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The Relevance of The Tax Effect To Explain The "Return On Equity" (Listed Companies – France, Germany, Portugal And Spain)

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Abstract

Financial statements provide information that could explain the return on equity. The DuPont extended model identifies five key ratios/indicators that might explain the performance of a company – tax effect, interest burden, earnings before interest and taxes (EBIT) margin, assets turnover and financial leverage. This study aims to analyse the relevance of the tax effect on the "return on equity" (ROE). For the purpose of the study we selected a sample based on listed companies from the stock markets of France, Germany, Portugal and Spain. The number of companies of the sample is 516. The Ordinary Least Square (OLS) method was used to determine the individual impact of each factor on the "return on equity". According to our findings, the tax effect and the interest burden play the most important role in order to explain the return on equity.

Keywords: tax effect, return on equity, DuPont model, stock markets.

Introduction

The evaluation of a company's performance is always a relevant issue in the management field. The tax burden (or tax effect) is a variable that significantly affects any company's financial performance. Consequently, all companies do tax planning, tax avoidance or even tax evasion, to reduce the tax burden. Therefore, the tax burden analysis in return on equity (ROE) is necessary if the managers intend to present better results to shareholders. An evaluation of performance could be performed using accounting or markets data. The financial statements provide the raw material to do the financial analysis. The DuPont model is a well-known model that uses financial accounting to analyse the company's performance. The most intuitive way to compute the return on equity is by dividing net income by equity. For detailed information about the factors which influence the ROE, the DuPont model claim that ROE depends on three factors: "net income margin", "assets turnover" and "leverage". A modified version suggested by Hawawini and Viallet (1999) extend the model to five factors: "tax burden", "interest burden", "EBIT margin", "assets turnover" and "financial leverage". Thus, in this study, considering that we are focused in tax burden relevance, using a sample with 516 companies listed in stock markets in France, Germany, Portugal and Spain, we calculate all the DuPont's components which affect the ROE in the 2017 year (which consists in on cross-section analysis). Then, we used the OLS method to find evidence about each variable' relevance, particularly the tax burden, to explain the ROE, according to the main objective. This study is structured as follows: firstly, we present a brief background about the topic; secondly, we expose the data, sample, variables and method; thirdly, we present and discuss the results. Finally, we disclose the main conclusions.

Brief Literature Review

For shareholders, the companies' taxation is an essential factor that influences the performance of any company. Therefore, managers try to reduce the tax burden. Thus, how mentioned previously, tax planning is a strategic followed to improve the shareholders' net income.

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The ratios' use in research has been one way to find evidence about the taxation impact on the companies' performance. The ratios could be used to measure several kinds of performance, at know, the financial performance. Therefore, in many studies, the company' performance is measure as a financial ratio (Lazar, 2016). For example, the ratios analysis can be defined as the use of ratios to interpret the financial statements to analyse the historical performance and current financial position (Sahu & Charan, 2013).

One of the most know and use ratio (in the profitability ratios category) is the ROE. As ROE, profitability ratios are like the confirmation that one company is efficiently capable of using their available resources to grow sales and/or the net income (Ciurariu, 2015). This ratio use net income as a reference in profitability measure (Kijeeska, 2016). However, can be get information more deep reformulating this formula. The main objective of DuPont model is learning how the other factors/ratios could be affecting ROE. DuPont model was first introduced by F. Donaldson Brown, an electrical engineer who integrated the financial department of a chemistry company in 1914 (Kharatyan, Lopes, Nunes & Aghababyan, 2016). The three facts formula is:

$$ROE = \frac{net\ income}{EBIT} \times \frac{sales}{total\ assets} \times \frac{total\ assets}{equity} \quad (1)$$

A change was introduced by Hawawini and Viallet (1999). Two more factors were added, constituting a total of five ratios combined to form ROE. The equation suggested by previous authors claimed as:

$$ROE = \frac{net\ income}{EBIT} \times \frac{EBT}{EBIT} \times \frac{EBIT}{income} \times \frac{income}{total\ assets} \times \frac{total\ assets}{equity} \quad (2)$$

Where EBIT is income before interest and taxes, EBT is income before interest and ROE is given by the following formula:

$$ROE = tax\ burden \times interest\ burden \times EBIT\ margin\ \times assets\ turnover \times leverage \quad (3)$$

In this ROE' formula, tax burden measure tax effect in ROE, interest burden measure effect that interest burden as tax has in ROE, EBIT margin measure ROE's operational profitability, assets turnover measure how efficiently company use its resources to generate income and financial leverage measures the relation between equity and asset turnover.

The DuPont method analysis requires a few simple calculi, as emphasised by Liesz and Maranville (2011) and offers managers the possibility to realise strategic financial planning. In literature, we can find several studies that use the DuPont model to explain profitability. However, some authors (e.g. Kharatyan, Lopes, Nunes & Aghababyan, 2016) claim that, individually, financial ratios indicate incomplete information of a company. Therefore, in many investigations, other ratios were also considered (e.g. current ratio or price/price). For example, Batchimeg (2017) examined which ratios can determine the financial performance of Mongolian companies. He used sales growth, income growth, assets growth, earnings per share, gross profit margin, cost/revenue ratio and return on profit, costs, short-term debt-to-assets ratio, current assets-to-total assets ratio, long-term debt to total assets, fast ratio, current ratio and cash ratio as explanatory variables. Return on assets (ROA), return on equity (ROE) and return on sales (ROS) were choose as the performance indicators.

The DuPont model has no regard the relation between return and risk, as capital asset pricing model and modified versions. However, it is always an essential tool for analysing a company's profitability and understanding the factors contributing to better performance.

We can find in literature many studies on performance issues. Lazar (2016) analysed specific determinants of Romanian companies' profitability during the period 2000-2011. He found that tangibles, leverage, size, and work intensity negatively affected a company's performance.

In addition to the previous factors, we believe that the "tax burden" will always be an important factor in improving profits shareholders. Sometimes, "tax burden", "interest burden" and, consequently, "capital structure" are linked to explain profitability. In 1963, Mogliani and Miller, based on two different companies, one financed by external

sources and other funded by intern sources, they find that the use the external sources seems to have an advantage due to deductions from interest costs. However, considering the taxation of corporate profitability, the weighted average cost of capital is influenced not only by the tax rate but also by the capital structure (Modigliani & Miller, 1963).

In terms of leverage, according to Ribeiro (2015, p.8) "hopes that companies more leveraged show effective taxes lower", mentioned that Richardson and Lanis (2007) and Kraft (2014) find a negative significative relation between leverage, using as a proxy the capital structure and effective taxes rates (ETR). Therefore, if the debt cost is less than the investment of profitability, due to a tax deduction of interest, the return on equity will increase.

Using a sample of 20 companies listed in the stock market of Bucharest and the net income and return on assets as a performance measure, effective tax rate, companies' size, capital structure, long term debt and financial leverage, Pitulice et al. (2016) analysed a possible influence of corporate tax on a company' financial performance. They found that the effective tax rate negatively influences the dependent variable (ROA); lower net profit 5,63% compared to 0,32% in ROA.

Constantin (2012), concerning the correlations between financial indicators and effective tax rate (ETR), found a negative relation between the asset ratio and the ETR: an increase of 1% in the ratio between fixed assets and total assets, the effective tax rate at company level decreases 0,3251%; the relation between effective tax rate and ROE is negative; sales margin and ETR show an indirect relation.

Xianyu (2011) finds that the tax burden on macro and micro operational performance has a significant negative impact on companies' performance listed in China.

The relation between the effective tax rate and leverage, calculated as the ratio debt to capital, occurs in some studies as negative (Md Noor et al., 2010; Richardson & Lanis, 2007; Gupta & Newberry, 1997). The authors found a significant negative relation between corporate tax and financial performance using an asset's profitability as a variable measure.

One study realised by Rotimi and Henry (2016) confirms a significant relationship between corporate tax and manufacturing companies' performance in Nigeria. The results show a negative relation between the corporate profitability tax and earnings per share, "indicating that a unit increase in tax cost reduces earnings per share in approximately 38,3%, during analysing' period".

Concerning component "assets turnover", Soliman (2008) study the decomposition of profits: assets turnover, profit margin and market association with DuPont components, either in long windows tests as in short windows. He found that assets turnover has an explicative power to future variations in "return on operating net assets".

Methodology

Objectives

The tax burden is always an essential factor that reduces the available profit to shareholders. The impact could be bigger or smaller considering tax rates, tax benefits, tax incentives and tax adjustments to "profit before tax" to calculate the "tax profit". Therefore, it depends on tax law and, consequently, is dependent on the country in analyse. Thus, this study's main objective is to calculate the impact of tax effect in return on equity, considering the DuPont model's variables as a whole.

Data and sample

The data was selected from financial statements in companies listed in stock markets in Germany, France, Portugal and Spain available in database Amadeus (http://amadeus.bvdinfo.com). The accounting information needed to the study is the data about results before tax, net profit, EBIT, sales, total assets turnover and equity. After getting the database information (march, 2019), the data was analysed and defined to avoid biased results. Data were obtained from 2017 financial statements, so the analysis is a cross-section. In the data preparation process, several companies were excluded according to the following guidelines:

(a) Financial institutions were removed from the database because they use a different accounting system with specifics accounting standards. Therefore, financial information isn't comparable with the purpose of this study;

(b) Companies with values considered outliers, which could bias the results (e.g. ROE values above 100% and negative);

(c) Companies with missing variable values, not allowing the calculation of ratios;

(d) Companies with no activity in 2017;

(e) Companies that didn't pay corporate taxes in 2017;

(f) Companies without financial charges ("positive" financial costs, i.e., tax profits higher than expenses).

As a result of our approach, the database includes 516 companies listed in the following values: Germany (199), France (233), Portugal (18) and Spain (66). Then, after identifying the extended DuPont model variables, values for these variables were calculated according to their formulas (see Table 1).

Variables

The variables used are the following: ROE, tax effect, interest burden, EBIT margin, asset turnover and financial leverage. Table 1 identifies the variables, descriptions and formulas, and the expected association between each variable and ROE.

Table 1: Identification and description of the variables included in the extended model.

Abbreviation	Variable	Description	Formula	Expected Association
ROE	Return on equity	Amount of income returned as a percentage of shareholders' equity	$\frac{net\ income}{total\ equity}$	n/a
tax_effect	Tax effect / tax burden	The proportion of the company's profits retained after paying income taxes%	$\frac{net\ income}{pré - tax\ income}$	+
interest_burden	Interest burden	Measures the effect on interest on ROE	$\frac{pré - tax\ income}{EBIT}$	+
EBIT_margin	EBIT margin	Measures how much is left of revenue considering the cost of goods sold and operating expenses	$\frac{EBIT}{sales}$	+
asset_turnover	Assets turnover	Measures the efficiency of a company's use of its assets in generating sales revenue	$\frac{sales}{total\ assets}$	+
leverage	Financial leverage	Is the use of borrowed capital to increase the potential return of an investment	$\frac{total\ assets}{equity}$	+/-

Source: Author's elaboration

ROE is the dependent variable (the one we intend to explain). All the others are the independent variables (the ones that we expect to have some association/effect on the ROE). Regarding the type of association with ROE, all independent variables are expected to present a positive association. For example, the higher the tax effect ratio value, the lower the tax to be paid. In other words, if the ratio increases, the tax burden decreases. The same happens with the interest burden. Regarding the EBIT margin, the higher the ratio, the better. Concerning the financial leverage, the higher the ratio value, the greater the leverage level.

Method

About the model, the traditional OLS regression method was used in this study to identify the most relevant indicators in explaining variations in ROE and quantify the relationship between each variable and the return on equity. Therefore, the OLS regression method is applied to determinate which variables are more explanatory/have better power of association in the ROE's variables.

The complete linear regression is present in equation (4). The OLS method application in equation (2) requires the use of logarithms. The equation estimate is the next:

$$ROE_i = \alpha + \beta_1 effect\_tax\_burden_i + \beta_2 effect\_interest\_burden_i + \beta_3 effect\_EBIT\_margin_i + \beta_4 effect\_assets\_turnover_i + \beta_5 effect\_financial\_leverage_i + e_i \quad (4)$$

Results and Discuss

First of all, it is important to remember the coefficients found in estimating the OLS model that relates the independent variables with the return on equity. Thus, the values found are shown in Table 2.

Table 2: Analysis of ROE by factors.

	Tax effect	Effect of the interest burden	Effect of EBIT margin	Effect of assets turnover	Effect of financial leverage
Estimated coefficient	1.20	1.64	0.33	0.10	0.27
R^2	0.29	0.35	0.13	0.01	0.02

Source: Author's elaboration

Note that the variation of 1% in the variables in the study, induces an increase between 0,10% and 1,64% in return on equity. The variables that encourage a higher increase in ROE by an increase of one unit in these same variables are the "interest burden effect" and the "tax effect", respectively. The variables have significant explanatory power, except for the variables "effect of financial leverage" and "effect of asset turnover" which have a determination coefficient of only 2% and 1%, respectively.

The main objective of this work is to evaluate the tax effect on the profitability of listed companies. Therefore, models were analysed with more than one explanatory variable, intending to conclude how the tax effect was manifested according to the analysed variables. Firstly, it isn't possible to perform the analyses with all the explanatory variables. Since the ROE is the product of the multiplication of all five explanatory variables, the model presents itself with perfect multicollinearity, which doesn't allow the estimation of that same model. Thus, the solution found is to remove each of the variables, in turn, and estimate the model.

Table 3 shows the models constants and the value of the variables in each model and the value of the adjusted coefficient of determination of the model. Model 1 corresponds to the estimation of ROE without considering interest burden, model 2 to the estimation of ROE without considering EBIT margin, model 3 to the estimation of ROE without considering assets turnover and model 4 without considering the financial leverage.

Table 3: Estimation of ROE for studied models

Explanatory variables		**Model 1**	**Model 2**	**Model 3**	**Model 4**
Constant		0.46	-2.23	-1.77	0.47
L_tax_effect		1.11	1.04	0.94	0.97
L_effect_interest_burden		-	1.68	1.64	0.71
L_effect_EBIT_margin		1.19	-	0.27	0.86
L_effect_asstes_turnover		1.24	0.05	-	0.91
L_effect_financial_leverage		0.85	0.75	0.88	-
Model adjustment accuracy indicators	**R^2 adjusted**	0.75	0.66	0.74	0.81
	F(4.511)	559.46	179.75	218.60	476.93
	P value(F)	0.00	0.00	0.00	0.00
Model information criteria	**Schwarz**	189.75	834.86	700.10	534.06
	Akaike	168.52	813.63	678.87	512.83
	Hannan-Quinn	176.84	821.95	687.19	521.15

Source: Author's elaboration

Model 1 shows that, with a 99% confidence level, it is possible to affirm that the 1% increase in any of the explanatory variables that are part of the model increases return on equity between 0.852% and 1.238%. The variable "effect of

asset turnover" is the one that most contributes to the variations in the variable ROE and the variable "effect of financial leverage" that least causes variations in the variable ROE. The adjusted determination coefficient indicates that the variations that occur in the explanatory variables with the "interest burden effect" as a variable omitted explain 90.3% of the variations that occur in ROE. This value is very high, so this model has high explanatory power. The F test assesses the joint significance of the variables and in this model, this parameter is statistically significant, which means that the variables together form a good model.

By analysing model 2. at a 99% confidence level. it is possible to state that the 1% increase in the variables "tax effect". "effect of interest burden" and "effect of financial leverage" increases the return on capital 1.041%. 1.675% and 0.752%. respectively. Although the variable "effect of assets turnover" indicates that if it undergoes an increase of 1%, the variable ROE increases by 0.050%. There is insufficient statistical evidence to affirm that this variable has significance in this model. The variable "effect of interest burden" is the variable that most changes the variable ROE and the variable "effect of financial leverage" is the one that causes the lower changes in the dependent variable. The variations in the explained variable are justified in 65.6% by the variations of the independent variables when the variable "effect of EBIT margin" is omitted, as shown in the adjusted determination coefficient parameter. This value is reasonable, so this model has some explanatory power that is in line with what is indicated in the F test result. This test indicates statistical significance, so these variables form a good set that allows building a model.

Model 3 shows that. with a 99% confidence level, it is possible to affirm that the 1% increase in any explanatory variables increases the ROE between 0.268% and 1.640%. It is the variable "effect of interest burden" that causes the bigger change in the dependent variable and the variable "effect of EBIT margin" is the one that least induces changes. By the adjusted coefficient of determination, it is possible to identify that 73.5% of the variations in the return on equity are explained by the variations in the independent variables when the variable "effect of assets turnover" is missing. The F teste shows that the variables together make a good model. The result is significant for a 1% significance level.

Model 4 shows that, with a 99% confidence level, it is possible to state that the 1% increase in any of the explanatory variables increases the ROE variable from 0.712% to 0.973%. The variable that causes the most changes in the dependent variable is "tax effect". The variable that has the least influence on the return on equity in this model is the "effect of interest burden". Observing the adjusted determination coefficient is possible to verify that 80.8% of the variations in the return on equity are justified by variations in independent variables. This value is high. So this model has an explanatory value. The F test proves that the use of this set of variables forms a good model with significance for a level of statistical significance of 1%.

Comparative analysis and discussion between models

Model 1 had an adjusted coefficient of determination of 90.3%, indicating that 90.3% of the variations that the return on equity suffers are justified by the variations in the explanatory variables that the model includes. It is a high value, so the model has good explanatory power. The F test confirms the explanatory power since it indicates that the set of variables form a good model. at a significance level of 1%.

In the observation of the adjustment accuracy of Model 2. it is noted that the model has an adjusted coefficient of determination of 65.6%. The variations in the profitability of equity are explained only 65.6% by the variations of the explanatory variables that integrate the model. Although it is not a high value, it is considered reasonable and allows us to conclude that the model has some explanatory power. The joint significance test indicates that the variables used form a good model at a significance level of 1%.

Model 3 has an adjusted coefficient of determination of 73.5%. The variations that occur in the profitability of equity are 73.5% explained by the variations of the independent variables that constitute this model. It is a high value and indicates that the model has explanatory power. With this, by observing the F test result, it can be affirmed that the variables together form a good model for a significance level of 1%.

Concerning Model 4, the adjusted coefficient of determination shows that 80.8% of the variations that occur in return on equity are explained by the variations of the model variables. This value is high and, therefore, the model has explanatory power. The F test proves this fact as it indicates that the set of variables forms a good model at a significance level of 1%.

As for specifying model information, three criteria - Schwarz. Anaike and Hanna-Quinn - were analysed. They allowed choosing the best model among the five models studied. According to the criteria selection rules, the model

with the lowest values is chosen. Thus. one can conclude whether the best model is Model 1 (see Table 3). as it has lower values. Accordingly, the adjustment coefficient also indicates, which is the best model that has the highest value (90.3%).

As for the worst model, it can be concluded that it is Model 2. The model has the lowest value in the parameter of the adjusted determination coefficient, indicating that the variations in the explanatory variables justify it in a lower percentage (compared to other models) changes in return on equity. In the three information criteria understudy, it is the model with the highest values.

The impact of the tax effect – global simple

The "tax effect" variable plays an important role in determining the return on equity. The impact measured in percentage terms, for each unit, varies between 0.944% and 1.112%. That is. if the tax effect varies by approximately 1%. the return on equity will vary between 0.944% (Model 3) and 1.112% (Model 1). Concerning the other variables, the "effect of financial charges" under Models 2 and 3 and the "effect of asset rotation" under Model 1 stand out.

In general, concerning the "fiscal effect". the results are in line with the studies carried out by Xianyu (2011). Constantin (2012). Pitulice et al. (2016) and Rotimi and Henry (2017). which show an effect positive effect of the "tax effect" on the return on equity. Concerning the other variables, the direction of the influence on the return on equity is also in line with other studies already carried out. In particular. with the evidence of Batchimeg (2017) who observed a positive influence of the "EBIT margin effect". Also, Gupta and Newberry (1997), Richardson and Lanis (2007), Soliman (2008) and Md Noor et al. (2010) obtain the same results. They are stating that the "effect of asset rotation" is positive. When this variable is negative, the results are in accordance with the results of Janssen and Buijink (2000) and Adhikiri et al. (2006). Regarding the "financial leverage effect". the results are in line with those of the investigation by Delen et al. (2013). who concluded that it had a positive impact.

Conclusion

Using data from companies listed on the German. French. Spanish and Portuguese stock markets we analysed the DuPont models' factors where the tax effect is included. The evidence shows that taxation plays an essential role in explaining ROE. The tax effect alone explains about 29% of ROE. In terms of the impact on ROE, if the tax effect increases by 1% (that is. the tax paid decreases. according to the model), ROE increases by 1.20% which shows the importance of this factor in the decision-making process about investment decisions. The interest burden is the factor that has the most significant impact on ROE and explains approximately 35%.

The analysis was carried out with companies from all countries (global sample). It is important in future research to extend the analysis to each country, taking into account the differences in ETR. The conclusions of this study must be considered taking into account the context of the DuPont model. From the initial sample, we had to eliminate several companies due to the deferred tax accounting procedure. When we think about the DuPont model, we can have the following premises: taxes will decrease profit before taxes and the interest burden will also decrease profit before interest paid. Currently, due to the general adoption of IASB international accounting standards (IAS. IFRS), the accounting context for deferred taxes may not be well understood when using the DuPont model; we expect taxes to decrease profit after tax. not the other way around. Therefore, although we have removed from the sample, the companies that present profits after taxes higher than profits before taxes, the results can be influenced by deferred taxes.

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