the macroeconomic condition on the adjustment speed and financial performance. It also allows an investigation into the direction of causality between adjustment speed and financial performance. The adjustment speed is estimated cross-sectional for the individual industrial groups by following general partial adjustment model expressed as following equation.

$$CS_{i,t+1} - CS_{i,t} = \vartheta_{i,t}(TCS_{i,t}^* - CS_{i,t}) \quad (2)$$

Alternatively, the Equation II can be written after mathematical manipulation as Equation II-B the value of  $\vartheta_{i,t} = 0$  implies a one hundred percent adjustment, whereas equals to one means 0 adjustments.

$$CS_{i,t+1} = (1 - \vartheta_{i,t})CS_{i,t} + TCS_{i,t}^* \quad (3)$$

### 3.4 Determinants of Adjustment Speed towards Target Leverage

Indigenous and exogenous factors limit the financial flexibility of firms to adjust leverage to an optimal level. Therefore, firms are often over-leveraged or under-leveraged. The

following equation captures the impact of macroeconomic factors and firm indigenous factors, instrumentalized by taking the difference between target and actual capital structure, on the adjustment speed.

$$\psi_{i,t} = \gamma_0 + \gamma_1 BSPR_{i,t} + \gamma_2 DIST_{i,t} + \gamma_3 GDPG_{i,t} + \gamma_4 MCAP_{i,t} + \gamma_5 INFL_{i,t} + \gamma_6 INTR_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where:

$\psi_{i,t}$   $1 - \vartheta_{i,t}$ , Capital Structure Adjustment speed of an Industrial sector  $i$  at time  $t$

$\gamma_0$  Is constant

$\gamma_1$  to  $\gamma_5$  Coefficients of independent variables

*BSPR* Banking Sector performance measured as the reciprocal of non-performing loans to total advances.

*DIST* Absolute distance between target and actual capital structure at time  $t$

*GDPG* Gross Domestic Product growth rate

*MCAP* Market Capitalization as a ratio of GDP

*INFL* Inflation

*INTR* Interest rate

Firm-specific factors were instrumentalized by the absolute distance between target and actual capital structure. External macroeconomic factors were included in equation individually.

### 3.5 Adjustment Speed and Financial Performance

Equation IV concludes the research by estimating the impact of the capital structure adjustments on the financial performance of the firm. Profitability as a determinant of capital structure has been reported by many studies (see, for example, Dang, 2013; Mateev et al., 2013; Memon et al., 2015). However, no any research could be found about the direction of causality between adjustment speed and financial performance. There are two possible arguments about this relationship. First, if firms are under-leveraged or over leveraged their funds utilization is suboptimal and resultantly the financial performance would be poor (Basseby et al., 2014). The contrary view is that if the firms are performing well, they have broader prospects to attract debt at favorable terms thus reduce the cost of capital and resultantly good financial performance can be expected. There is no clear theoretical guidance about this cause and effect relationship.

Therefore, Granger causality test was run prior to running following regression equation to test the impact of capital structure adjustment speed on financial performance. To establish the direction of causality between capital structure adjustment speed and financial performance the standard test of causality is performed. Granger causality test result gives fair idea about the cause and effect relationship between the variables of interest. To achieve the unbiased results the annual data is transformed into quarterly data by interpolation in Eviews software. The standard test of causality base on the power of prediction of one variable on the basis of the appropriate lag length of the predictor. The simple idea behind the granger causality is that effect cannot happen before cause.

In order to satisfy the basic assumption of the granger causality, unit root test is performed prior to checking the presence and direction of causality. Augmented Dicky Fuller test of

stationarity is used to check the unit root of the variables. The series, financial performance and speed of adjustment were found I(0) integrated. Direct test of stationarity merits the analysis.

$$\rho_{i,t} = \alpha + \beta \psi_{i,t} + \epsilon_{i,t} \quad (5)$$

All tiers are articulated and whole analysis was built on progressive linkages among the tiers. The logical progression leads to answer the question that how the speed of adjustment towards dynamic capital structure affects the financial performance of corporate sector of developing economies like Pakistan.

#### 4. Results

Results of Equation 1 by GMM estimation approach have presented in Table 3. The results indicate that all the determinants of target capital structure except growth opportunities are statistically significant. Return on assets, firm-specific interest rate, non-debt tax shield, and spontaneous finance have an inverse relationship with financial leverage targets. The size of the firm, the collateral value of assets and short-term solvency has a positive and statistically significant relationship with leverage targets. Contrary to other studies, we found a statistically insignificant impact of growth opportunities on the capital structure targets as indicated by corresponding insignificant t-statistic (see, for example, Haas and Peeters, 2006; Delcours, 2007; Shah and Khan, 2007). The estimated parameter coefficients were used to estimate the target leverage of individual firms.

**Table 3: Parameter Coefficients of Target Capital Structure**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\lambda SIZE_{t-1}$	0.03629*	0.00967	3.75268	0.0002
$\lambda ROA_{t-1}$	-0.00198*	0.00020	-9.84407	0.0000
$\lambda CVA_{t-1}$	0.33671*	0.03085	10.9156	0.0000
$\lambda FSIR_{t-1}$	-0.00104*	0.00030	-3.88359	0.0001
$\lambda GRTH_{t-1}$	0.00008	0.00001	0.64135	0.5214
$\lambda NDTs_{t-1}$	-0.00362**	0.00158	-2.28593	0.0224
$\lambda SPTF_{t-1}$	-0.40847*	0.02353	-17.3617	0.0000
$\lambda STS_{t-1}$	0.20507*	0.01643	12.4807	0.0000

\*significant at 1% level, \*\* Significant at 5% level

R-squared value (0.6712) and Adjusted R-Squared value (0.6461) suggest that the model has strong predictive powers. Durbin-Watson Stat (1.7745) shows the model is free from autocorrelation problem. Overall the model is robust and can be applied for unbiased estimation of target leverage.

Estimated target leverage and the actual leverage of firms were regressed in accordance with estimation scheme presented in Equation 2 to capture the annual adjustment towards the target. The adjustment speed was estimated for each industrial group separately over fifteen year period. The sixty year-industry observations of adjustment speed are summarized and presented in Table 4. The results indicate that companies in Textile Sector achieved average 45 percent adjustment per annum towards their dynamic leverage targets.

Miscellaneous small sector companies were second to the textile sector with 40 percent adjustment towards dynamic target leverage. At third and fourth positions were companies in the chemical and engineering sectors with 33 and 28 percent adjustments respectively. The results show that the sugar sector had minimum adjustment speed towards the target. The capital structure adjustment speed over time and across industries shows a great deal of variations ranging from a minimum 11.5% to a maximum of 69%. This variation can be attributed to the volatile economic environment of Pakistan.

**Table 4: Summary Statistics of Estimated Target Capital Structure**

	<b>Textile</b>	<b>Chemical</b>	<b>Sugar</b>	<b>Engineering</b>	<b>Miscellaneous</b>
<b>Mean</b>	0.4541	0.3340	0.2262	0.2772	0.4033
<b>Median</b>	0.4933	0.2989	0.2451	0.2671	0.3767
<b>Std. Dev</b>	0.1653	0.1535	0.0944	0.1255	0.0733
<b>Range</b>	0.5373	0.5084	0.2937	0.4034	0.2215
<b>Minimum</b>	0.1491	0.1713	0.1173	0.1153	0.3257
<b>Maximum</b>	0.6873	0.6801	0.4102	0.5184	0.5462

The estimation of adjustments towards the dynamic target of five industrial sectors over a 14 year period yielded a balanced pool of 70 observations. The estimated annual adjustment towards target leverage was regressed with the macroeconomic variables and variance from the target of the firm to find out the stimulus of the adjustment.

The results in Table 5 show that banking sector performance (BSPR), the distance between target and actual capital structure (DIST), GDP growth rate have positive impacts on the adjustment speed. The positive values of coefficient (0.0036) and corresponding t-Stat (2.0956) indicate that banking sector performance (BSPR) has a positive impact on the adjustment process at 5% significance level. Target leverage variance is a significant and positive stimulus of adjustment. GDP Growth also has a positive impact, as indicated by coefficient value (0.0386) and significant at 1% significance level. Market capitalization has a positive impact but it is not statistically significant to draw any inferences. Volatile inflation and market interest rate impede the leverage adjustment of the corporate sector.

**Table 5: Macroeconomic conditions and adjustment speed**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>BSPR</b>	0.0036**	0.0017	2.0956	0.0407
<b>DIST</b>	0.5144*	0.1094	4.7003	0.0000
<b>GDPG</b>	0.0386*	0.0065	5.9593	0.0000
<b>MCAP</b>	0.0019	0.0020	0.9608	0.3409
<b>INFL</b>	-0.0036	0.0023	-1.5448	0.1281
<b>INTR</b>	-0.1836**	0.0314	-2.6197	0.0193

\*significant at 1% level. \*\* Significant at 5% level

Other statistics like R-Squared (0.6559), Adjusted R-squared (0.6265) and Durbin –Watson stat (1.5228) indicate the model is robust and the results are not spurious.

Regression indicates the nature and magnitude of the relationship among the variables. However, it does not indicate the cause and effect relationship. The relationship between leverage adjustments and financial performance has not been tested before. Therefore, there is no theoretical guidance about the cause and effect relationship. To establish leverage adjustments cause of financial performance Granger Causality test was run. Table 6 presents the results of the Granger causality test. The results indicate that the capital structure adjustment speed Granger causes the financial performance.

**Table 6: Granger Causality**

Null Hypothesis	Lags:2		Lags:1	
	F-Statistic	Prob.	F-Statistic	Prob.
ROE does not Granger Cause ADJS	2.5067	0.0929	5.3564	0.0246
ADJS does not Granger Cause ROE	0.8244	0.4450	0.8195	0.3695

The last tier concludes the research by measuring the impact of capital structure adjustment on the financial performance of the firms. The results indicate that adjustment speed affects the financial performance positively. Statistically, capital structure adjustment speed causes 46 percent variations in ROE as indicated by R-squared. The question arises regarding the greater explanatory power of the model with just one variable whereas the financial performance depends on various factors. The firm's capability to restructure capital also depends on various factors. The adjustment speed is representative of all such factors, therefore, the high explanatory power is justifiable.

**Table 7: Impact of Adjustment Speed on the Financial Performance**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.1130*	0.0364	3.1065	0.0030
CAPA	0.2836*	0.1016	2.7920	0.0072
R-squared	0.458816			
Adjusted R-squared	0.427225			

\* indicates significant at 1% level

The robust results provide strong evidence to report that firms which pursue their target actively and able to reconcile the gap between the actual and target leverage perform better. The ability of firms to realize dynamic targets, referred to as resilience, affect financial performance positively as indicated by the positive value of coefficient (0.2836) and corresponding t-stat (2.7920).

## 5. Conclusion

It is inferred on the basis of empirical results that firm's indigenous factors determine the optimal level of debt in the capital mix. The debt targets of firms are dynamic which increases with an increase in the size of the firm, the collateral value of assets and short-term solvency. However we found that profitability, firm's specific interest rates, non-debt tax shield and spontaneous finance have an inverse relation with the leverage targets. The

leverage targets are dynamic which changes in response to changes in a firm's specific factors. Firms strive to achieve the dynamic target leverage which they seldom reach completely and unrestrained.

We found, on average, firms could adjust towards their dynamic target capital structure 23 to 46 percent in a year. The leverage adjustments have a great deal of variations across industrial sectors and over time. This variation can be attributed to the volatile economic conditions of the developing countries like Pakistan. Therefore, the ability of firms to realize dynamic target leverage, referred to as financial leverage resilience, is significantly affected by environmental forces and to some extent firm's indigenous factors. Amongst significant macroeconomic factors which enhance the resilience of firms are banking sector performance, GDP growth. Volatile Inflation and high market interest rate impedes the adjustment process and limits the ability of firms to reach the leverage targets. It is concluded on the basis of research findings that the speed of adjustment towards the dynamic target is high not because the firms in developing economies are financially efficient than developed countries, it is because the leverage targets are more volatile compared to developed economies.

The results indicate that in the volatile economic environment, common attribute of developing economies, firm's leverage resilience to random economic shock positively affect the financial performance thus enhances the firm's value. Besides many challenges, developing economies like Pakistan provides opportunities to the business firms to financially outperform just by effectively adjusting leverage ratios to dynamic targets. To attain the dynamic optimality fully, firms need an active and thoughtful financial policy as well as sound, stable and favorable financial environment.

#### **6. Future Research Directions**

This research study investigated the combined effect of the upward and downward adjustments due to certain data and methodological limitations. Further research may be extended to explore the implications of upward and downward leverage adjustments separately by using the robust time series methodologies. The modified partial adjustment model yield annual estimates of speed of adjustment, the impact of adjustment speed on the growth opportunities of the firm is also an unexplored area.

#### **7. Limitations**

The scope of the study is limited to the non-financial corporate sector of Pakistan. Financial sector is not included in the analysis due to the fact that financing decision of financial sector is not directly comparable to non-financial sector. The data of the non-financial sector is also limited in terms of time span. This study covers only fifteen years of the non-financial corporate sector of Pakistan. This study included the maximum available data of non-financial corporate sector of Pakistan from the official sources.

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