

Analysis of Return on Equity of Kenyan Telecommunication and Technology Industry Using DuPont Model

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Abstract: The management prepares, publishes and presents the annual reports and financial statements to various stakeholders for their varied uses. Investors are interested in understanding the amount of return generated by every \$1 of their investment in terms of return on equity ratio. However, most investors find the issued financial statements and annual reports complex, confusing as well as difficult to understand. This paper analysed the performance of the Kenyan Telecommunication and Technology Industry using the three-step DuPont model that disintegrates the return on equity into its components that include the financial leverage, profit margin and total assets turnover ratios. A ten year period (2008-2017) was studied and correlation and regression analysis conducted. Correlation results revealed that profit margin and total assets turnover ratios had positive and significant association with return on equity while financial leverage had a negative and insignificant association. Regression results showed that each of the predictor variables had a positive and significant association with return on equity. Under the regression analysis, multiple correlation coefficients indicated that financial leverage, profit margin, and total assets turnover ratios combined had a positive and significant association with return on equity at 0.999. In addition, 0.998 of the variability in the return on equity was explained by the components of the three-step DuPont model.

Keywords: ROE, Total Assets Turnover, Net Profit Margin, Equity Multiplier, DuPont Model, Kenyan Telecommunication and Technology Industry.

I. INTRODUCTION

In disclosing their operations and other matters relating to the corporation, the management prepares, publishes and presents the annual reports and financial statements to various stakeholders such as the government, shareholders, potential investors, customers, creditors, employees and public among others. However, on their face value, the annual reports and financial statements' data as a communication avenue to the various stakeholders may say little about the real status, performance and position of the reporting entity. As a result, systematic and comprehensive analysis is necessary to understand the financial performance of businesses. One of the multiple tools and techniques used in evaluation of financial performance is the ratio analysis (Sur, Mitra, & Maji, 2014). Doorasamy (2016) noted that ratios are used in establishing the association between variables and how they affect each other. In performing ratio analysis, the financial and operational problems of an entity are effectively diagnosed, and an investor is able to assess the performance and risk of a given firm.

The ratios fall under five main categories namely: profitability, efficiency, liquidity, market, and leverage ratios, and as posited by Doorasamy (2016) each category measures different aspects of the firm and serves a different group of stakeholders. For instance, the profitability ratios are most meaningful to the shareholders (Harris, 2010). These ratios are useful in the evaluation of the profit earnings ability of an entity, or how effective it has been in meeting its overall returns goals, and are computed in reference to assets, owners' contributions, and sales. Among the most useful profitability

ratios is the return on equity (ROE). The ROE is useful in assessing how many dollars that a \$1 investment by the shareholder generates (Albrecht, Stice, & Stice, 2007). As noted by Godwin and Alderman (2010) and Herciu and Ogrea (2011) investors want their returns from investment maximized, hence the importance of the return on equity ratio. Herciu and Ogrea (2011) stated that the return on equity indicates management’s stewardship in using the investors’ money by growing the company’s value. Additionally, it is used in assessing the rate of return of the investors’ equity.

To better understand the return on equity, Albrecht, Stice and Stice (2007) noted that the investors use a DuPont analysis. The main variants of DuPont Analysis are: the basic three step, and amplified five step models. According to Brown (2010), DuPont analysis is considered a simple and a straightforward way of understanding the company’s profitability. Godwin and Alderman (2010) noted that the DuPont analysis offers an insight into the avenues through which the entity’s return on equity was produced by disaggregating the return into several elements. It also offers a framework through which several ratios are calculated to get a dipper understanding of the business’ areas of strength or weakness.

Despite the presence of such techniques, Ernst & Young (2008) and PwC (2012)’s survey reports established that most investors found the issued information murky, confusing as well as difficult to understand. Therefore, this paper adopts the basic three-step model analysis to indicate how investors can use it to determine the ROE of Kenyan Telecommunication and Technology Industry.

Objective of study

The paper aimed at analysing the Kenyan Telecommunication and Technology Industry’s return on equity using three-step DuPont Model.

II. LITERATURE REVIEW

Theoretical framework:

The DuPont Model was developed in 1920 by Donaldson Brown, the then engineer at E.I. DuPont Nemours and Company’s Treasury department, to assess the firm’s profitability. Brown revealed that the company’s profitability was influenced by the return on assets (ROA). As shown in equation 1, the firm’s operating decisions were concentrated on improving both the profitability and efficiency (Doorasamy, 2016).

$$(\text{Net income/Net sales}) * (\text{Net sales/ Average total assets}) = \text{Net income/Average total assets.} \quad (1)$$

$$\text{Profit margin} \quad * \quad \text{assets turnover} \quad = \quad \text{return on assets}$$

The net profit margin ratio is useful in assessing the overall profitability of an organization (Herciu & Ogrea, 2011; Roucan-Kane, Wolfskill, Boehlje, & Gray, 2013). It is also an important ratio as it indicates an entity’s efficiency and that of its management in controlling costs of sales and other expenses. It is obtained by expressing the net income as a proportion of net sales. The assets turnover ratio is useful in assessing how efficiently the company uses its resources (assets) in producing sales (Needles, Powers, & Crosson, 2010; Sur, Mitra, & Maji, 2014). It shows how many dollars of revenues are earned by \$1 of assets, and the higher it is the better as it implies that the entity is productively utilizing its resources. On their individual basis, Needles, Powers and Crosson (2010) noted that the assets turnover and the net profit margin ratios have some limitations, which are solved by ROA. The ROA is important in showing the income generating strength of the business’ resources and how efficiently it is using them.

The DuPont model underwent a modification and the focus shifted from ROA to ROE by adding a financial leverage ratio as a third element of attention (Doorasamy, 2016). Godwin and Alderman (2010) noted that DuPont analysis offers an insight into the avenues through which the entity’s return on equity was produced by disaggregating the return into three ratios: return on sales, assets turnover, and the financial leverage as shown in equation 2.

$$(\text{Net income/Net sales})*(\text{Net sales/ Average total assets})*(\text{Average total assets/ Equity}) = \text{Return on equity} \quad (2)$$

$$\text{Profit margin} \quad * \quad \text{assets turnover} \quad * \quad \text{equity multiplier} \quad = \quad \text{ROE}$$

The equity multiplier is the leverage factor and represents the company’s capital structure (Godwin & Alderman, 2010). The leverage factor is arrived by dividing the assets by the equity, and indicates the proportion of assets financed through external debt and that financed by owners’ equity (Sur, Mitra, & Maji, 2014). It can also be computed by dividing the debt by equity, and then add 1. In the case that the leverage ratio is high, then it implies that the company has a greater

proportion of its assets financed through borrowings. Another implication of a higher leverage ratio is that the business has a riskier capital structure (Roucan-Kane, Wolfskill, Boehlje, & Gray, 2013).

The latest modification considers a total of five ratios in determining the ROE (Doorasamy, 2016). This amplified five-step model helps in the identification of the sources of financial problems within an entity and is shown in Figure 1. Figure 1 below indicates that the company's ROE is influenced by various aspects. The tax burden ratio shows the tax charge that an entity has to remit to the government (Sur, Mitra, & Maji, 2014). An entity with higher percentage of debt in its capital structure will have a lower tax burden since interest is a tax allowable item. The interest burden ratio indicates the interest payable by an entity against debts. A firm that relies on more debt will pay a higher interest. The five-step DuPont model has been demonstrated in Appendix III.

Empirical review:

Doorasamy (2016) conducted a study to assess the financial performance of the food industry by a focus on top the three listed firms using DuPont model. The author used the 2013 and 2014 financial statement data. The author found that using the DuPont model, the three companies had different ROE. These findings agree with Vasigh, Fleming and Mackay (2010) who stated that the ROE may vary among the companies in the same industry, though it does not differ that much between industries.

Sur, Mitra and Maji (2014) study aimed at getting the ROE of Tata Steel Ltd using DuPont model. The authors used the five-step model where they regarded the tax burden ratio, interest burden ratio, assets turnover ratio, profit margin ratio and equity multiplier as independent variables. On the other hand, they treated the ROE as the dependent variable. The study period was 15 years (1996/97-2010/11) and the data was analysed through correlation and regression analysis. The findings were that a significant correlation existed between ROE and the independent variables. In addition, the regression results indicated that ROE had a significance dependency on the respective explanatory variables.

A DuPont analysis of the 2009 Fortune's global rank of the 20 most profitable companies in absolute terms by Herciu and Ogrean (2011) aimed at answering the hypothesis that the most profitable entities are not equally the most attractive for investors. The authors computed the return on sales (ROS), ROA and ROE. They further performed a correlation analysis to establish the relationship between the net income, ROS, ROA and ROE. They concluded that the comparison of companies on the absolute measurement was irrelevant, and therefore the ratios were useful. A similar DuPont analysis study was conducted by Raza, Jawaid and Adnan (2013) on the South Asia Region insurance sector to establish the most fruitful companies for investors. The authors ranked the companies on the basis of net income and also on the basis of ROE. Through a regression analysis, they studied the effect of ROA and financial leverage (independent variables) on the ROE (dependent variable). They established that ranking firms on the basis of DuPont proved more reliable for investors compared to the net income method.

Kijewska (2016) conducted a study on two Poland companies from mining and metallurgy sector to assess the determinants of their ROE using the DuPont model. The researcher used both the three and five-step model and utilised the data for three years (2011-2013). The findings were that the components of both the three and five-step DuPont models, and which involves financial and operational strategies affected the ROE. In establishing the financial performance of Indian Pharmaceutical companies, Geethalakshmi and Jothi (2016) used the return on investment (ROI) ratio and the DuPont model. The period of study was 2006/2017 to 2015/2016. They established that the ROI and ROE were the most comprehensive measures of profitability since they consider the investing, operating and the financing decisions.

III. RESEARCH METHODOLOGY

The study is based on the Kenyan telecommunication and technology industry, where Safaricom Limited was selected as it is the only listed company in this industry. The secondary data was used and was obtained from the company's annual reports for a period of 10 years (2008-2017). Calamar (2016) advised that a 10 year period was good for analysis if the analyst wanted to get the consistency of ROE performance. Calamar further added that a 10 year period was right because the normal fixed investment cycle occurs every seven to eleven years. Therefore, through this period, this paper assumed that the various economic environments including expansions, contractions and other economic fluctuations were encompassed and Safaricom Limited would demonstrate its ability to consistently deliver high level performance throughout the economic climate changes.

The tool used was the three-step DuPont model where the return on equity (ROE) is assessed through the multiplication of: net profit margin (NPM), total assets turnover (TAT) and equity multiplier (EM). The inferential statistics used were the regression and correlation analysis. The correlation analysis was done through Pearson coefficient to establish the degree of association between the independent variables (NPM, TAT and EM) and ROE. Regression analysis was conducted to establish the joint effect of the independent variables on the ROE. The regression model of this study is:

$$ROE = \alpha + \beta_1 NPM + \beta_2 TAT + \beta_3 EM + \varepsilon$$

Where

ROE = Return on equity

NPM = Net profit margin

TAT = Total assets turnover

EM = Equity multiplier

β_1 - β_3 = Beta coefficients

ε = Error term

Since the regression is on time-series data, the resulting residues were tested for the presence of serial autocorrelation using Durbin-Watson test. As noted by Lee and Peters (2015) and Wilson, Hill and Glazer (2013) the paper adopted the statistical values of a range of 0-4 with 2 being the midpoint. The authors noted that values equal to 2 or closer to it were an indication of absence of autocorrelation while the values approaching 0 signified a positive autocorrelation and those closer to 4 implying a negative autocorrelation.

IV. STUDY RESULTS AND DISCUSSION

Correlation analysis:

Table 1 presents the results of correlation analysis. Table 1 shows clearly that there is a high, positive and statistically significant correlation at 0.996 and $P = 0.000 < 0.01$ between ROE and net profit margin at 99% confidence interval. These results agree with Sur, Mitra and Maji (2014) who noted that a positive and significant relationship existed between ROE and net profit margin since these variables were two sides of a common coin. Table 1 also depicts that at 5% significant level there is a positive and statistically significant relationship between ROE and the total assets turnover at 0.762 and $P = 0.01 < 0.05$. It is noticed from Table 1 that at 95% confidence interval, a negative and insignificant relationship exists between ROE and equity multiplier at -0.604 and $P = 0.065 > 0.05$ thereby agreeing with Burja and Mărginean (2014) who found that the ROE profitability was negatively correlated with equity multiplier.

Table 1. Correlation results

		Return on equity	Net profit margin	Total assets turnover	Equity multiplier
Return on equity	Pearson Correlation	1			
	Sig. (2-tailed)				
Net profit margin	Pearson Correlation	.966**	1		
	Sig. (2-tailed)	.000			
Total assets turnover	Pearson Correlation	.762*	.584	1	
	Sig. (2-tailed)	.010	.077		
Equity multiplier	Pearson Correlation	-.604	-.427	-.952**	1
	Sig. (2-tailed)	.065	.218	.000	
N = 10					
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Regression analysis:

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.999 ^a	.998	.998	.0040132	1.992 ^a
a. Predictors: (Constant), Equity multiplier, Net profit margin, Total assets turnover					

As shown in Table 2, the Durbin-Watson value is 1.992 implying that the analysed components of DuPont model had no serial autocorrelation during the studied period. From Table 2, it can be observed that the multiple correlation coefficient (R) of ROE on NPM, TAT and EM was 0.999, implying that there was a high, positive and significant relationship between the Safaricom Limited’s ROE and the selected predictor variables at 5% significance level. It is also clear from Table 2 that the coefficient of determination (R²) is 0.998 implying that 99.8% of the variability in the ROE of Safaricom Limited over the studied period was explained by the components of the three-step DuPont model while the rest was explained by factors not included in the model.

Table 3. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.059	3	.020	1220.657	.000 ^b
	Residual	.000	6	.000		
	Total	.059	9			
a. Dependent Variable: Return on equity						
b. Predictors: (Constant), Equity multiplier, Net profit margin, Total assets turnover						

Table 3 depicts that the F-statistics value is 1,220.657 and a P = 0.000<0.05 implying that NPM, TAT and EM were significant in predicting the dependent variable, ROE of Safaricom Limited.

Table 4. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.597	.094		-6.355	.001
	Total assets turnover	.296	.034	.618	8.748	.000
	Net profit margin	1.580	.051	.733	30.786	.000
	Equity multiplier	.190	.040	.298	4.695	.003

a. Dependent Variable: Return on equity

The regression coefficient results in Table 4 show the extent to which the NPM, TAT and EM could predict the ROE of Safaricom Limited. From these values, the regression equation in this study takes the form:

$$ROE = -0.597 + 1.580NPM + 0.296TAT + 0.190EM + \epsilon$$

The beta coefficients for NPM, TAT and EM measure the number of units that each component of the three-step DuPont model lead to a corresponding 1 unit increase in the ROE of Safaricom Limited. It is observed that when the NPM was increased by 1 unit holding other predictors constant, the ROE rose by 1.58 and this effect was positive and statistically significant at 95% confidence interval (t = 30.786 and P = 0.000 < 0.05). Further results in Table 4 show that 1 unit increase in TAT and EM lead to a 0.296 and 0.190 units increase in ROE respectively during the studied period. This positive relationship is significant at 95% confidence interval at t-values of 8.748 and 4.695 and P = 0.000 and 0.003 respectively, which are both less than 0.05.

V. CONCLUSION

At their face value, the annual reports and financial statements may not be extremely useful to their users. Ratios analysis is one such technique used in the analysis of annual reports and other financial statements by expressing one item as a proportion of the other. Several ratios exist and each has its use and users. One such user is the stakeholder who wants to understand the earning power of his contributed capital and is therefore interested in profitability ratios such as the ROE. To better understand the ROE, investors use DuPont model. It is a model that analyses the ROE by disintegrating it into its various components. This study sought to analyse the performance of Kenya Telecommunication and technology Industry through the three-step DuPont model. From the established results, the DuPont analysis enables an individual to perform a detailed analysis on the various operational, financing and investing activities that affect the ROE.

REFERENCES

- [1] Albrecht, W. S., Stice, E. K., & Stice, J. D. (2007). *Financial accounting*. Boston: Cengage Learning.
- [2] Brown, R. E. (2010). *Business essentials for utility engineers*. Boca Raton, Florida: CRC Press.
- [3] Burja, V., & Mărginean, R. (2014). The study of factors that may influence the performance by the DuPont analysis in the furniture industry. *Procedia Economics and Finance*, Vol. 16, 213-223.
- [4] Calamar, A. (2016). *Return on equity: A compelling case for investors*. Lake Oswego, OR: Jensen Investment Management.
- [5] Doorasamy, M. (2016). Using DuPont analysis to assess the financial performance of the top 3 JSE listed companies in the food industry. *Investment Management and Financial Innovations*, Vol.13 (2), 29-44.
- [6] Geethalakshmi, A., & Jothi, K. (2016). Financial performance of select pharmaceutical companies in India using DuPont Analysis. *International Journal of Multidisciplinary Research and Development*, Vol. 3 (4), 321-324.
- [7] Ernst & Young. (2008). *Reporting to shareholders*. Ernst & Young.
- [8] Harris, P. (2010). *Accounting and finance for the international hospitality industry*. Milton Park, Abingdon: Taylor & Francis.
- [9] Herciu, M., & Ogorean, C. (2011). A Du Pont analysis of the 20 most profitable companies in the world. *2010 International Conference on Business and Economics* (pp. 45-48). Kuala Lumpur, Malaysia: IACSIT Press.
- [10] Kijewska, A. (2016). Determinants of the return on equity ratio (ROE) on the example of companies from metallurgy and mining sector in Poland. *Journal Metalurgija*, Vol. 55 (2), 285-288.
- [11] Lee, N., & Peters, M. (2015). *Business statistics using EXCEL and SPSS*. Thousand Oaks, California: SAGE.
- [12] Needles, B. E., Powers, M., & Crosson, S. V. (2010). *Principles of accounting, chapters 1-13*. Boston: Cengage Learning.
- [13] PwC. (2012). *Investor View: Why is use of clear language important in financial statements?* PwC.
- [14] Raza, S. A., Jawaid, S. T., & Adnan, M. (2013). A DuPont analysis on insurance sector of South Asian Region. *Munich Personal RePEc Archive Paper No. 49289*, 1-15.
- [15] Roucan-Kane, M., Wolfskill, L. A., Boehlje, M. D., & Gray, A. W. (2013). Bringing the DuPont profitability model to extension. *Journal of Extension*, Vol. 51 (5), 1-15.
- [16] Sur, D., Mitra, S., & Maji, S. K. (2014). *Disintegrating return on equity using the DuPont Model: A case study of Tata Steel Ltd.*
- [17] Wilson, R., Hill, A. V., & Glazer, H. (2013). *Tools and tactics for operations managers (collection)*. Upper Saddle River, New Jersey: FT Press.
- [18] Vasigh, B., Fleming, K., & Mackay, L. (2010). *Foundations of airline finance: Methodology and practice*. Farnham: Ashgate Publishing.

APPENDIX - A

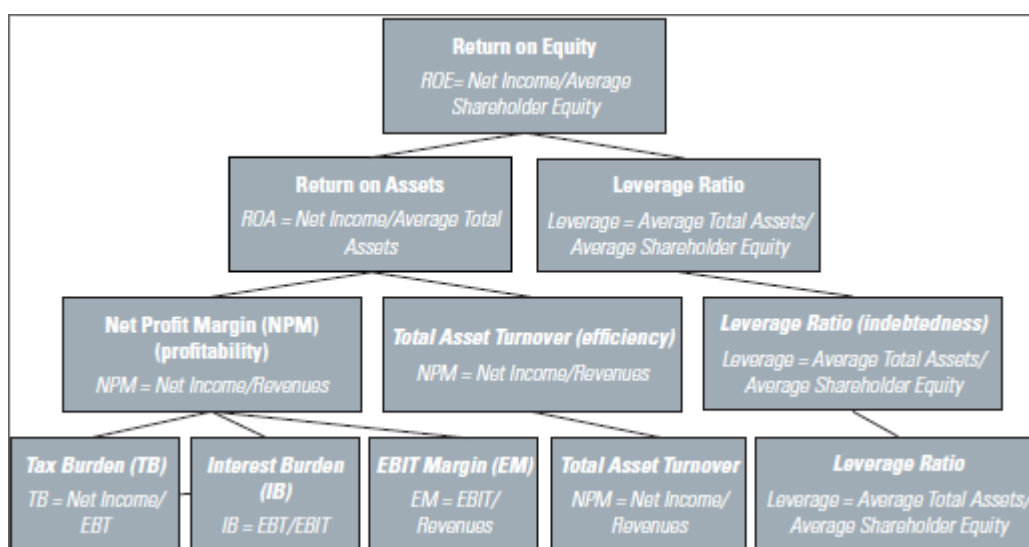
Appendix I. Selected financial values for analysis (in KShs)

YEAR	Net income	Turnover	Total assets	Average total assets	Equity	Average equity
2017	8,444,418,000	12,885,194,000	61,686,996,000	60,434,787,500	07,489,243,000	12,114,142,000
2016	38,104,290,000	95,685,224,000	159,182,579,000	58,070,102,500	16,739,041,000	10,507,786,000
2015	31,871,303,000	163,939,725,000	156,957,626,000	145,779,286,000	104,276,531,000	97,756,255,000
2014	23,017,540,000	144,799,102,000	134,600,946,000	131,728,551,500	91,235,979,000	85,750,553,500
2013	17,539,810,000	124,287,856,000	128,856,157,000	125,377,917,000	80,265,128,000	76,173,413,000
2012	12,627,607,000	106,995,529,000	121,899,677,000	117,877,219,500	72,081,698,000	70,195,890,500
2011	13,158,973,000	94,832,227,000	113,854,762,000	108,987,806,000	68,310,083,000	65,536,600,000
2010	15,148,038,000	83,960,677,000	104,120,850,000	97,901,587,000	62,763,117,000	56,955,098,500
2009	10,536,760,000	70,479,587,000	91,682,324,000	83,024,162,000	51,147,080,000	46,894,540,000
2008	13,853,286,000	61,369,408,000	74,366,000,000	65,387,000,000	42,642,000,000	37,715,500,000
2007	12,010,000,000	47,447,000,000	56,408,000,000		32,789,000,000	

Appendix II. Computed ratios of Safaricom Limited

Year	Net profit margin	Asset turnover	Equity multiplier	ROE
2017	0.22756	1.32693	1.43100	0.43210
2016	0.19472	1.23796	1.43040	0.34481
2015	0.19441	1.12457	1.49125	0.32603
2014	0.15896	1.09922	1.53618	0.26842
2013	0.14112	0.99131	1.64595	0.23026
2012	0.11802	0.90769	1.67926	0.17989
2011	0.13876	0.87012	1.66301	0.20079
2010	0.18042	0.85760	1.71893	0.26596
2009	0.14950	0.84890	1.77044	0.22469
2008	0.22574	0.93856	1.73369	0.36731

Appendix III. Five-step DuPont model



Source: Calamar (2016)