Application of Panel Data Regression Model on the Capital Structure of Indian FMCG Sector for Determining its Possible Factors

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Abstract: This research article investigates the empirical determinants of capital structure decision of Indian FMCG industry. In the study, the analysis is focused on a sample of 15 BSE listed companies over 10 years' time-period ranging from 2012-13 to 2021-22. Secondary data were analyzed employing panel data regression approach. Following past empirical works, the observations were analyzed using STATA to run random-effects, fixed-effects and pooled regression models. Explanatory variables like, profitability, firm size, growth in assets, tangibility, NDTS, liquidity and variability in income are examined to find their association with capital structure choice considering three capital structure theories specifically Trade-Off theory, Pecking Order Theory and Agency Cost Theory. This research paper concludes that profitability, non-debt tax shields, firm size and liquidity determinants are essential in determining the capital structure policy in Indian FMCG sector. The regression analysis interprets that profitability and NDTS are positively associated with leverage, however, size and liquidity variables adversely linked to leverage and their impact is statistically significant too. The positive and significant effectiveness of profitability on leverage implies that higher profitability motivates the application of debt and instigates companies to get advantage of tax shields on payment of interest.

Keywords: Capital Structure, Leverage, Indian FMCG Industry, Firm-Specific Variables, Panel Data Analysis

INTRODUCTION

The Modigliani Miller Theory propounded by France Modigliani and Merton Miller (1958 & 1963), provide the base for extensive research and latest presentation on contemporary capital structure. The theory developed a proposition that assists companies to discover how taxes and financial distress influence a company's capital structure policy. In their irrelevant theorem, they suggested that under perfect market condition, it does not matter whether a company employed debt capital or equity capital for designing its capital structure to fund its operation. The theory highlighted that a company's operating profit is the main determining factor of its total value. Ever since ample research works have recommended these hypotheses and revised them to integrate further genuine and essential variables, like company and personal taxes (Miller, 1977), costs of bankruptcy (Myers & Pogue, 1974), and costs of agency (Jensen & Meckling, 1976), framing the trade-off theory; information asymmetry or the signalling theory (Ross, 1977) and Myers and Maljuf (1984) who expanded and drawn out the 'pecking order theory' initially proposed by Donaldson (1961). The finance literature on factors influencing capital structure choice is widely known for the presence of three popular theories namely, trade-off theory, agency cost theory and pecking order theory. Every theory offers a distinct description of corporate funding. According to trade-off theory (Myers, 1984), optimal capital structure is obtained by equating tax savings and bankruptcy costs. In accordance with pecking order theory (Donaldson, 1961 and Myers & Majluf, 1984) while companies adopt funding decisions where companies rely firstly on internal funds of financing and if this is insufficient for investment projects, the company goes in search of external funding from debt capital just as second option, then equity capital as the final source. The agency cost theory (Jensen & Mackling, 1976) postulates that debt carry fixed commitments, like interest on debt and payment of principal amount that have to be paid by the company. These commitments are supposed to be covered by company's free cash flow "if exist", consequently controlling managers behaviour of misusing companies' financial resources. Generally, capital structure denotes the mix of debt capital and shareholders' fund which is to fund companies' non-current assets and operations. Capital structure policy connotes an important long-term decision completed by the management team. To maximize worth of a company company's capital structure is closely connected to its financial performance like, assets and shareholders' fund. Previous studies massively recommended that capital structure can affect a

company's process and productivity. Many studies on influencing factors of capital Structure are laid the outcomes and usually combine. In this concern the institutional factors or countries specific-factors play a significant part to describe the diverse outcomes.

LITERATURE REVIEW

Literature Review of Foreign Study

Kouki and Said (2012) examined the capital structure determinants of 244 French listed companies (119 companies from industrial sector, 86 companies from service and trade sector, 23 companies from transport sector and 16 companies from oil sector) for a time-period of 10 years beginning from 1997 to 2007. The study evaluated the impact of explained variable scaled by long-term debt ratio represented by book leverage (ratio of long-term liabilities to total of long-term liabilities and book equity) and market leverage (ratio of long-term liabilities to total of long-term liabilities and market equity) and explanatory variables, specifically, company size, tangibility, growth opportunities, profit ability, NDTS, bankruptcy risk , funding gap, market timing. The study has also considered some controlled variables, like, free cash flow and ownership structure. The theories tested here are trade-off theory, pecking order theory and market timing theory. The study indicates to the presence of correlation among trade-off theory and financial deficit determinant; however, insignificant influence was observed for market conditions on leverage. Market timing is irrelevant for French companies. The importance of lagged measure in all analyses validates presence of dynamic adjustment procedure to a target level. Daskalakis, Balios and Dalla (2012) surveyed the factors of capital structure of 17317 non-financial SMEs in Greece belonging to 2004-2014, which further divided into two parts comprising growth period (2004-08) and recession period (2009-14). Under the study, the dependent variable is denoted by leverage (using three scales, firstly, total debt ratio proxied by total of short-term and long-term book value of debt to total assets; secondly, short-term debt ratio proxied by short-term debt to total assets and thirdly, long-term debt ratio proxied by long-term debt to total assets) and independent variables such as micro-economic variables (tangibility, size, growth, profitability, NDTS and trade credit) as well as macro-economic variables (credit supply, inflation rate and interest rate) are examined. The estimated results proposed that the behaviour and debt maturity influence the perseverance and

tenacity of association among independent factors and lending over various macro-economic conditions. Nejad and Wasiuzzaman (2015) inspected the determinants of 171 sample companies selected from 7 sectors and 63 industries listed on Bursa Malaysian Stock Exchange from 2005 to 2010. They have taken into consideration firm-specific determinants (growth opportunities, profitability, risk, size, tangibility, ownership, dispersion, board of directors' size, NDTS, firm's age, firm's assets,liquidity, dividend and tax), industry-specific determinants (industry leverage, Industry liquidity, industry-concentration) and country- specific determinants (GDP, inflation rate and lending rate) and the dependent variable include marked total leverage (ratio of book total debt to total firm value) .The ordinary least squares outcomes revealed that growth opportunities, profitability, size, ownership, dividend, industry leverage and inflation rate are significantly associated with leverage and GDP having weak significant bearing on leverage. Further a great variation in capital structure is linked with company's intrinsic features whereas industry and nation attributes are accountable for just 3.62 and 0.28 percent of variation in capital structure respectively. Yusuf,Al-Attar and Al-Shattarat (2015) considered 344 observations from industrial companies listed on Amman Stock Exchange for a time span of 6 years i.e. 2006-2011 to study the linkage between firm-specific variables, corporate governance and capital structure. They have analysed the impact of eleven explanatory factors (tangibility, size, firm risk, NDTS, profitability, liquidity, growth, ownership structure, non-executive structure, board size and CEO/dualityon explained factor leverage which is scaled by three ratios such as ratio of total debt to total assets, ratio of short-term debt to total assets and ratio of long-term debt to total assets. The study concluded that Jordanian companies' capitalstructure is determined by firm-specific variables as well as corporate governance which generate goodbase for obtaining short-term loans which lead to lessen agency hazards and refunding risk. Vo (2016) used GMM regression approach for Vietnamese companies to analyse the factors of capital structure during 2006 to 2015. They have taken into consideration five explanatory factors namely (growth, company size, profitability, tangibility and liquidity) and dependent factor, i.e., leverage specified by three ratios, viz., short-term debt ratio (short-term debts divided by total assets), long-term debt ratio (long-term debt divided by total assets) and ratio of long-term debt divided by short-term debt. The findings explored that tangibility and size have the significant impact on long-term leverage measure and significant negative influence on short-term leverage measure.

On the other hand, tangibility, profitability, size and liquidity have significant negative effect on short-term leverage measure. Furthermore, tangibility, liquidity and growth have significant positive influence on long-term to short-term debt ratio, however, company size has significant inverse bearing over long-term to short-term debt ratio. The GMM regression estimation denotes that independent variables determining capital structure are diverse for long-term and short-term leverage measures. Gharaibeh and Saqer (2020) studied the pivotal variables of capital structure of Jordian service sector including 45 sample companies listed on Amman Stock Exchange during five years study period extending from 2014 to 2018 employing panel data regression method. In the study, regressors are represented by size, tangibility, profitability, growth, business risk, NDTS, institution ownership and regresand is symbolized by leverage (total debt to assets ratio). They found that size and NDTS have positively significant, though, profitability and business risk have negatively significant linkage with leverage. The study has remarked that the trade-off, bankruptcy cost, agency cost and pecking order theories are vital in describing the Jordian service sector's capital structure excluding factors like NDTS and tangibility. Abdulazeer et al. (2020) used technique of staticand dynamic pane data evaluation method and GMM estimation on 827 non-financial companies listed on Malaysian stock market. The estimated outcomes interpreted that tax-shied, profitability, liquidity, growthopportunity and volatility of cash flow have significant negative connectivity with debt ratio and in opposition, collateral value, earnings volatility and non-debt tax have significant positive linkage with debt ratios. Besides company age, inflation rate, company size and interest rate play crucial role in deciding present value of debt capital. They also found inverted U-shaped association among company age and capital structure. As a whole, the study has generated evidences in agreement with the postulation of pecking order and trade-off hypotheses.

Literature Review of Indian Study

Dhingra and Dev (2016) applied panel data technique to investigate the determinants of capital structure for Indian oil sector comprising 10 sample companies. The study has taken into account five explanatory variables viz., profitability, tangibility, business risk, solvency, financial strength and leverage (ratio of total debt to total assets and ratio of long-term debt to total assets) signifies explained variable. The results interpreted that all explanatory variables play vital role in capital structure decision. Further, companies adopt various

policies toframe their capital structure regardless that they pertaining to the similar sector. Sethi and Tiwari (2016) used GMM method on an unbalanced panel of 1077 companies to evaluate the determinants of capital structure in case of Indian manufacturing industry for the 13 years study period i.e., from 2000-01 to 2012-13. The study considered seven independent variables, namely, profitability, size, growth, tangibility, NDTS, uniqueness, signal and dependent variable as leverage measured by three ratios, viz., ratio of total external debt to total asset, ratio of long-term debt to total assets and ratio of short-term debt to total asset. The estimated results suggest that profitability, size, growth, tangibility, NDTS, uniqueness, and signal have statistically significant impact on leverage. Moreover, the pecking order theory and static trade-off theory support the resultant outcomes. Sathyanarayana, Harish and Kumar (2017) conducted study on determining factors of capital structure applying linear multiple regression model for capital goods, FMCG, infrastructure and IT industry belonging to the study period from 2006 to 2015. The study included seven independent factors, namely, tangibility, size, profitability, growth, business risk, NDTS and leverage as dependent factor represented by ratio of total debt to capital employed. The estimated results indicate that for capital good industry factors, like, profitability, tangibility and growth, for FMCG industry factors such as, profitability, tangibility, size, growth and NDTS, for infrastructure industry variables, viz., size, growth and business risk and for IT industry variables specifically, profitability, size and business risk are vital factors shaping their capital structure. Sofat and Singh (2017) analysed capital structure of best 100 BSE listed manufacturing companies of Indiato identify its affecting variables using multiple regression methodology and correlation matrix. The study showed that asset composition, business risk and return on asset have significant positive impact on capital structure, however, company size and debt service capacity are not significant variables. Soni (2017) has conducted a study to explain capital structure determinants of FMCG industry represented by 15 BSE listed sample companies employing multiple regression approachand correlation matrixes for a time period ranging from 2011-12 to 2015-16. The regressors include profitability, tangibility, size, liquidity; NDTS, business risk, coverage ratio and regresand consist of debt-equity ratio. The derived results show that only two variables, viz., profitability and liquidity are statistically significantly and negatively associated with debt-equity ratio, while, tangibility, size, NDTS, business risk and coverage ratio have no significant impact. Panda and Nanda (2020) used

econometric models, like, semi parametric and non-parametric regression models for determining regressors of capital structure policy and panel co-integration model for explaining long-run equilibrium linkage of capital structure with its regressors in case of eight Indian manufacturing industries. The estimate outcomes established that every manufacturing industry has distinctive determining factors of capital structure. Furthermore, the level of debt has significant relation with tangibility, growth opportunities, effective tax rate, tangibility, profitability, NDTS, company size, cash flow, government lending, interest rate, foreign investment and economic growth. Overall, all these factors have robust long-run equilibrium linkage with capital structure policy. Sahoo and Dev (2022) analysed the determinants of capital structure for Indian Automobile Industry for the time period of 17 years, i.e., 2004-2020, employing GMM model. They observed that variation in firms-specific variables such as company size, tangibility positively and significantly connects with capital structure, conversely, bankruptcy risk and liquidity negatively and significantly linked with capital structure. Further, they remarked that macro-economic conditions take important part in deciding capital structure where determinants, viz., currency strength has inverse and FDI inflows has positive relationship with capital structure which are statistically significant also. Bhatia and Srivastava (2022) used the techniques of ordinary least squares, static panel data and dynamic panel data for investigating the influencing factors of capital structure in the context of non –financial Indian companies with2327 observations. The estimated results suggest that profitability, liquidity, size and business risk made Indian companies less dependent on debt while, growth opportunities encourage them to collect greater amount of debt capital. Moreover, they indicated that capital structure choices are dynamic in nature and determining factors of short-term borrowings largely change from long-term borrowings. The evidences validate propositions of pecking order theory. In view of this discourse, our study made an attempt to explore the influencing variables of capital structure strategy of sample companies representing FMCG sector in the Indian scenario.

OBJECTIVES OF THE STUDY

The study is conducted:

1. To evaluate the determinants of capital structure policy of Indian FMCG industry comprising 20 BSE listed companies over a 10-years' time frame extending from 2012-13 to 2021-22. For achieving this

goal, sevencompany-specific variables, i.e., profitability, size, liquidity, tangibility, non-debt tax shield, growth and income variation are picked here to validate their association with leverage.

2. To scrutinize which hypothesis or hypotheses of capital structure choice are most suitable to state the financial performance of the Indian FMCG sector. The capital structure hypotheses predominantly verified here areTrade-Off Hypothesis, Pecking Order Hypothesis and Agency Cost Hypothesis.

HYPOTHESES OF THE STUDY

The proposed research article has tested the following null hypothesis on linkage between the explanatory variables of FMCG sector in India:

H_0- There is no significant connectivity between leverage and profitability, size, growth, tangibility, NDTS, liquidity and income variation.

H_1- There is a significant connectivity between leverage and profitability, size, growth, tangibility, NDTS, liquidity and income variation.

RESEARCH DESIGN

Research methodology adopted for the present research has been demonstrated as follows: -

1. **Method of Data Collection and Period of the Study:** The current study has covered the period of 10 years beginning from 1st April 2012 to 31st December 2022 .We have selected an aggregate of 15 sample companies listed on BSE belonging to FMCG sector (which include companies from personal care, food processing, beverages and distilleries, dairy products, tobacco, food and beverage).The gathered data has been chosen on the basis of greatest market capitalization and obtainability of data for 10 years study period. A list of selected sample companies is given in Annexure1.

2. **Source of Data:** The existing study is investigative and empirical in character and employs secondary data. The data for the study has been sourced from 'CAPITALINE 2000' database and Annual Reports for the chosen companies for the period under study have been used.

3. **Panel Data Technique:** In this research article, we have chosen 15 sample companies over 10 years' time-frame from Indian FMCG sector. Overall number of observations for our set of panel data should

be 150 (15 companies × 10 years). However, we have in fact 149 observations due to non-availability of data for Nestle India Ltd. for the year 2021-2022.

4. **Variable Selection:** To analyse the capital structure of FMCG industry in India, the financial leverage (dependent Variable) is proxied for capital structure and seven independent variables, namely, profitability, firm size, growth in assets, tangibility, non-debt tax shield, liquidity and variability in income are considered here.

Table 1: Showing List of Variables with their Indicators And Definitions

Variables	Definitions
Financial Leverage	Total Debt to Total Assets Ratio
Profitability	EBIT to Total Assets Ratio
Firm Size	Log of Net Sales
Growth in Assets	Percentage Change in Total Assets
Tangibility	Fixed Assets to Total Assets Ratio
Non-Debt Tax Shield	Annual Depreciation Expenses to Total Assets Ratio
Liquidity	Current Assets to Current Liabilities Ratio
Variability in Income	Natural Logarithm of Standard Deviation of EBIT

5. **Selection of Model:** Panel data technique gives longitudinal analysis which denotes that with the application of panel data, explanatory and explained variables can be derived for each factor. In econometric, there are three panel estimation models, viz., Fixed-Effects Model (FEM), Random-Effects Model (REM) and Pooled Regression Model.

Table 2: Model Selection

Tests	Significant (Probability value less than or equal to 0.05)	Insignificant (Probability value greater than 0.05)
Housman Specification Test	FEM	REM
Breush & Pagan Lagrange Multiplier Test	REM	Pooled Regression Model
When both tests having same results	REM selected	
When both tests having contradictory results	FEM selected	

Table 3: Model Selection for Panel Data Analysis on Capital Structure Determinants

Industry	Hausman Specification Test		Breusch & Pagan Lagrange Multiple Test		Model
	Test Statistic value	Probability value	Test Statistic value	Probability value	
FMCG	9.58	0.0879	134.04	0.0000	REM

DATA ANALYSIS AND FINDINGS

In case of FMCG industry, the Random-Effects Model is chosen whose estimated regression results are demonstrated as follows:

Table 4: Association of Financial Leverage with Various Explanatory Variables in FMCG Industry Based on Random-Effects Model

FACTORS	ESTIMATED COEFFICIENT	STANDARD ERROR	NULL HYPOTHESIS ACCEPTED OR REJECTED	CONSISTENT OR INCONSISTENT TO EXPECTED OUTCOME	ACCEPTED THEORY
PROFITABILITY	0.4574*	0.1038	REJECTED	INCONSISTENT	TRADEOFF THEORY & AGENCY COST THEORY
SIZE	- 0.00006*	0.0002	REJECTED	INCONSISTENT	PECKING ORDER THEORY
GROWTH	0.00000000904	0.0000000492	ACCEPTED	------	------
TANGIBILITY	0.04170	0.08998	ACCEPTED	------	------
NDTS	3.9765*	1.1561	REJECTED	INCONSISTENT	#
LIQUIDITY	- 0.12607*	0.01997	REJECTED	CONSISTENT	PECKING ORDER THEORY & AGENCY COST THEORY

INCOME VARIANCE	0.00329	0.00628	ACCEPTED	------	------
CON-STANT	0.4793*	0.0642			
R^2	0.4418*				
Wald Chi-square	132.69				

Note: # indicate that no definite theory validates this significant linkage. * denotes significance at 1% level.

The estimated regression outcomes reveal that profitability and non-debt tax shield have positive and statistically significant association with leverage. However, size and liquidity have negative and statistically significant connectivity with leverage. The other explanatory variables like, growth, tangibility and income variance are found to be statistically insignificant and hence, have no relation with leverage. Moreover, the Wald Chi-square value i.e., 132.69 derived from R^2 value of 0.4418 provides probability value of 0.0000 which exhibits that the regression model is statistically significant 1% level of significance. Consequently, the estimated Random-Effects Model connotes that a significant portion of the regress and is described by the regressors jointly.

CONCLUSION

The main purpose of the study is to analyse the influences of the firm-specific variables such as profitability, size, growth in assets, tangibility, non-debt tax shield, liquidity and variability in income on capital structure denoted by leverage (total debt to total assets ratio) of Fast-Moving Consumer Goods industry in India. Besides, we have also explored which capital structure theory or theories are best suited to define the capital structure decision of Indian FMCG industry. In this study, we have observed from the regression results that the impact of profitability and NDTS are significantly positive on leverage. The positive and significant effectiveness of profitability on leverage reveals that higher profitability encourages the utilization of debt capital and provides inducement to companies to get advantage of tax shields on payment of interest. This positive association is supported by both Trade-Off Theory and Agency Cost Theory. Next, the significant positive association of NDTS with leverage indicates that NDTS cannot be substituted in place of debt financing. On the contrary, size and liquidity variables impact leverage adversely and their

impact is statistically significant as well. The negatively significant relationship between size and leverage is established by the proposition of Pecking Order Theory and suggestive of the fact that selected FMCG sample companies tend to apply internal resources first. Moreover, the negatively significant linkage of liquidity and leverage is authenticated by both Pecking Order Theory and Agency Cost Theory which signifies that current assets are applied to fund prospective investment.

RECOMMENDATIONS

1. The analysis of country-specific variables and industry-specific variables of capital structure decision should be investigated for future research.

2. The sample size can be enlarged further by including more sample companies from FMCG sector of India.

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ANNEXURE I

List of Selected Sample Companies Under Indian Fmcg Sector

Serial No.	Sample Companies
1.	BRITANNIA INDUSTRIES LTD.
2.	COLGATE PALMOLIVE (INDIA) LTD.
3.	DABUR INDIA LTD.
4.	DFM FOODS LTD.
5.	GODFREY PHILLIPS INDIA LTD.
6.	HATSUN AGRO PRODUCTS LTD.
7.	HERITAGE FOODS LTD.
8.	HINDUSTAN UNILEVER LTD.
9.	ITC LTD.
10.	MARICO LTD.
11.	NESTLE INDIA LTD.
12.	RADICO KHAITAN LTD.
13.	TATA CONSUMER PRODUCTS LTD.
14.	UNITED SPIRITS LTD.
15.	VARUN BEVERAGES LTD.