Effect of Capital Structure on Firm Profitability (An Empirical Evidence from London, UK)

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Abstract

This paper intends to explore the effect of capital structure on firm profitability. For the purpose of empirically investigating the effect of capital structure, a sample of 30 firms have been selected from FTSE-100 index of the London Stock Exchange. The data period for the study was 2005 to 2014. The study used multiple regression analysis method to explore the impact of capital structure on firm performance. The results revealed that Interest Coverage has positive significant impact on ROA, ROE and ROIC where DE has positive significant impact on ROE but negative significant impact on ROA and ROIC. The study concluded that an optimal level of capital structure, effective utilization and allocation of resources shall be employed to achieve the targeted level of efficiency in business. Keywords: debt to equity (DE), interest coverage (IC), return on asset (ROA), return on equity (ROE), return on invested capital (ROIC).

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1 I. Introduction a) Introduction

n an era of globalization of economic policies and financial markets, investment opportunities and financing options have increased, causing a significant increase on the dependence of capital markets. A new business requires capital and further capital is needed if the firm is to expand. The required funds can come from various sources, which can be categorized into two major proportions comprising of debt and equity capital. The relative proportion of these two major sources in the total capital of a firm is a measure of capital structure. One of the most important reference theories in companies financing policy is the theory of capital structure.

Capital structure is the combination of debt and equity capital that composite a firm's financing its assets. Financing is referred to as a process of generating cash which can be used for acquisition of assets, current operations or any expected growth. Firms can use either debt or equity capital to finance their assets. Therefore, capital structure can be written as the sum of net worth plus preferred stock plus longterm debts. Besides these sources of finance, enterprises may issue hybrid securities such as income bonds. These hybrid securities possess the features of both equity and debt securities.

The capital structure decision is an important decision as it influences the investors' return on their investment. It is therefore obligatory on the management of company to make appropriate capital structure so to maintain the interest of its investors.

2 b) Objectives of the Study

The study is intended to undertake the following objectives:

? To identify the nature of relationship between capital structure and firm performance.

? To explore the impact of capital structure on firm performance.

Considering the dependent variables (return on equity, return on assets and return on invested capital) and independent variables (debt to equity and interest coverage), the objective of the study has been divided into models as under:

Model 1: UK firms and Return on Asset (ROA): To investigate the effect of independent variables on return on asset.

3 Model 2: UK firms and Return on Equity (ROE):

To investigate the effect of independent variables on return on equity.

4 Model 3: UK firms and Return on Invested Capital (ROIC):

To investigate the effect of independent variables on return on invested capital.

5 c) Significance of the study

The relationship between capital structure and profitability cannot be ignored because the long-term survivability of firm depends upon the improvement in the profitability of the firm. The interest paid on debt is tax deductible payments, so the addition of debt in the capital structure will improve the profitability of the firm. It is important to know the relationship between capital structure and the profitability of the firm in order to make sound decision on capital structure.

Findings of the study are useful for the investors as well as companies who wants to invest in FTSE-100 index. Findings are also useful for the Government sectors for collecting more taxes and boost that particular sectors.

6 II. Literature Review a) Literature View

Based on literature review there is a plenty of research which intends to enlighten the relationship between capital structure and performance of listed firms.

Determining the ideal capital structure and value of firms can be traced back to Modigliani and Miller (1958) who in their research concluded that the value of the firm is self-determining of capital structure and that the value of an unlevered firm is equal to that of a levered firm. The research was based on the assumption of absence of taxes. This assumption was considered unrealistic and in their subsequent research Modigliani and Miller (1963) took tax into consideration and concluded that because of tax shield on debt as a factor, the value of a levered firm was more than the value of an unlevered firm and that this value was equal to the value of the tax shield. Modigliani and Miller (1977) later modified their earlier research of 1963 and incorporated the effect of personal taxes. Personal taxes were classified into two categories, tax on income from holdings shares and tax on income from debt securities. In this research (1977), Modigliani and Miller identified certain special cases where gain from leverage became zero, giving the original (1958) result. Thus their results signify the existence of an optimal capital structure at the macro level but not at the micro level. Deesomsak et al. (2004) examining the effect of capital structure's effect on firm performance, reported a negative relationship between capital structure and firms performance measured by gross profit margin in the Malaysian firms. The study indicated that in Singapore, Taiwan and Australian the relation of leverage with firm's performance is negative but statistically insignificant. Moreover, the effect of firm size on leverage is significant and positive for all the countries except Singapore, because in Singapore firms have government support and are less exposed to financial distress costs.

Nimalathasan & Brabete (2010) examined methodically the relationship between capital structure and financial performance of firms listed on Columbia Stock Exchange, Sri Lanka. The study guides the entrepreneurs and policy planners to formulate better policy decisions regarding the mix of debt and equity capital to control over capital structure planning. Abor (2005) investigate the relationship between capital structure and profitability of listed firms on Ghana Stock Exchange. He reveals a positive relationship between short term debt to total assets and return on equity due to low interest rates. Further, he suggests that in Ghanaian firm's short term financing shows 85 percent of total debt and is considered a main element of financing for them. Moreover, a negative relationship find between long term financing and equity returns, and a positive relation exists between total debt and profitability. He also suggests that debt is considered as a major source of financing for high profitable firms.

7 b) Hypothesis of the Study

Based on above literature review, the researcher formulates the following hypothesis.

8 Model 1

H 0 : There is no significant impact of Independent Variables 1 The hypothesis for each model has been described in on Return on Asset.

H 1 : There is significant impact of Independent Variables on Return on Asset.

9 Model 2

H 0 : There is no significant impact of Independent Variables on Return on Equity.

H 1 : There is significant impact of Independent Variables on Return on Equity.

10   Model 3

H 0 : There is no significant impact of Independent Variables on Return on Invested Capital.

H 1 : There is significant impact of Independent Variables on Return on Invested Capital.

Table 1 as shown in appendix.

11   III. Research Methodology a) Population and Sample Set of the study

The population for this study is all top 100 companies listed in FTSE-100 index. The researcher has selected the sample for the research from this population to check the effect of capital structure on firm performance.

In this study, a sample of 30 firms has been selected from the FTSE-100 index of London Stock Exchange for the purpose of investigating the effect of capital structure on firm performance. This panel data has been collected for the period of 10 years i.e. from 2005 to 2014 from the financial statements of the firms in order to empirically investigate the relationship between capital structure and firm performance.

12   b) Theoretical Framework/ Conceptual Framework

The study uses following variables to investigate the effect of capital structure on firm performance. i. Independent Variables In this study, the capital structure being measured by interest coverage and debt to equity ratios are taken as independent variables.

13   a. Interest Coverage

The interest coverage ratio (ICR) is measure of company's ability to meet its interest payments. It is a financial ratio that measures company's ability to make interest payments on its debt in a timely manner.Interest Coverage = EBIT / Interest Expense [Nimalathasan & Brabete (2010), {12}]

b. Debt to Equity Debt/Equity Ratio is used to measure a company's financial leverage, calculated by dividing a company's total liabilities by its shareholders' equity. The D/E ratio indicates how much debt a company is using to finance its assets relative to the amount of value represented in shareholders' equity.

Debt to Equity = Total Liabilities / Total Shareholder's Equity [Muhammad, Shah, & Islam (2014), {14}]

ii. Dependent Variables Financial performance is considered to be a major standard to measure firms' operational and financial efficiency. The current study uses three measures of firm performance including return on assets, return on equity and return on invested capital.

14   a. Return on Assets

Return on Assets or Investment is the raise in the cash flows produced by the operating cycle as a

15   iii. Return on Invested Capital

Return on Invested Capital is used to assess a company's efficiency at allocating the capital under its control to profitable investments. Return on invested capital gives a sense of how well a company is using its money to generate returns.

16   ROIC = Net Income -Dividends/ Total Capital c) Regression Analysis

Regression analysis is used to investigate the effect of capital structure on firm performance. More precisely, it helps to understand how the value of the dependent variable changes when independent variable is varied. This study uses the following regression models: The highest value of mean is 18.15027 of IC, where ROA has the lowest mean of 0.075340. IC has the highest value of standard deviation being 41.02593 and the lowest value is 0.089427 relating to ROA. In respect of Kurtosis, IC has the highest value of kurtosis where ROIC has the lowest value 17.97986.

17   Global

C ROA = ? 0 + ? 1 DE + ? 2 IC + ? (1) ROE = ? 0 + ? 1 DE + ? 2 IC + ? (2) ROIC = ? 0 + ? 1 DE + ? 2 IC + ? (3)

18   b) Correlation Analysis

Correlation means the relationship between two variables. The correlation shows two things, first it shows the direction between two variables and secondly it shows the strength of associations between two variables. The below Table 3 shows the correlation between dependent (ROA, ROE and ROIC) and independent (DE and IC) variables.

19 Sample: 2005 2014

20 C

Where: ? 0 = Coefficient of Intercept ? 1 -? 2 =

21 IV. Results and Discussions a) Descriptive Statistics

The descriptive statistics is used as a measure for the analysis of mean, median, maximum, minimum, standard deviation, skewness and kurtosis of the study sample in order to explore the data variation in the firm's listed on the FTSE -100. The below The coefficient value of interest coverage is 0.000532, which means that 0.0532 percent variation of return on asset has been explain by the variation of interest coverage. The t-statistics of interest coverage is 4.012955 with a p-value is < 0.05 shows that interest coverage has got significant positive impact on return on asset. If one unit increases in interest coverage then return on asset will increase at 0.000532 units. The coefficient value of debt to equity is -0.021581, which means that 2.1581 percent negative variation of return on asset has been explain by the variation of debt to equity. The t-statistics of debt to equity is -2.475469 with a p-value is < 0.05 shows that debt to equity has got significant negative impact on return on asset. If one unit increases in debt to equity then return on asset will decrease at 0.021581units.

The values of determination of coefficient R^2 is 0.347279, which means that 34.7279 percent variation of return on asset has been explain by the variations of independent variables, which are debt to equity and interest coverage.

The value of $AdjR^2$ is 0.271778, shows that if the researcher incorporate more relevant variables than it will adjust R^2 at the rate of 27.1778 percent.

Model is found statistically significant (F = 4.599651, $p < 0.01$); the value of F-statistics is 4.599651 and p-value is <0.05 shows that the model is good fit for the study.

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22 . Model 2 -UK firms and ROE

The result of Hausman test (cross section random with Prob. 0.0876) shows that Random Effect is the appropriate test for the study.

23 Correlated Random Effects -Hausman Test Test Summary

Chi-Sq. Statistic Chi-Sq. d.f. Prob.

Cross-section random 4.869432 2 0.0876 Table 5 in the appendix shows the results of regression analysis for model 2. The result shows that all 30 firms have a common coefficient of 0.040741.

The coefficient value of interest coverage is 0.001930, which means that 0.1930 percent variation of return on equity has been explain by the variation of interest coverage. The t-statistics of interest coverage is 2.051486 with a p-value is < 0.05 shows that interest coverage has got significant positive impact on return on equity. If one unit increases in interest coverage then return on equity will increase at 0.001930 units. The coefficient value of debt to equity is 0.277936, which means that 27.7936 percent variation of return on equity has been explain by the variation of debt to equity. The t-statistics of debt to equity is 4.893138 with a p-value is < 0.05 shows that debt to equity has got significant positive impact on return on equity. If one unit increases in debt to equity then return on equity will increase at 0.277936 units.

The values of determination of coefficient R^2 is 0.079153, which means that 7.9153 percent variation of return on equity has been explain by the variations of independent variables, which are debt to equity and interest coverage.

The value of $AdjR^2$ is 0.072952, shows that if the researcher incorporate more relevant variables than it will adjust R^2 at the rate of 7.2952 percent.

Model is found statistically significant (F = 12.76463, $p < 0.01$); the value of F-statistics is 12.76463 and p-value is <0.05 shows that the model is good fit for the study.

24 C iii. Model 3 -UK firms and ROIC

The result of Hausman test (cross section random with Prob.0.0038) shows that Fixed Effect is the appropriate test for the study.

25 Correlated Random Effects -Hausman Test

26 Test Summary

Chi-Sq. Statistic Chi-Sq. d.f. Prob.

Cross-section random 11.147838 2 0.0038 Table 6 in the appendix shows the results of regression analysis for model 3. The results revealed that all 30 firms have a common coefficient of 0.15742.

The coefficient value of interest coverage is 0.001028, which means that 0.1028 percent variation of return on invested capital has been explain by the variation of interest coverage. The t-statistics of interest coverage is

4.651186 with a p-value is < 0.05 shows that interest coverage has got significant positive impact on return on invested capital. If one unit increases in interest coverage then return on invested capital will increase at 0.001028 units. The coefficient value of debt to equity is -0.032028, which means that 3.2028 percent negative variation of return on invested capital has been explain by the variation of debt to equity. The t-statistics of debt to equity is -2.203081 with a p-value is < 0.05 shows that debt to equity has got significant negative impact on return on invested capital. If one unit increases in debt to equity then return on invested capital will decrease at 0.032028 units.

The values of determination of coefficient R 2 is 0.441113, which means that 44.1113 percent variation of return on invested capital has been explain by the variations of independent variables, which are debt to equity and interest coverage.

The value of AdjR 2 is 0.376466, shows that if the researcher incorporate more relevant variables than it will adjust R 2 at the rate of 37.6466 percent.

Model is found statistically significant (F = 6.823382, $p < 0.01$); the value of F-statistics is 6.823382 and p-value is <0.05 shows that the model is good fit for the study.

27 V. Conclusion and Recommendation a) Conclusion

The main objective of the study is to empirically investigate the effect of capital structure on firm performance of 30 companies listed on FTSE-100, London Stock Exchange, United Kingdom. For the purpose of exploring the effect, the study consists of three models including two independent variables and three dependents.

Based on the correlation analysis of the study, DE is positively correlated with ROE and ROIC while negatively correlated with ROA, whereas IC is positively correlated with ROA, ROE and ROIC. There is negative correlation between DE an IC. A positive correlation is revealed among all independent variables. Besides, the regression results of first model reveals that DE and IC have p-value of 0.0139 and 0.0001 respectively showing significant impact on Return on Asset and the value of R-squared is 0.347279 which denotes that 34.7279% of variation in ROA is due to debt to equity and interest coverage. This shows that IC has positive significant impact on return on asset while DE has negative significant impact on return on asset.

The regression result of the second model reveals that variables DE and IC have p-value of 0.0000 and 0.0411 respectively showing significant impact on Return on Equity. The value of R-squared is 0.079153 which denotes that 7.9153% of variation in ROE is due to independent variables debt to equity and interest coverage. This shows that DE and IC have positive significant impact on return on equity.

The regression result of third model reveals that DE and IC shows p-value of 0.0284 and 0.0000 respectively meaning that independent variables have significant impact on Return on Invested Capital Both independent variables (DE and IC) showing significant value 0.0284 and 0.0000 respectively showing significant impact on return on invested capital. The value of R-squared is 0.441113 which denotes that 44.1113% of variation in ROIC is due to independent variables debt to equity and interest coverage. This shows that IC has positive significant impact on return on invested capital where DE has negative significant impact.

Based on the empirical finds the study concludes that there is significant effect of capital structure on firm performance.

The study concludes that there is significant effect of capital structure on firm performance. The results of the study determines that the higher the value of debt, higher will be the tax benefits (tax shield) received by firms. Therefore, the firms' executives and managers shall maintain optimum level of capital structure in order to achieve the targeted level of efficiency in business.

28 C b) Recommendation

The researcher has conducted the research on effect of capital structure on firm performance evidence from FTSE-100 index over the period of 2005-2014 by using two independent and three dependent variables. If anyone else wants to conduct the research on the same topic: ? The researcher must incorporate more independent variables ? The period of the study should be more than 20 years for better results ? The researcher must collect the data more the 50 companies for better results

29 Appendices

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Figure 1: 1

Figure 2:

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	DE	IC	ROA	ROE	ROIC
DE	1.000000				
IC	-0.192475	1.000000			
ROA	-0.016145	0.307764	1.000000		
ROE	0.404273	0.081229	0.494161	1.000000	
ROIC	0.047440	0.334291	0.937808	0.573084	1.000000

Figure 3: Table 3 :

2

Sample: 2005 2014

Table 2 -Descriptive Statistics

	DE	IC	ROA	ROE	ROIC
Mean	0.846667	18.15027	0.075340	0.311095	0.148971
Median	0.605000	8.030000	0.067000	0.200250	0.126550
Maximum	5.970000	423.0000	0.671100	9.850200	1.215300
Minimum	0.010000	-39.54000	-0.535400	-2.623200	-0.965800
Std. Dev.	0.855844	41.02593	0.089427	0.774534	0.161158
Skewness	2.531492	6.420749	0.010960	8.065354	0.494186
Kurtosis	11.01491	55.10743	19.98988	91.87858	17.97986
Jarque-Bera	1123.408	36001.11	3608.207	101995.0	2817.163
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	254.0000	5445.080	22.60200	93.32850	44.69140
Sum Sq. Dev.	219.0085	503254.9	2.391137	179.3709	7.765562
Observations	300	300	300	300	

Figure 4: Table 2 :

1

: Hypothesis

Figure 5: Table 1

4

Variable C DE_? IC_?	Fixed Effects			
	Coefficient	Std. Error	t-Statistic	Prob.
Fixed Effects (Cross) AAL–C ABDNF–C ANFGY–C ARGKF–C ASBFY–C AZN–C BAESY–C BRGYY–C BTI–C BTLCY–C BZLFY–C	0.083955 -0.019375 0.008207 0.029815 -0.031637 0.047545 0.001997	0.000532 -0.066916 0.044487 0.051874 -0.005128 -0.032653	9.14338 0.009182 0.008712 0.000138	0.0000 0.0139 0.0001
CMPGY–C	-0.007974			
COIHY–C	0.019579			
CPYYY–C	-0.023621			
EVRZF–C	-0.009078			
GKN–C	-0.034399			
HMSNF–C	-0.038829			

-0.021581
-0.021581
8475469
8012955

Figure 6: Table 4 :

5

Variable	Random Effects			
	Coefficient	Std. Error	t-Statistic	Prob.
C	0.040741	0.098586	0.413255	0.6797
DE_?	0.277936	0.056801	4.893138	0.0000
IC_?	0.001930	0.000941	2.051486	0.0411
Random Effects (Cross)				

Figure 7: Table 5 :

6

17

Figure 8: Table 6 :

249 [Hannan-Quinn and Criter] , Hannan-Quinn , Criter . 1.026574.

250 [Journal of Human Social Science (2012)] , *Journal of Human Social Science* 2249-460X and Print: 0975-587X.
251 March 2012. 12 (5) .

252 [Revista Tinerilor Economist (The Young Economists Journal) (November)] , *Revista Tinerilor Economist*
253 *(The Young Economists Journal)* November. 1 p. 15.

254 [Durbin-Watson (stat 1.941166)] , Durbin-Watson . stat 1.941166.

255 [Handoo and Sharma ()] 'A study on determinants of capital structure in India'. A Handoo , K Sharma . *IIMB*
256 *Management Review* 2014. 2014. 26 p. .

257 [Nimalathasan and Brabete ()] *Capital Structure and its impact on Profitability: A study of Listed Manufacturing*
258 *Companies*, B Nimalathasan , V Brabete . 2010. Sri Lanka.

259 [Modigliani and Miller (1963)] 'Corporate Income Taxes and Cost of Capital: A correction'. F Modigliani , H
260 Miller . *The American Review* 1963. June 1963. 53 (3) p. .

261 [Modigliani and Miller (1976)] 'Debt and Taxes'. F Modigliani , H Miller . *Papers and Proceedings of the Thirty-*
262 *fifth Annual Meeting of the American Finance Association*, (Atlantic City, New Jersey) 1977. September
263 16-18, 1976. May, 1977. 32 p. .

264 [Ahmad ()] 'Impact of Capital Structure on Firm Profitability: An Empirical Analysis of Cement Sector of
265 Pakistan'. T Ahmad . ISSN 2222-2847. *Research Journal of Finance and Accounting* 2222-1697. 2014. 2014.
266 Online. 5 (17) . (Paper)

267 [Riaz ()] 'Impact of Capital Structure on Firm's Financial Performance: An Analysis of Chemical Sector of
268 Pakistan'. S Riaz . *Journal of Poverty, Investment and Development* 2422-846X. 2015. 2015. 12.

269 [Chisti et al. ()] *Impact of Capital Structure on Profitability of Listed Companies (Evidence from India). The*
270 *USV Annals of Economics and Public Administration*, K Chisti , K Ali , M Sangmi . 2013. 2013. 13.

271 [Modigliani and Miller (1958)] 'The Cost of Capital, Corporate Finance and The Theory of Investment'. F
272 Modigliani , H Miller . *The American Economic Review* 1958. June 1958 Number Three. XLVIII.

273 [Deesomsak et al. ()] 'The determinants of capital structure: evidence from the Asia Pacific region'. R Deesomsak
274 , K Paudyal , G Pescetto . *Journal of multinational financial management* 2004. 14 (4) p. .

275 [Salawu and Awolowo ()] 'The Effect of Capital Structure on Firm Profitability: An Empirical Analysis of Listed
276 Firms in Nigeria'. R Salawu , O Awolowo . *The International Journal of Business and Finance Research* 2009.
277 2009. 3 (2) .

278 [Yegon et al. ()] 'The Effect of Capital Structure on Firm's Profitability: Evidence from Kenya's Banking Sector'.
279 C Yegon , J Cheruiyot , J Sang , P Cheruiyot . ISSN 2222- 2847. *Research Journal of Accounting and Finance*
280 2222-1697. 2014. 2014. Online. 5 (9) .

281 [Abor ()] 'The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana'. J Abor
282 . *Journal of Risk Finance* 2005. 6 p. .

283 [Ajlouni and Shawer (2013)] 'The Effect of Capital Structure on Profitability: Evidence from the petrochemical
284 companies in the kingdom of Saudi Arabia'. A Ajlouni , M Shawer . *International Journal of Research in*
285 *Commerce, IT and Management* 2231-5756. 2013. 2013. November. 3 (11) .

286 [Gill et al. (2011)] 'The Effect of Capital Structure on Profitability: Evidence from United States'. A Gill , N
287 Biger , N Mathur . *International Journal of Management* 2011. 1 Dec 2011. 28 (4) .

288 [Opoku et al. ()] *The Impact of Capital Structure and Profitability of Listed Banks on the Ghana Stock Exchange.*
289 *Social and Basic Sciences Research Review*, E Opoku , J Kwame , B Anarfi . 2014. 1.

290 [Muhammad et al. ()] 'The Impact of Capital Structure on Firm Profitability: Evidence from Pakistan'. H
291 Muhammad , B Shah , Z Islam . *Journal of Industrial Distribution and Business* 2233-4165. 2014. 2014.
292 5 (2) p. .

293 [Sheik and Wang ()] 'The Impact of Capital Structure on Performance'. N Sheik , Z Wang . *International Journal*
294 *of Commerce and Management* 2013. 23 p. .

295 [Azhagaiah and Gavoury ()] 'The Impact of Capital Structure on Profitability with Special Reference to IT
296 Industry in India'. R Azhagaiah , C Gavoury . *Managing Global Transitions* 2011. 2011. 9.

297 [Ebaid ()] 'The impact of capital-structure choice on firm performance: empirical evidence from Egypt'. I E
298 Ebaid . 10.1108/15265940911001385. *The Journal of Risk Finance* 2009. 10 (5) p. .

299 [Shubita and Aslawalhah ()] 'The relationship between Capital Structure and Profitability'. F Shubita , J
300 Aslawalhah . *The special issue on Contemporary Research in Art and Social Sciences, Centre for promoting*
301 *Ideas*, (USA) 2012. 2012. 3. (Special Issue -August)