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**DETERMINANTS OF THE COMPANY'S FINANCIAL PERFORMANCE:
ON THE NASDAQ 100
(Vanadzor)**

This study is aimed at investigating the driving factors of return on equity (ROE). The analysis is carried out on the example of 90 largest non-financial companies, which are the constituents of the NASDAQ-100 index. The ordinary least squares method is used to find out the most impactful drivers of ROE. The extended DuPont method's components as well as other financial ratios are incorporated in this study. According to the results, the extended DuPont components are the main factors affecting ROE.

Keywords: return on equity, ratio analysis, DuPont method, return on equity drivers.

Introduction. The aim of this study is to analyze and explain factors (ratios and indicators) which are believed to have a significant impact on return on equity (ROE). The main goal of a company is the generation of profit and maximization of shareholders' equity. Looking through corporate finance textbooks and literature, ample information is found on shareholder wealth maximization being the primary goal of corporations. [1], [2] and many others argue that maximizing the market value of a firm offers the most essential objective function which is necessary for the efficient management of a firm. Therefore, the importance of return on equity as a profitability indicator becomes evident taking into account the fact that it measures how effectively the management generates wealth for shareholders. However, thorough analysis of profitability (return on equity) is a demanding and complicated process. [3], [4] along with other studies have identified that an absolute profitability measure doesn't provide reliable results and, only by grouping several profitability ratios, it is possible to achieve meaningful outcomes. DuPont method clarifies this issue as it presents ROE as a profitability measure and gives information about the drivers of ROE. With the DuPont method, the main issue of absolute profitability is resolved as the latter simply reflects capital not how well company's assets are utilized. DuPont method is a widely used gauge of profitability which links several factors to ROE. Liesz and Maranville have found that extended DuPont formula adds more to ratio analysis and through decomposition links ROE to a set of critical ratios [5]. Therefore, to gain a deeper understanding of the drivers of ROE "Really"

modified DuPont method's components are used in this study. In addition to DuPont components, other indicators of market and financial profitability such as price-to-earnings, current and book-to-market ratios are incorporated into the analysis.

The modified DuPont method is presented below [6].

$$\text{ROE} = \frac{\text{Net profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Shareholder's equity}}$$

DuPont analysis not only measures profitability but also explores how the company can yield return even with debt and how it can generate cash and produce more sales with each asset. DuPont analysis links balance sheet to income statement. It helps to spot areas within a company that are stronger or weaker. A top-profit business exists to generate wealth for its owners. ROE is, therefore, arguably the most important of the key ratios, since it indicates the rate at which owner wealth is increasing. It is obvious that DuPont analysis is not an adequate substitute for detailed financial analysis as it has certain drawbacks. However, it is an excellent tool to get a quick overview of company's strengths and weaknesses.

The "really" modified or extended DuPont method is shown below, which decomposes ROE into five ratios [7].

$$\frac{\text{Net Income}}{\text{Avg. shareholders' equity}} = \frac{\text{Net income}}{\text{EBIT}} \times \frac{\text{EBT}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Avg. total assets}} \times \frac{\text{Avg. total assets}}{\text{Avg. shareholders' equity}}$$

where:

EBIT- earnings before interest and taxes

EBT- earnings before taxes

There is significant and expanding literature on the use of ratios/indicators and the DuPont method. The literature mainly focuses on the viability and effectiveness of the DuPont method as a gauge of overall firm profitability. However, there is very little research and evidence concerning to the factors affecting ROE. According to [5] to perform DuPont analysis few simple calculations are required. The authors justify that these calculations lead to meaningful results for small businesses. Even with the original model it is possible to get valuable insights in return, however, extended modified DuPont analysis clarifies relatively complex financial analysis and gives managers the ability to effectively conduct strategic and financial planning [8]. examines the extended modified DuPont method as a simple tool which can be used by managers, small business owners and other market participants. The author claims that the method simplifies complicated financial analysis and is an effective

tool to identify how the DuPont components affect ROE. Herciu and others perform DuPont analysis on twenty most profitable companies in the world [4]. The authors stress that company's profitability as an absolute measure is not an effective measure for investors as it provides an overview of company's activity without giving details about the company's management of dividend, debt, liabilities and other indicators. With the help of profitability ratios like return on sale, return on assets and return on equity the authors demonstrate that those absolute measurements are not reliable most of the time and only by relating them to other indicators that clarify the relationship between effect and effort it is possible to achieve meaningful results. Padake and Soni analyze the efficiency of top twelve banks in India through DuPont analysis [3]. The authors claim that DuPont analysis provides a much deeper understanding of a firm's efficiency. They conclude that judging a performance of a bank solely by profit or one ratio is not accurate as the banks which made more profit were not more efficient than the others. Thus, profit is the reflection of capital, but not how well a firm utilizes its assets. Burja and Mărginean analyze the impact of DuPont components on ROE and asset turnover [9]. The analysis is conducted on five largest Romanian companies of furniture industry for a 13-year horizon. The authors conclude that ROE is positively correlated with return on sales, return on assets and negatively correlated with equity multiplier. Katchova and Enlow use DuPont method to compare ROE components of agribusiness companies [10]. They conclude that asset turnover has the largest impact on ROE indicating, the higher operating efficiency of agribusinesses.

Data and Methodology. The data were collected for the constituents of the Nasdaq-100 index. The Nasdaq-100 index includes 106 of the largest domestic and international non-financial companies listed on the Nasdaq Stock Market based on market capitalization². All the data concerning financial ratios and indicators used in this research study were obtained from Bloomberg database as of 23th of February, 2016. The data refers to the business year of 2015, and therefore is a cross sectional database (all the variables are measured at the same moment in time). The data consists of nine variables, namely: return on equity, tax burden, interest burden, operating margin, asset turnover, financial leverage, price-to-earnings, book-to-market and current ratios. Formulas depicted in Table 1 can differ from other sources as different databases use different formulae to calculate indicators. The ratios from

² <http://www.nasdaq.com/markets/indices/nasdaq-100.aspx>

Table 1 were acquired from the Bloomberg database and were used to calculate the independent variables/indicators.

With respect to methodology of inferential data analysis, the Ordinary Least Squares (OLS) regression method is used in this study to both identify the most relevant indicators that explain the changes occurring in return on equity and to quantify the relation between each indicator and the return on equity.

Table 1 depicts the variables used in the study, the abbreviation of their full name, their complete definitions as well as their units of measure and ratios that were used to calculate the variables. The expected relation between each independent variable and the dependent variable (ROE) is also depicted in the table. The (+) and (-) notations are used to explain the type of relationship between each independent variable and the dependent one. The (+) notation indicates a positive relationship with the independent variable, or in other words, a variation in the dependent variable in question influences positively the return on equity. In contrast, the (-) notation indicates the existence of a negative relationship between the selected independent variable and the variable that is being explained, this is, if the dependent variable varies the return on equity will vary in the opposite direction. The (+) notation means that variations in the dependent variable are expected to change the return on equity in the same direction. Whereas, the (-) notation implies that variations in the independent variable are expected to alter the return on equity in an opposite direction.

Table 1

Description of dependent and independent variables and the expected relation between them

Variable	Abbreviation	Description	Ratio	Unit of measure	Type of association
Return on equity	ROE	Amount of income returned as a percentage of shareholders equity	$ROE = \frac{\text{Net income available for common shareholders}}{\text{average total common equity}} \times 100\%$	%	n/a
Tax burden	TB	The proportion of the company's profits retained after paying income taxes	$TB = \frac{\text{Net income available for common shareholders}}{\text{Pre-tax income}} \times 100\%$	%	+
Interest burden	IB	Measures the effect on interest on ROE	$IB = \frac{\text{Pre-tax income}}{\text{Operating income (loss)}} \times 100\%$	%	+
Operating margin	OM	Measures how much is left of revenue considering cost of goods sold and operating expenses	$OM = \frac{\text{Operating income}}{\text{Net sales}} \times 100\%$	%	+
Asset turnover	AT	Measures the efficiency of a company's use of its assets in generating sales revenue	$AT = \frac{\text{Net sales}}{\text{Average total assets}}$	€	+
Financial leverage	FL	Is the use of borrowed capital to increase potential return of an investment	$FL = \frac{\text{Average total assets}}{\text{Average total common equity}}$	€	(+)/(-)
Price-to-earnings	PE	Measures a company's current share price relative to its per-share earnings	$PE = \frac{\text{Last price}}{\text{Earnings per share}}$	€	-
Price-to-book	PB	Compares a stock's market value to its book value	$PB = \frac{\text{Last price}}{\text{Book value per share}}$	€	+
Current ratio	CUR	Measures a company's ability to cover its short-term liabilities with its current assets	$CUR = \frac{\text{Current assets}}{\text{Current liabilities}}$	€	+

Note: The ratios are acquired from Bloomberg database and were used to calculate the variables in study. The notation n.a. means that an expected relation is not applicable. ROE is the dependent variable

Source: Author's calculations using Bloomberg data retrieved as of 23.02.2016

Empirical results of the analysis. Some variables are presented in percentage terms while others are presented in monetary units (€) which makes the comparison of each variable's impact on ROE difficult. For an obvious reason, it is necessary to present them in a same unit of measure to simplify the comparison of results. Therefore, the linear functional form of the model is transformed into a logarithmic functional form. Logarithmic values are known to decrease the degree of dispersion of a variable's values. Second, the transformation allows to analyze all the coefficients in percentage values. Thus, a second model using the same variables is estimated.

As shown in Table 2, both models show high R-squared values indicating that variations occurring in the independent variables effectively explain variations occurring in the dependent variable. The first model presents a R-squared value equal to 0,8621 for original values and the second model presents a higher R-squared value of 0.9847. The results with logarithmic values are better due to the higher R-squared value. The F-test results for both normal and logarithmic values are statistically significant for a significance level of 1%. The Root MSE is much lower for regression model using logarithmic values, indicating much higher accuracy compared to the model with normal values.

Table 2

Results of the OLS regression analysis of global sample, using original measurement units and logarithmic values

Variables	Model 1: Normal values				Model 2: Logarithmic values			
	Estimated coefficient	Standard Robust Error	p-value	VIF	Estimated coefficient	Standard Robust Error	p-value	VIF
TB	0.44	0.154	0.005 ***	1.24	0.94	0.034	0.000 ***	1.47
IB	0.00	0.004	0.659	1.04	0.95	0.044	0.000 ***	1.54
OM	0.59	0.273	0.033 **	1.32	0.89	0.047	0.000 ***	4.32
AT	11.23	3.585	0.002 ***	1.17	0.90	0.056	0.000 ***	4.13
FL	9.02	3.047	0.004 ***	1.41	0.89	0.064	0.000 ***	3.59
PE	-0.06	0.030	0.040 **	1.55	-0.10	0.047	0.037 **	4.35
PB	0.63	0.207	0.003 ***	1.37	0.14	0.066	0.042 **	4.24
CUR	1.83	1.249	0.147	1.31	-0.03	0.019	0.132	1.92
Constant	-59.43	19.489	0.003 ***		-8.24	0.484	0.000 ***	
N=90				N=87				
R-squared= 0.6786				R-squared= 0.9930				
F-test (8, 81) = 5.55 ***				F-test (8, 78) = 4364.82 ***				
Root MSE = 14.831				Root MSE = 0.06895				
Ramsey test: F (3, 75) = 51.19 ***				Ramsey test: F (3, 75) = 0.44				

Notes: * means that the coefficient presents a 10% level of significance; ** means that the coefficient presents a 5% level of significance; *** means that the coefficient presents a 1% level of significance

Source: Author's calculations using Bloomberg data retrieve as of 23.02.2016

According to the results, tax burden, interest burden, operating margin, asset turnover, financial leverage ratios (extended DuPont components) describe changes

occurring in return on equity. The coefficients of the second model for TB, IB, OM, AT and FL are 0.94, 0.95, 0.89, 0.90 and 0.89 respectively, which means that 1% change in TB, IB, OM, AT and FL translates into 0.94 %, 0.95 %, 0.89 %, 0.90 % and 0.89 % change in return on equity, respectively. The model asserts that TB, IB, OM, AT and FL (extended DuPont components) are the most powerful drivers of ROE.

Conclusions. As mentioned throughout the article, profitability analysis plays a crucial role in financial statement analysis and return on equity (profitability measure) is an important metric for a company manager who attempts to understand the company's strengths and weaknesses or an investor who seeks a profitable investment. Any market participant practically uses profitability measures, independent of the underlying reason of financial analysis in question. In this respect, return on equity assumes a greater relevance as it measures how effectively capital is utilized to generate profit for company's shareholders. Therefore, it is imperative to identify the determinants of return on equity, in other words, ratios and indicators that have the most explanatory power regarding return on equity.

The most important finding of this study is that extended DuPont components are the most powerful drivers of return on equity. The extended DuPont components have enough explanatory power to describe the variations occurring in return on equity. Therefore, extended DuPont analysis can be considered as a very sophisticated tool for financial ratio analysis. By solely making extended DuPont analysis, a market participant is equipped to observe the changes in the components, which in turn change the return on equity. According to the findings, extended DuPont analysis provides important insights into the changes in return on equity.

REFERENCES

1. **Brealey R. A., Myers S. C., and Allen F.** Principles of corporate finance. -New York, NY: McGraw-Hill/Irwin, 2006.
2. **Brigham E. F., and Ehrhardt M. C.** Financial Management: Theory and Practice (13-th ed.). - Australia: South-Western Cengage Learning, 2011.
3. **Padake, V., & Soni, R.** Measurement of Efficiency of Top 12 Banks in India Using DuPont Analysis // IUP Journal of Bank Management. – 2015. - 14(4). - P. 59-68.
4. **Herciu, M., Ogrean, C., & Belascu, L.** A Du Pont Analysis of the 20 Most Profitable Companies in the World // 2010 International Conference on Business and Economics Research. - 2011. - I. - P. 45-48.

5. **Liesz, T. J., & Maranville, S. J.** Ratio Analysis featuring the Dupont Method: an overlooked topic in the finance module of small business management and entrepreneurship courses // Small Business Institute® Journal. – 2011. - 1(1). - P. 17-34.
6. **Fridson, M. S., & Alvarez, F.** Financial statement analysis: a practitioner's guide (Vol. 597). - John Wiley & Sons, 2011.
7. **Hawawini, G., & Viallet, C.** Finance for executives: Managing for value creation. - Cengage Learning, 2010.
8. **Liesz, T. J.** Really modified Du Pont analysis: Five ways to improve return on equity // SBIDA Conference Proceedings. – 2002. - Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.610.5026&rep=rep1&type=pdf>.
9. **Burja, V., & Mărginean, R.** The Study of Factors that may Influence the Performance by the Dupont Analysis in the Furniture Industry // Procedia Economics and Finance. - 2014. - 16. - P. 213-223.
10. **Katchova, A. L., & Enlow, S. J.** Financial performance of publicly-traded agribusinesses // Agricultural Finance Review. - 2013. - 73(1). - P. 58-73.

Դ.Ա. ԽԱՌԱՏՅԱՆ

ԿԱԶՄԱԿԵՐՊՈՒԹՅԱՆ ՖԻՆԱՆՍԱԿԱՆ ԱՐԴՅՈՒՆԱՎԵՏՈՒԹՅԱՆ ՈՐՈՇԻՉ ԳՈՐԾՈՆՆԵՐԸ («NASDAQ-100» ԿԱԶՄԱԿԵՐՊՈՒԹՅՈՒՆՆԵՐԻ ՕՐԻՆԱԿՈՎ)

Ուսումնասիրվել են սեփական կապիտալի շահութաբերության վրա ազդող գործոնները: Հետազոտությունը կատարվել է 90 խոշորագույն ոչ ֆինանսական ընկերությունների օրինակով, որոնք «NASDAQ-100» ինդեքսի բաղադրիչներն են: Սեփական կապիտալի շահութաբերության վրա ազդող գործոնները բացահայտելու համար օգտագործվել է փոքրագույն քառակուսիների ռեգրեսիոն անալիզի մեթոդը: Աշխատանքում ընդգրկվել են ինչպես ընդլայնված Դյուպոն մեթոդի բաղադրիչները, այնպես էլ այլ ֆինանսական ցուցանիշներ: Ըստ հետազոտության արդյունքների՝ ընդլայնված Դյուպոն մեթոդի բաղադրիչներն են սեփական կապիտալի շահութաբերության վրա ազդող հիմնական գործոնները:

Առանցքային բաներ. սեփական կապիտալի շահութաբերություն, գործակիցների վերլուծություն, Դյուպոն մեթոդ, սեփական կապիտալի շահութաբերության որոշիչ գործոններ:

Д.А. ХАРАТЯН

**ДЕТЕРМИНАНТЫ ФИНАНСОВОЙ ЭФФЕКТИВНОСТИ
ОРГАНИЗАЦИИ: НА ПРИМЕРЕ ОРГАНИЗАЦИЙ “NASDAQ-100”**

Изучены факторы, влияющие на рентабельность собственного капитала. Исследование проводилось на примере 90 крупнейших нефинансовых компаний, которые являются компонентами индекса “NASDAQ-100”. Метод наименьших квадратов регрессионного анализа использовался для определения факторов, влияющих на доходность собственного капитала. Рассмотрены как компоненты расширенного метода Дюпон, так и другие финансовые показатели. Результаты исследования показали, что компоненты расширенного метода Дюпон являются основными факторами, влияющими на рентабельность собственного капитала.

Ключевые слова: рентабельность собственного капитала, анализ коэффициентов, метод Дюпона, детерминанты рентабельности собственного капитала.