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The determinants of banks' capital structure in SAARC economies

Raja Rehan[1*], Auwal Adam Sa'ad[2], Guo Hong Fu[3*], Muhammad Asghar Khan[4]
[1]IIUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, Kuala Lumpur, Malaysia, rajarehan@iium.edu.my (R.R.).
[1]Department of Business Administration, ILMA University, Karachi, Pakistan.
[2] IIUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, Kuala Lumpur, Malaysia; auwal@iium.edu.my (A.A.S.).
[3,4] School of Economics and Management, Panzhihua University, Panzhihua 617000, Sichuan, China; 1434804935@qq.com (G.H.F), asgharkhan@pzhu.edu.cn (M.A.K.).

Abstract: The capital structure determinants for South Asian banks are required to be exposed. This investigation attempts to address the existing gap by examining the capital structure determinants for the South Asian Association for Regional Cooperation (SAARC) countries. To accomplish the main objective, the Panel Data of 52 banks is collected from the four main regional economies for the period starting from 2012 to 2022. The methodology is based on the estimation of constructed models by executing Static Panel Data analysis and Dynamic Panel Data analysis via the Generalized Method of Moments (GMM). The investigation discovered that tangibility, growth, profitability and non-performing loans have positive significant influences, whereas, liquidity and gross domestic products have negative significant impacts on the regional banks' capital structure. Also, the significant lagged variable and the presence of adjustment speed suggest the implementation of the Dynamic Trade-Off theory in the SAARC countries' banking sectors. The findings will help regulatory bodies develop a harmonization policy to enhance financial integration among SAARC economies via adopting identified capital structure determinants.

Keywords: *Capital structure, Dynamic model, GMM, Panel data, SAARC.*

1. Introduction

The capital structure refers to a process by which a business attains finances for its operations by mixing numerous financial assets such as debt, equity, and available retained earnings to accomplish the core aim i.e. best financial performance. Several financial studies have pointed out that a firm's choices for the formulation of an appropriate debt and equity mix are linked with its contextual settings [1]. Moreover, the theories that are connected with capital structure, help firms to find those determinants that seem to be fixed in their contextual setting and formulate an optimal capital structure (see [2, 3]). Technically, a capital structure that is considered optimum is the best grouping of several funding choices that boost a business's overall value and lessen its capital cost [4]. Importantly, constructing an optimal capital structure for financial institutions, specifically, banks is a tricky solution. Typically, the banks' role as a financial intermediary is prone to numerous risks that lead them toward insolvency, it also raises a systematic risk for the entire economy [5]. Thus, banks are bound by the local state banks of countries where they are functioning and numerous regulatory bodies such as the Basel Committee on Banking Supervision (BCBS) to secure their capital structure.

Visibly, the debate for optimum capital structure determinants for financial firms remains inconclusive in the current literature [6, 7]. An abundant number of former studies excluded financial firms especially, banks while investigating determinants of an optimal capital structure (see [8-10]). Technically, the

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* Correspondence: rajarehan@iium.edu.my; 1434804935@qq.com

omission of banks from capital structure investigations is because of their dissimilar capital structure preserving practices. Moreover, the banks' capital structure comprises the best blend of subordinated debt, equity, and customers' deposits. The banks that are operating in dissimilar contexts are severely bound by their local state banks to maintain capital funds which skewed their debt-equity selections [11, 12]. Remarkably, the formulation of banks' capital structure is a subject of key importance in banks' stability-related debates. The inappropriate decision to construct banks' capital structure disturbs their stability as well as their capability to resist financial fiascos. Banks are vulnerable to financial shocks because they offer a quality asset transformation that introduces them to dissimilar sorts of risks [13]. The quality asset transformation is the procedure in which banks create assets i.e. loans by using liabilities that are received from customers as a deposit. Hence, as compared to non-financial firms, risk-taking is among the key activities of the banks [14] thus, analyzing risk-connected factors must be obligatory while structuring capital structure for banks. Moreover, compared with non-financial firms, the demanders and suppliers of capital to banks are also different, impacting their capital adequacy ratio [8]. On the flip side, several agreed that the banking industry is one of the structured industries that has a crucial role in any country's financial system. For instance, the banking industry growth is considered a core factor of South Asian countries' economic growth [15, 16].

The organization of the South Asian Association for Regional Cooperation i.e. in short abbreviated as SAARC, was formed on the 8th of December in 1985. One of the main objectives of this association is to accelerate economic growth among the member countries. To achieve this aim, several steps were initiated under the SAARC umbrella to increase financial integration among the member countries, such as the formation of SAARC Development Funds (SDF), South Asian Federation of Exchanges (SAFE), SAARC Preferential Trading Arrangement, South Asian Securities Regulators' Forum (SASRF), etc. Also, the preceding decade i.e. 2010-2020 was designated by SAARC as the era to improve interregional connections among the member countries. Likewise, the SAARCFINANCE was established on the 9th of September 1998 to create harmonization in banking-related practices and regulations within the member countries [17]. In the recent scenario, the SSARC member countries are facing several financial issues, as in April 2022 its member country i.e. Sri Lanka's central bank declared financial default due to the heavy burden of foreign debt [18]. The other important regional member i.e. Pakistan is also on the verge of economic disaster [19]. Moreover, the rising interest rate and liquidity shortage slow down the Indian banks' credit growth [20]. Bangladesh's economic growth also shows a declining trend and stood at 3.78% in the second quarter of financial year 2023-2024 [21]. Considering the economic situation in the region and in line with the SAARCFINANCE manifesto, the local banks are required to create harmonization in banking practices and regulations. Notably, the capital structure i.e. optimum helps firms to decrease the overall capital cost and also move them toward their best financial performance. Thus, adopting similar capital structure-connected policies for banking systems may help SAARC countries overcome existing financial issues and enhance region-level banking integration.

Evidently, the core significant determinants that construct an optimum capital structure for banks that are operating in SAARC countries have not still been recognized. Most of the preceding investigations that examined capital structure connected significant determinants in the SAARC context eliminated financial firms from their data sample sets (see [22, 23]). Similarly, the earlier investigations that discovered these determinants for the banks are country or industry-specific (see [22, 24-26]) hence, not offering comprehensive and conclusive outcomes for the entire banking industry of the SAARC region. Undoubtedly, central banks across the region preserve capital structure effectively due to their local governments' strict monitoring. However, the identification of core capital structure determinants for the other banks that are operational in the region is warranted.

Because of the discussed context, the current inquiry intends to come up with several new outcomes about the significant determinants of capital structure for the entire banks that are operating in the main SAARC countries. Moreover, considering the recent economic and financial landscape of the region, this study also inspects the influence of up surging risks on the capital structure formulating practices of the regional banks. Besides, to cohere with the research aim key capital structure theories are also tested to

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discourse the theoretic relation among the nominated determinants and banks leverage. This inquiry depends on the annual Balanced Panel Data of 52 banks from the year 2012 to 2022 of four key countries of the region. Furthermore, Panel Data Static models and Dynamic model approaches are implemented to accomplish the observed investigation. The scholars believe that this study is among one of the initial efforts that are conducted to explore the key capital structure determinants for the entire South Asian banking industry. The analysis provide evidence that tangibility, liquidity, profitability, growth, gross domestic product (GDP), and non-performing loans influence banks' capital structure formulation practices in the SAARC region.

The remaining paper is arranged as follows: Section 2 highlights earlier literature. Then, Section 3 explains the extracted data nature and implemented methodology for this investigation; Section 4 presents the empirical investigation discoveries. Next, Section number 5 deliberates on the outcomes attained from the performed analysis. Afterward, Section 6 contains the conclusion, additionally, it also discusses the implications and the study limitations.

2. Literature Review

Capital Structure is considered as a main deliberated but still an unresolved issue in the corporate finance world. However, capital structure theories assist financial managers in adopting those determinants that produce an appropriate blend of various financial resources [27]. The conventional theories namely the Net Income (NI) and Net Operating Income (NOI) open new ways for the entrance of other capital structure theories such as Modigliani and Miller (MM), Pecking Order and Trade-Off theories, etc. Modigliani and Miller [28] presented their initial proposition which illustrated that in a faultless or ideal market, a business decision to formulate capital structure is independent of the organization's value and its overall weighted average capital cost (WACC). Principally, in a faultless capital market, information is asymmetrical for everyone, and taxes, agency costs, bankruptcy costs, transaction costs, etc. do not exist. Later, M&M amended their first proposition and presented Propositions II and III. In comparison with MM theory, the Trade-Off theory proposes the idea of an ideal blend of financial resources and explains that a firm can create an optimum capital structure after adjusting its debt and equity level. Subsequently, the theory of Pecking Order suggests that firms first select their available funds i.e. retained earnings, and then move for the other option i.e. debt, and in the end, equity to generate its capital structure [29].

Formerly, numerous studies investigated country-specific determinants of leverage for commercial banks that are functioning in SAARC countries. Remarkably, in the last few decades, the Central Banks and the Ministries of Finance of the SAARC countries have made several efforts and enhanced regulations for the industry. The banking industry is now compared and measured with metrics like profitability, tangibility, liquidity, and Size. For instance, Sheikh and Qureshi [25] inspected capital structure determinants for the banks operating in Pakistan. The Panel Data estimation methods such as Pooled OLS and Static models are nominated to examine leverage-preserving practices of the banks from 2004 to 2014. The outcome specified that tangibility and size i.e. sales have significant relationships with firms' leverage. Likewise, Saeed, et al. [30] explored the capital structure determinants that impact the performance of banks in Pakistan. This study utilized five years of data over the period from 2007 to 2011 and adopted the Multiple Regression model for investigation. The outcomes postulated that independent variables have significant relationships with capital structure. Notably, the capital structure is measured by profitability ratios which are earnings per share (EPS), ROE, and ROA, whereas, size indicates banking size and asset growth are adopted as control variables. The findings of both studies (see [25, 30]) explained that profitability, tangibility, and size are the core determinants that explain banks' capital structure formulation practices in Pakistan.

In the context of India, Goyal [31] explored the capital structure determinants for public sector banks that are listed in the Indian National Stock Exchange during the period from 2008 to 2012. By using the Regression Analysis technique, the findings exposed that profitability which is measured by return on equity, return on assets, and earnings per share are the core determinants of short-term debt i.e. capital

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structure. This study concluded that profitability is the core determinant that explains the capital structure of listed banks in India. Similarly, Chavali and Rosario [32] examined capital structure-connected determinants of selected financial firms that are not involved in banking-related business and listed on the Indian National Stock Exchange. The findings concluded that net profit margin, return on equity (ROE), interest ratio, return on capital (ROC), and return on assets (ROA) have a substantial influence on financial firms in India. Also, Pinto, et al. [33] investigate the adoption of external debt on the income of Indian banks. This investigation adopted 21 public and private sector banks' data of total five years. Three selected variables, net profitability, return on capital i.e. ROC, and margin on net interest were taken as the main capital structure determinants whereas, profitability-related variables were used as control variables. Besides, the debt to total assets and debt to equity were used as capital structure proxies. The result indicated that the financial risk for the banking industry is falling with the decrease in its debt-to-equity ratio. In conclusion, this study also delivered strong evidence of significant relationships among nominated capital structure variables with profitability, net interest margin, and return on capital. Clearly, in India profitability (see [31, 33]) and tangibility (see [31, 32]) are indicated as core determinants of the banking sector.

Velnampy and Niresh [34] investigated capital structure determinants of 10 listed Sri Lankan banks over the period from 2002 to 2009. The results explained significant negative relationships between capital structure and profitability variables with the exemption of return on equity. Further, they concluded that Sri Lankan banks were highly leveraged financial institutes. Similarly, Tharangani and Wijesinghe [35] investigated capital structure determinants of licensed commercial banks in Sri Lanka. This study analyzed extracted Panel Data over the period from 2006 to 2015 by adopting a regression analysis technique. The results reported a significant negative association between the debt-to-equity ratio and return on assets, whereas, debt to total fund was found significantly positive with return on assets. Besides, the debt-to-equity ratio is also reported positive and significant association with firms' profitability i.e. return on equity. The former studies in Sri Lanka's context reported an important association of profitability and tangibility with capital structure (see [34, 35]).

In the context of Bangladesh, Siddik, et al. [26] revealed the impact of leverage-preserving practices on banks' profitability by using Panel Data of selected 22 banks from the period 2005 to 2014. Total liability, short-term liability, and long-term liability are adopted to measure the banks' capital structure, however, return on equity, earnings per share, and return on assets are used to represent financial performance. The outcomes presented a reverse but important association between industry and capital structure. In addition, Hossain and Yakub [36] executed an inquiry to discover Bangladesh's banking sector capital structure determinants. This inquiry adopted 47 Bangladesh public sector banks from the period 2008 to 2012. The capital structure is analyzed by the debt-to-asset ratio whereas tangibility, liquidity, and profitability are tested as independent determinants. The outcomes explained a negative and substantial relationship between asset tangibility and capital structure. Most recently, Zahid, et al. [37] explored capital structure factors for Shariah and Non-Shariah banking sector in Bangladesh. The seven-year Panel Data from 2010 to 2017 is used to examine capital structure determinants of 6 Shariah and 18 Non-Shariah banks. The outcomes specified a significant association between GDP, return on equity, and return on assets with banks' capital structure. Remarkably, the investigation conducted by Zahid, et al. [37] also specified profitability and tangibility as core capital structure elements for banks functioning in Bangladesh.

From the above discussion, it is evident that former investigations delivered clear indications that tangibility, profitability, and size are those core determinants that explicated capital structure preserving practices of banks functioning in the SAARC continent (see for example [25, 26, 30-33, 35-38]). However, these investigations focused only on particular individual countries and ignored the region-specific determinants. Moreover, the current scenario of the region specifies the financial imbalances in the member countries which increases risk factors for the banking industry of South Asia. Having considered the above-discussed literature, this study also explores the impact of risk factors that are non-performing loans (NPL), loan ratio, and risk-weighted assets on the leverage-sustaining practices of the selected banks

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that are operative in the region. Also, following the practices of former researchers (see [8, 26, 39]) the macroeconomics variables that are gross domestic products (GDP) and inflation rate are adopted to check their influences on the regional banks capital structure maintaining practices. Keeping in view the discussed literature, the associated hypotheses of this study are:

H_1: There is a positive association between banks' capital structure and liquidity (LIQ).
H_2: There is a negative association between banks' capital structure and tangibility (TANG).
H_3: There is a positive connection between banks' leverage and profitability (ROA).
H_4: There is a positive connection between banks' leverage and profitability (ROE).
H_5: There is a negative connection between banks' leverage and Growth (GRO).
H_6: There is a positive connection between banks' leverage and risk (LR).
H_7: There is a positive connection between banks' leverage and credit risk (NPL).
H_8: There is a positive connection between banks' leverage and credit risk (RWS).
H_9: There is a positive connection between banks' leverage and inflation (INF).
H_{10}: There is a connection between banks' leverage and gross domestic product (GDP).
H_{11}: There is a significant dynamic association between banks' leverage and selected determinants.

3. Data and Methodology

This analysis is set to recognize the determinants of capital structure for the banks that are effective in the key republics of the SAARC region which are Sri Lanka, India, Bangladesh and Pakistan. For that purpose, a total of 52 banks' eleven years i.e. 2012 to 2022 Balance Panel data is extracted from the Thomson Reuters Eikon database. A Balance Panel Data set contains the same set of both time series and cross-sectional observations of individuals such as firms, countries, etc. without missing any values [9]. Moreover, considering the previous investigators practices in a capital structure (see [40-42]) the Purposive sampling method is used to construct a data set. The purposive sampling technique also named as the judgmental sampling technique, allows researchers to construct a sample set by their judgment [43]. Notably, other SAARC member countries are excluded from the data sample because of the inaccessibility of data. Furthermore, after an extensive review of the literature, this inquiry considers eleven explanatory variables and one dependent variable to perform the analysis. Table 1 explains the nominated variables, their symbols, and measurements.

Table 1.
Nominated capital structure determinants for SAARC banks.

S#	Variables		Acronym	Measurement	References
1	Dependent variable	Leverage	LEV(Y)	Total debt /Total assets	Diaz and Tin [41] and Anarfo [42]
2	Standard capital structure explanatory variables	Liquidity	LIQ(X_1)	Current assets/ Ready Assets	Pervin and Nowreen [44] and Siddiqui [45]
3		Tangibility	TANG (X_2)	Tangible fixed assets / Total assets	Anarfo [42]; Amidu [46]
4		Return-on- assets	ROA(X_3)	Net income / Total assets	Siddik, et al. [26] and Anarfo [42]
5		Return-on- equity	ROE(X_4)	Net income / Total equity	Siddik, et al. [26]
6		Growth	GRO(X_5)	(Assets of present year-assets of prior year)/Assets of the prior year	Siddik, et al. [26] and Amidu [46]

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S#	Variables		Acronym	Measurement	References
7	Internal risk variables	Loan-ratio	LR(X_6)	Loans-net/Deposits-total	Allen and Powell [47].
8		Non-Performing Loan (Credit Risk)	NPL(X_7)	Non-performing loan/Total loans	Allen and Powell [47].
9		Risk- weighted-asset (Credit risk)	RWS(X_8)	Risk-weighted assets/Total Assets	Allen and Powell [47].
10	Control variable	Size	SIZE (X_9)	Ln (Total assets)	Khan, et al. [8]; Diaz and Tin [41] and Anarfo [42]
11	Macroeconomic variables	Inflation	INF (X_{10})	Yearly inflation rate	Toumi [39]; Khan, et al. [8] and Siddik, et al. [26]
12		Gross domestic products	GDP (X_{11})	Yearly GDP rate	Toumi [39]; Khan, et al. [8] and Diaz and Tin [41]

Note: Y designates the dependent, whereas, X clarifies the independent variables.

Table 1 elucidates the designated variables and their measurement for this study. The leverage ratio is used to estimate selected countries' banks' capital structure. Likewise, LIQ designates banks' liquidity, TANG is adopted to calculate banks' tangibility. The banks' profitability is explored by accepting two financial ratios, which are return on assets i.e. mentioned as ROA and return on equity i.e. mentioned as ROE. The banks' growth is calculated by using a growth ratio which is mentioned as GRO. Importantly, considering the economic condition of the SAARC region this study also adopts those determinants that calculate existing risk for the banking sector such as loan ratio i.e. specified by LR. Technically, the loan ratio is used to check the banks' liquidity position. Remarkably, This study adopts LIQ and LR to analyze the liquidity position and liquidity risk for banks operating in the SAARC region. The BCBS explains that in liquidity risk banks are not able to raise their funds for assets or liabilities with the low cost. The liquidity position specifies the ability of banks to meet all overdue payments [48]. Also, non-performing loans i.e. NPL and risk-weighted assets mentioned as RWS are used to analyze credit risk [49]. The credit-risk is the financial loss that banks face due to borrowers' failure to repay their loans. Typically, one of the core functions of the banks is credit risk management. The microeconomic variables such as gross domestic product which is indicated as GDP and inflation and symbolized as INF are adopted to check these microeconomic variables' impact on capital structure maintaining practices of SAARC countries' banks.

Analytically, the Panel Data approaches which are Static and Dynamic methods are adopted to discover the association among the selected variables. Thus, this investigation also adopts the Panel Data Dynamic model by considering the practices of earlier researchers (see [50, 51]) who explained that the banks' capital structure is dynamic in form. To investigate the dynamic relationship, a vigorous estimation technique which is considered the best to execute dynamic investigation called the two-step Generalized Method of Moments (GMM) is mobilized that also recognizes significant variables and the speed of adjustment (SOA). The SOA clarifies that the banks' capital structure diverges from its optimum or targeted level, though, in the presence of SOA, it rapidly returns to its best level [52]. Precisely, the GMM assessor is measured as the best evaluator to identify the dynamic associations and adjustment speed i.e. SOA among the chosen dependent and independent variables [53]. Typically, the first-step GMM is constructed as a main evaluator, though, the two-step GMM possesses additional characteristics and is also able to measure the SOA. Moreover, it reduces the issue of endogeneity in the constructed model which exists due to the presence of any significant association between nominated variables and the model error term [54]. The basic model for Panel Data is displayed in Equation 1.

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$$y_{it} = \alpha_i + \gamma_t + \beta x_{it} + \varepsilon_{it} \quad (1)$$

In Equation 1, 'i' specifies individuals and 't' explains the designated time period of this study, 'y_{it}' designates the nominated dependent determinant of this investigation, 'α_i' is the cross-sectional functions and then 'γ_t' are functions of dissimilar time series through the certain time period. Likewise, 'x_{it}' specifies the nominated independent determinants and 'ϵ_{it}' specifies the error term of the created model.

Analytically, the below give Equation 2 explicates the liner equation of a single dynamic model for the two-step GMM model.

$$y_{it} = (1 - \lambda)\, y_{i,t-1} + \beta_1 k_{it} + \beta_2 X_{it} + \mu_{it} \quad (2)$$
$$i = 1 \ldots 46, t = 1,2,3,4, \ldots,11$$

This inquiry considers the above model of Equation 2 to examine selected determinants and their SOA by executing a two-step GMM. Technically, this empirical inquiry has selected the Panel Data Static and Panel Data Dynamic models that were earlier implemented by Zandi, et al. [54] and Rehan and Abdul Hadi [55]. Equation 3 explains the Panel Data POLS model, whereas, Equation 4 and Equation 5 explain Panel Data Static models which are Panel Data Fixed and Randoms effect models. Similarly, Equation 6 clarifies the constructed model for a Panel Data Dynamic investigation.

1. Pool Ordinary Least Squares (POLS) Regression Model

$$LEV_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 TANG_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 GRO_{it} + \beta_6 LR + \beta_7 NPL_{it} + \beta_8 RWS_{it} + \beta_9 SIZE_{it} + \beta_{10} INF_{it} + \beta_{11} GDP_{it} + \varepsilon_{it} \quad (3)$$

2. Panel Data Fixed Effects (FE) Regression Model

$$LEV_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 TANG_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 GRO_{it} + \beta_6 LR + \beta_7 NPL_{it} + \beta_8 RWS_{it} + \beta_9 SIZE_{it} + \beta_{10} INF_{it} + \beta_{11} GDP_{it} + \mu_{it} \quad (4)$$

3. Panel Data Random Effects Regression Model (RE)

$$LEV_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 TANG_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 GRO_{it} + \beta_6 LR + \beta_7 NPL_{it} + \beta_8 RWS_{it} + \beta_9 SIZE_{it} + \beta_{10} INF_{it} + \beta_{11} GDP_{it} + \varepsilon_{it} + \mu_{it} \quad (5)$$

4. Panel Data Dynamic Regression Model

$$LEV_{it} = (1 - \lambda) LEV_{i,(t-1)} + \beta_1 LIQ_{it} + \beta_2 TANG_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 + \beta_6 LR + \beta_7 NPL_{it} + \beta_8 RWS_{it} + \beta_9 SIZE_{it} + \beta_{10} INF_{it} + \beta_{11} GDP_{it} + \varepsilon_{it} + \mu_{it} \quad (6)$$

The introduced variables in Equations 3, 4, 5, and 6 I are already explained with their symbols and measurements in above given Table 2. Moreover, 'ε_{it}' explains an error term, whereas, 'μ_{it}' indicates a random difference. Moreover, in Equation 6 the $(1 - \lambda) LEV_{i,(t-1)}$explained the legged variable of the nominated dependent variable.

Notably, the POLS regression is considered as the finest model, especially, for those samples that are homogeneous [56]. The homogeneous sample sets are those in which units share alike features such as gender, age, etc [57]. Additionally, this empirical study also executes numerous diagnostic tests to find the accuracy of the created model. First, by following the practices of earlier scholars (see [58-60]) this inquiry performs a Pearson Correlation matrix analysis which is executed to check the connection among the designated determinants. According to the described standard, if the Pearson Correlation test coefficient is found at number +1 it means a precise and positive relation exists among these variables, however, if it is observed at -1 then it classifies the precise and negative association between the explored variables. Moreover, if the coefficient figure is detected at 0, it means the absence of any association in the measured determinants [61]. Likewise, the test of Variance Inflation Factor (VIF) is also executed to find the presence of any association i.e. multicollinearity in the selected variables.

The problem of multicollinearity is detected due to accurate correlation among the selected determinants of the constructed model. Fundamentally, the multicollinearity is present, if the VIF test outcome surpasses value 10 [62, 63]. The analytical model of the VIF diagnostic test is portrayed in Equations 7, 8, and 9.

$$R^2Y \longrightarrow Y_{it} = \alpha_0 + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + e_{it} \quad (7)$$
$$j = R_Y^2, R_{X1}^2, R_{X2,}^2 R_{X3,}^2 R_{X4,}^2 R_{X5}^2 \quad (8)$$

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$$Tolrance = 1 - R_j^2 \qquad VIF = \frac{1}{Tolerance} \qquad (9)$$

After confirming the accuracy of the constructed models, the individual properties are assessed by using the Breusch-Pagan Lagrange-Multiplier (BPLM) test. Likewise, the Fixed Effects (FE) and the Random Effects (RE) features of individuals are recognized by implementing the [72] test. Typically, the test of Hausman adopts the m-statistics of the BPLM test to recognize the correct hypothesis. The acceptance of the null hypothesis (H_0) of this test explains that the POLS is the best to perform the analysis. However, the acceptance of the alternative hypothesis (H_1) indicates that the RE model is appropriate to perform the investigation. Remarkably, Hausman's test specifies the best model from the Panel Data both models that RE and FE [64]. The Equation 10 explains the Hausman test statistical model:

$$H = (b_1 - b_0)(Var(b_0) - Var(b_1))(b_1 - b_0) \qquad (10)$$

Additionally, this study also performed a dynamic analysis to find the dynamic determinants for the South Asian banks and their speed of adjustment. For this purpose, the robust estimation via GMM assessor is performed. Besides, the diagnostic problems connected with the GMM investigation are checked by the Sargan and Autocorrelation tests. The GMM diagnostic test, named as Sargan test, is implemented to check the issue of exogeneity. Similarly, the Autocorrelation test, also named 'AR(m)' test, is performed to explore the designated variables' dependence on their former values. Interestingly, the GMM assessor eliminates these both analytical problems that are autocorrelation and exogenity from the selected model [53].

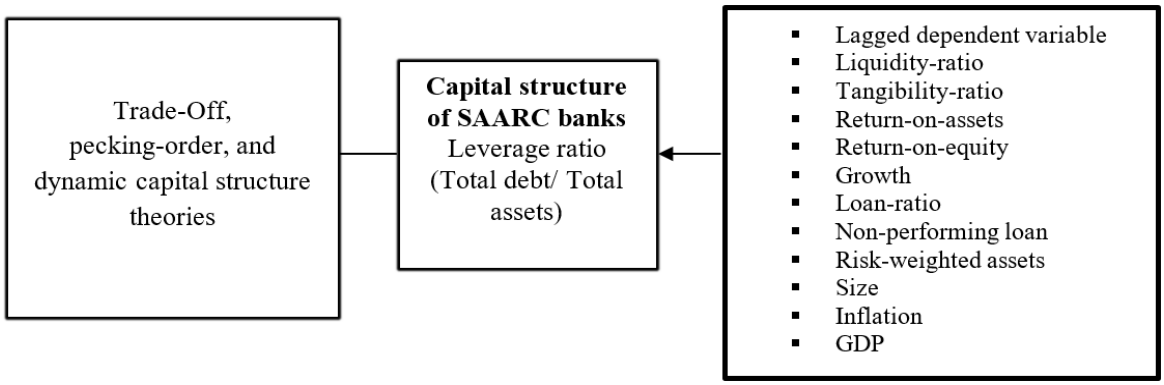

Figure 1.
Theoretical framework for SAARC bank capital structure determinants.

The Figure 1 describes the created framework to execute this empirical inquiry. The designated dependent variable and explanatory variables are clarified in above given Table 1. The adopted capital structure theories which are the Trade-off theory, the Pecking-Order theory, and their Dynamic versions are tested to find the capital structure preserving practices of SARRC banks.

4. Findings

To execute the analysis, all of the designated determinants such as leverage ratio which is nominated as a dependent variable, assets tangibility (TANG), profitability (ROA and ROE), growth (GRO), loan ratio (LR), non-performing loans (NPL), Risk-weighted assets (RWS), Size (SIZE), inflation (INF) and gross domestic products (GDP) are coded into SAS analytical software. The descriptive statistics analysis of all selected variables which are displayed in below given Table 2, is performed to realize the nominated variables behaviour by their minimum values i.e. mentioned as Min, mean, maximum values i.e. mentioned as Max and the values of standard deviation i.e. mentioned as Std. Dev.

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Table 2.
Descriptive analysis.

Variables	Obs.	Mean	Min.	Max.	Std. dev.
LEV	572	0.861	0.625	9.347	0.3670
LIQ	572	12.371	3.2017	33. 137	4.630
TANG	572	22.265	25.045	70.315	21.573
ROA	572	0.989	-3.379	4.573	0.637
ROE	572	0.847	-2.478	5.322	0.532
GRO	572	16.411	-40.519	100.000	11.321
LR	572	0.020	-0.045	0.065	0.009
NPL	572	0.638	0.093	1.812	0.411
RWS	572	0.531	0.073	1.372	0.431
SIZE	572	17.236	-30.214	80.312	13.517
INF	572	6.929	3.213	-0.900	3.121
GDP	572	7.324	-2.312	9.627	1.035

The results clarify that the value of the mean of the selected dependent determinant i.e. leverage ratio (LEV) is at 0.861. Similarly, the LIQ mean figure is 12.37, the TANG mean value is observed at 22.265, the ROA mean is at 0.989, and the ROE mean value is observed at 0.084. Moreover, in GRO which describes the growth of nominated SAARC banks, the mean figure is at 16.411. After that, the mean value of LR is found at 0.0208, the NPL mean figure is detected at 0.6381 and the RWS mean is stated at 0.531. The mean values of control variables that are Size, INF, and GDP are found at 17.32, 6.929, and 7.32 respectively. Visibly, the attained data does not demonstrate any kind of disparities, as all the figures are noticed closer. Furthermore, the Std. Dev i.e. standard deviation of all the selected determinants are not greater than their average values. Subsequently, this inquiry performed a Pearson correlation matrix and then VIF tests to examine any statistical association among the designated variables. The outcomes obtained from the execution of the Pearson correlation test are displayed in below given Table 3.

Table 3.
Pearson correlation matrix for SAARC banks.

Variables	LEV	LIQ	TANG	ROA	ROE	GRO	LR	NPL	RWS	SIZE	INF	GDP
LEV	1	-	-	-	-	-	-	-	-	-	-	-
LIQ	0.703	1	-	-	-	-	-	-	-	-	-	-
TANG	-0.194	0.417	1	-	-	-	-	-	-	-	-	-
ROA	0.042	0.031	0.099	1	-	-	-	-	-	-	-	-
ROE	0.316	0.521	0.217	0.126	1	-	-	-	-	-	-	-
GRO	0.072	0.027	0.021	0.421	0.084	1	-	-	-	-	-	-
LR	0.137	0.031	0.006	0.021	0.069	0.025	1	-	-	-	-	-
NPL	0.155	0.163	0.024	0.113	0.133	0.412	0.054	1	-	-	-	-
RWS	0.066	0.014	0.628	0.022	0.052	0.321	0.612	0.431	1	-	-	-
SIZE	0.046	0.018	0.628	0.052	0.042	0.261	0.512	0.382	0.233	1	-	-
INF	0.055	0.011	0.418	0.013	0.022	0.611	0.421	0.561	0.542	0.451	1	-
GDP	0.087	0.01	0.428	0.052	0.082	0.512	0.512	0.381	0.316	0.917	0.562	1

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The correlation matrix for SAARC banks is displayed in Table 3. Visibly, the results describe very weak associations among the studied determinants. It explained that the multicollinearity problem in developed models is improbable. Besides, this inquiry also conducts a 'VIF' assessment to check the existence of multicollinearity among the nominated determinants. The outcomes obtained from the VIF test are as given below:

Table 4.
VIF diagnostic test outcomes.

Variables	'VIF'	'1/ VIF'
LIQ	2.661	0.376
TANG	2.211	0.452
ROA	2.643	0.378
ROE	3.125	0.320
GRO	2.633	0.380
LR	5.121	0.195
NPL	2.206	0.453
RWS	2.901	0.345
SIZE	2.020	0.495
INF	2.111	0.474
GDP	2.313	0.432

Table 4 demonstrates the results gained from the execution of the VIF diagnostic assessment. The results specify that all variable values for VIF and 1/VIF are below the level of 10. Thus, it describes the absence of any sort of significant relation or the presence of multicollinearity among the investigated determinants. Afterward, the BPLM test is implemented to explore the fitting model for investigation between POLS and RE models. Thus, Table 5 specifies the findings obtained from the BPLM test.

Table 5.
BPLM test (Two-way).

H_0: POLS is a fitted model H_1: RE is a fitted model	
'm-value'	**'P > m'**
9754	0.007

Clearly, the attained value of p from the BPLM test in above given Table 5 indicates not to accept the H_0. Hence, the obtained results explain that the R.E assessment is more suitable than the POLS. After the confirmation of the RE analysis, this study implemented the Hausman assessment which results are displayed in Table 6.

Table 6.
Hausman's test outcomes.

H_0: RE is fitted model H_1: FE is fitted model	
'Chi-square-test-value'	9.116
P - value	0.6103

Clearly, the outcomes reveal that the figure of 'p' is greater than the explained criteria i.e. 'p< 0.05'. Therefore, the RE model is selected for the analysis and comparatively more fit than the FE. The outcomes accomplished from the RE model are displayed below in Table 7.

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Table 7.
Random effects results for SAARC banks.

'Wallace-Hussain': 'Two-way-random-effects'				
Variables	**Estimate**	**Standard error**	**'t-value'**	**'Pr > |t|'**
Intercept	0.1712	0.0681	2.5140	0.0119
LIQ	-0.1832	0.0635	-2.8850	0.0039**
TANG	0.0231	0.0041	5.6341	0.0001**
ROA	0.0141	0.102	0.1382	0.8901
ROE	0.1126	0.0261	4.3142	0.0001**
GRO	0.0512	0.013	3.9385	0.0001**
LR	2.118	1.326	1.5973	0.1102
NPL	0.0631	0.0131	4.8168	0.0001**
RWS	0.0133	0.101	0.1317	0.8952
SIZE	0.0642	0.131	0.4901	0.6421
INF	0.0611	0.0112	5.4554	0.0001**
GDP	-0.0541	0.0112	-4.8304	0.0001**
R-square				0.7033

Note: ** significant at the level of 5%.

Table 7 shows the results attained from the implementation of the RE model. The designated determinants of capital structure are TANG (tangibility), ROE (return on assets), GRO (growth), NPL (non-performing loans), and INF (inflation) have positively significant influences on capital structure formulating practices of SAARC countries banks. However, LIQ (liquidity) and GDP (gross domestic product) are observed as negative but significant determinants for banks that are working in the region of SAARC. Notably, the R-Square (0.7033) specifies that the examined model is fitted.

Additionally, this analysis also executes the dynamic investigation to find the existence of dynamic determinants and SOA for the SAARC countries' banks. Thus, the next tables explain the dynamic inquiry which is performed by executing GMM assessment. Also, this study performed diagnostic assessments to check the model's fitness. Table 8 clarifies the Sargan test outcomes for this empirical investigation.

Table 8.
Sargan diagnostic test for GMM analysis.

H_0: The nominated instruments are effective H1: The nominated instruments are not effective	
Statistics	**'Prob' > ChiSq**
48.22	0.1931

The outcomes obtained from the Sargan test in Table 8 postulate the absence of exogeneity issue, thus, the null hypothesis (H_0) is recognized. Moreover, the test results designates that the designated instruments are not connected with residuals. Table 10 displays the results accomplished from autocorrelation assessment which is implemented to identify any sort of serial correlation problem in the constructed Panel Data Dynamic model.

Table 9.
Autocorrelation (AR(m)) for GMM analysis.

H_0: Autocorrelation issue is not exist H_1: Autocorrelation is exist		
Lag	**Statistics**	**Prob > ChiSq**
1	-8.11	0.921

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The results displayed in Table 9 stipulate that the dynamic model is free from the Autocorrelation problem. Hence, the null hypothesis (H_0: Autocorrelation does not exist) is not rejected. Technically, the results obtained from the AR(m) test explain that the designated determinants are not linked with residuals. Subsequently, after finding that the GMM dynamic model is free from any diagnostic problem, the GMM analysis is executed. The attained outcomes from GM analysis are presented in Table 10.

Table 10.
GMM analysis for dynamic determinants of SARRC banks.

GMM: First differences transformation				
Estimation method: Two-step GMM				
Parameter estimates of lev model for SAARC banks				
'Variables'	LEV model (Lagged dependent variable = LEV_1)			
	'Estimate	**Std. error**	**t-value**	**'Pr' > '|t|'**
Intercept	-0.0131	0.0233	-0.5622318	0.574
LEV_1	0.1711	0.0772	2.2163	0.0267**
LIQ	-0.2151	0.2324	-0.9256	0.3547
TANG	0.2463	0.2112	1.1662	0.2435
ROA	0.2451	0.0612	4.0049	0.0001**
ROE	0.1821	0.0513	3.5497	0.0004**
GRO	0.2635	0.0414	6.3647	0.0001**
LR	0.3513	0.2122	1.6555	0.0978
NPL	0.0631	0.0211	2.9905	0.0028**
RWS	0.411	0.319	1.2884	0.1976
SIZE	0.264	0.2453	1.0762	0.2818
INF	0.2825	0.2313	1.2214	0.2219
GDP	-0.0746	0.0212	-3.5189	0.0004**

Note: ** significant at the level of 5%.

The outcomes displayed in Table 10 disclose that lagged variable i.e. LEV_1, ROA, ROE, GRO, and NPL have significant figures and contain positive influences on the capital structure maintaining practices of the SAARC countries' banks. Likewise, GDP has a significant but negative influence on the capital structure of the nominated countries' banking industries. Also, the positive and significant figure of the lagged variable i.e. LEV_1 clarifies the occurrence of the dynamic nature of banks' leverage and also the SOA for the banks that are functioning in the region. Statistically, the coefficient value of the lagged determinant is at 0.1711 and its p figure is at 0.0267. This infers that in case of deviation in SAARC countries, banks targeted capital structure levels the adjustment speed i.e. SOA for its optimal level is 82% (1-0.1711 = 0.8289). This illustrates that the banks operating in the SAARC region return toward their equilibrium or required position l of capital structure in one year and two months only (100 ÷ 82 = 1.219). Hence, the lagged determinant and the occurrence of SOA designated that the theory of Dynamic Trade-off is dominant among other theories in the SAARC countries' banking sectors.

5. Discussion

The capital structure determinants for banks that are operational in the SAARC nations is still an unsolved problem. On the other side, the recent economic and financial landscape of the region is not satisfactory and leaving adverse impacts on the entire Banking industry of the region. For instance, in April 2022 Sri Lanka's central bank declared bankruptcy and financial default [65]. Likewise, Pakistan is also facing a financial crisis and rising interest rates negatively impact its banking sector performance [66]. The World Bank also forecast a high rate of inflation for Bangladesh in 2023 and 2024 [21]. Similarly, the up surging interest rate and shortage of liquidity slow down the Indian banks' credit growth [20]. Considering the circumstances, this empirical inquiry is set to inspect the capital structure

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determinants for the entire banking industry that is functioning in the SAARC region. Notably, the formulation of an optimum capital structure declines the cost incurred on availing external capital but it also enhances the value of the firms, thus, moving them towards their main target i.e. profitability. To perform the empirical investigation, this study used 52 banks that are functioning in India, Pakistan, Sri Lanka, and Bangladesh. The eleven years' i.e. from 2012 to 2022 Panel Data is gathered to investigate the capital structure preserving practices of nominated regional banks.

The outcomes gained from the Static Model of Panel Data designate that liquidity (LIQ) and gross domestic products (GDP) have negative, whereas, tangibility (TANG), profitability (ROE), growth (GRO), non-performing loan (NPL) and inflation rate (INF) have positive impacts on capital structure preserving practices of the banks that are operational in the SAARC region. Interestingly, in line with the Static Model outcomes, the Panel Data Dynamic estimation via GMM also confirms the negative association between GDP and the positive association of GRO, ROE, and NPL. Additionally, GMM estimation confirms that ROA is a positive and significant capital structure determinant for SAARC countries' banking industry. Technically, the negative LIQ via the Static model confirms that banks functioning in the SAARC region face a shortage of liquid assets to cover their obligations. For instance, Sri Lanka and Pakistan are facing the worst economic disasters and are not able to settle their foreign obligations. The outcomes are matched with the discoveries of Gorodilov and Sokolov [67] and Anderson [68] who indicate a negative relationship between banks' liquidity and capital structure. Nevertheless, the results contradict the outcomes of Oanh, et al. [69] who explain a positive relationship of liquidity with Vietnam banks' capital structure. Moreover, the significant growth, tangibility, and profitability (ROE and ROA) via GMM estimation specify that the growing banking sector plays a noteworthy role in the SAARC economies. Clearly, despite the worst economic situation, the banking sector of Pakistan experienced significant growth in deposits and investments during the last five years [70]. The results are matched with the supposition of Sumaira and Bibi [71] who specify that bank-connected financial growth boosts the economic and financial growth of the South Asian countries.

Likewise, the significant non-performing loan (NPL) indicates that South Asian banks granted additional loans to their customers. Typically, the extreme percentage of NPLs is directly connected with the banking industry failure and it leads toward financial fiascos in both developed and non-developed countries [72]. The non-performing loan disturbs economic efficiency, growth and increases credit risk. The significant inflation via the Static model postulates that an increase in NPLs also upsurges the inflation rate in the region. In the same vein, the negative but significant GDP is evident that the SAARC banks' NPLs impacted negatively on the regional GDP. The results are consistent with the conclusion of Ekanayake and Azeez [73] who explained the negative association of GDP with NPLs in the context of Sri Lanka. Also, the results are in line with the findings of Takahashi and Vasconcelos [74] who clarified that significant NPLs negatively impact on the efficiency of the banks. Remarkably, the significant and positive lagged dependent variable, growth, and significant control variable i.e. size confirm that the capital structure of the SAARC banks is dynamic in nature and possesses SOA. The existence of SOA directly infers the significance of the Dynamic Trade-off theory in explaining the capital structure preserving practices of banks that are operating in the SAARC countries. Overall, the outcomes sustenance the validation of constructed Hypotheses 2, 3, 4,7,10, and 11.

6. Conclusion, Policy Implications and Limitations

The assessment of the capital structure determinants for the banks that are functioning in the SAARC member countries is an unsettled issue. Hence, this investigation is designated to discover the main determinants of capital structure for the banks that are functioning in the key countries of the SAARC region such as India, Pakistan, Sri Lanka and Bangladesh. The results explains that tangibility, growth, liquidity, profitability, non-performing loans, gross domestic product and size are the significant determinants that influence the capital structure formulating practices of the SAARC countries banking industry. Also, the positive significant lagged variable confirms the existence of the dynamic nature of capital structure and speed of adjustment (SOA). Thus, the significant tangibility, size, growth and SOA

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indicate that among others the Dynamic Trade-off theory is more appropriate to clarify the capital structure preparation practice of the banks that are situated in the region of SAARC.

The attained outcomes bring a fresh understanding of banks' significant capital structure determinants which are functioning in main SAARC countries. Furthermore, it offers a guideline for policymakers to develop unique policies about capital structure formulation choices for the banks that are operating in the South Asian region. Undoubtedly, the regional-level parallel policies implementation for capital structure formulation helps banks handle all sorts of financial fiascos and maintain financial performance in dissimilar inflation regimes. In the long-term, the regional level similar policies adoption will enhance SAARC countries' banking sector integration and help to control ongoing and foreseen negative impacts of worst economic situations on the banking industry.

The important restraint for capital structure-related inquiries is the inaccessibility of finance-related data which is the key limit for recognizing significant capital structure elements [75]. Also, this inquiry omitted dissimilar countries of the region such as Afghanistan, Bhutan, Maldives, Nepal, and other variables from the raised sample set due to the unavailability of the data. Moreover, another restraint is that this investigation accepts only twelve variables to test as a capital structure determinant. Notably, only those main determinants are involved in the raised sample set whose designated period i.e. eleven years of data is available. Although, this study is limited to the SAARC region, however, its outcomes can be beneficial for other economic regions such as the Association of Southeast Asian Nations (ASEAN), the Organization for Economic Co-operation and Development (OECD), etc. The policymakers can also adopt and test the indicating significant determinants of this study in the other regions while constructing capital structure for their banking industry. Thus, future inquiries should add other economic regions, other SAARC countries, and macroeconomic determinants such as interest rate in their investigations.

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