IMPACT OF FINANCIAL STRUCTURE ON ECONOMIC RETURN (ROA - RETURN ON ASSET); CASE STUDY: WHOLESALE OF MOTOR VEHICLE PARTS AND ACCESSORIES (NACE: 4531)

Rodica Baciu (Boanta)\textsuperscript{152}
Petre BREZEANU\textsuperscript{153}

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Abstract: The purpose of this research is to determine whether there is a relationship between capital structure and economic performance of firms active in Romania in the wholesale of motor vehicle parts and accessories (NACE 4531). Capital structure refers to how a firm chooses to finance their investments and future growth by dividing debt into subcategories (bank, commercial) and time horizon, while economic performance is evaluated by the return on assets (net result divided by total assets in the balance sheet). By determining this relationship, firms in these sectors should have a better understanding of how to finance long and short term investments to maximize the return on assets and exceed the cost of capital. The main output of the study consists in the fact that the financial structure divided by debt components of the companies explains significantly the return on assets, while the model can be improved by adding operating profits and asset turnover to better explain economic return.

Key words: capital structure, return on assets, operating leverage

1. INTRODUCTION

The current paper aims to evaluate the impact of financial structure on the return on assets. According to the literature review presented in the following section, it is very important to understand the principal drivers of the economic return to understand important indicators reflecting the long term solvency of any company, starting with the assets performance and cost of capital coverage. Methodology and sample description are presented in the third section, providing further details on the multifactor regression initial and improved model. The first model is adjusted due to multicolinearity issues among financial structure independent variables. The results are presented in the fourth section for both the initial and adjusted model. According to the multifactor regression equation results in E-Views, we conclude that subcomponents of financial structure explaining 64% from the variation of the return on assets. Moreover, general leverage together with new independent variables included (operating margin and asset turnover, described in the second model) explain up to 78% of the economic performance for the appraised companies. In the end, we recommend future research under volatile interest rates inflationary pressures specific to Romania during the current year, which can significantly affect companies active in wholesale activity!

\textsuperscript{152} The Bucharest University of Economic Studies Department of Finance, Bucharest, Romania
\textsuperscript{153} The Bucharest University of Economic Studies Department of Finance, Bucharest, Romania
2. LITERATURE REVIEW

Return on assets (ROA), or the economic return, is one of the most important indicators to reflect the performance of investments on both long and short term (Christensen et al., 2015). Companies can be competitive only if they constantly search for investment in new projects, markets, products/services or technology to generate growth opportunities (Kato et al., 2016). This is mostly important in emerging countries, where business cycles are higher in amplitude (Kannadhasan et al., 2016) and the process of disruptive regeneration is more intense (Botosan et al., 2011). Hence, during recessionary periods companies default, creating opportunities for the existing firms to expand their capacity of production and increase sales (Giacomini et al., 2016). This is mostly beneficial during the initial recovery period, when interest rates are low to encourage spending and investments (Liu and Li, 2012), assets are usually undervalued and future growth perspective should support investments (Galsband, 2010). Following the initial investment, management should develop a process of monitoring the performance of execution from both operational and financial point of view. To the latter respect, investments in assets should generate enough return to cover the cost of capital necessary to finance the initial cash outlay (Jung, 2016). To this perspective, companies use the weighted average cost of capital to reflect the financing effort. For an estimate of the weighted average cost of capital (WACC, eng: Weighted Average Cost of Capital) one must determine the cost and weight of each capital components, as it follows:

[1] Debt contracted from different lenders: credit institutions, affiliated entities, or different State funds borrowed (bonds, syndicated loans or club). However, not all lenders charge a "cost of money". Suppliers provide services and/or deliver goods for which they issue bills with a profit margin. The State provides services to the public and ensure general infrastructure financing activities which charge different taxes (tax on profit/income, VAT, social contributions, etc.). Thus, the only creditors who actually perceive a "cost of money" are credit institutions, through the effective annual interest rate (Martins and Martins, 2015). The average annual effective interest rate paid by a company during a year, for all contracted loans from credit institutions, can be calculated using the formula:
\[ K_d = \frac{\text{Expenses regarding the interest}}{\frac{D_t + D_{t-1}}{2}}, \]

where

\[ D = \text{total debts contracted from the credit institutions} \]

When calculating the effective annual interest rate corresponding to loans contracted, we must consider the fiscal / tax deductions. There are certain borrowings (from Group entities, associates/shareholders, etc.) for which the deductions are restricted (depending on the interest rate ceiling or supported limit on the degree of indebtedness of capital). Nevertheless, for the most common situations (bank loans or financial leasing contracts), interest expenses are fully deductible in determining the taxable profit, irrespective of the level of indebtedness or a certain level of the interest rate. Thus, the deductible nature of borrowings contracted from credit institutions generates a tax saving. In this context, when we calculate the weighted average cost of capital, we will consider the value of the respective annual net interest after adjusting the level of tax charges, namely \( K_d \times (1-t) \)

[2] **Equity capitals** attracted from shareholders. Unlike the actual annual interest level, which is a calculable variable based on the company's financial statements, the cost of capital raised from shareholders is not directly observable. Thus, shareholders who invest in the company are having some expectations of future returns. The objective expectations of the shareholders should be set according to the three prime: **country risk** (in which company is located), **the sector risk** (operating company) and **the risk of the company** (Wibowo, 2005).

Some researches have found that modest return on assets and suboptimal capital structure are the principal cause of companies insolvency risk increase on the long run, because expectations from all capital provides can’t be settled simultaneously (Kruger et al., BREZĂNU PETRE

Professor
The Bucharest University of Economics Studies, Bucharest (Romania)

- Teaching activities and seminars in Romanian and French to undergraduate and master cycle;
- Scientific Steering PhD;
- Activity training and scientific coordination of dissertations and diploma works in Romanian and French;
- Scientific research projects of national and international research;
- Tutorial activities;
- Organizational activities.

Organisational / managerial skills:
- During 2001-2012 Vice-Dean of the Faculty of Business Administration, teaching foreign languages, French department coordinator, ASE Bucharest;
- Coordinator of faculty from all events were related to the french language during 2001-2012;
- Coordinator of the faculty for the student scientific sections FABIZ, ASE Bucharest in the period 2001-2010;
- Deputy Director of the Master of financial products in insurance, Faculty of Finance, Insurance, Banking and Stock Exchange, ASE Bucharest in the period 2004-2008;
- Member of the organization 10 years after the establishment of the Faculty of Economic Studies in Foreign Languages from 1991 to 2001, ASE Bucharest;
- Coordinator of the studies in economic education open and distance, Faculty of Finance, Insurance, Banking and Stock Exchange, ASE Bucharest in 1999-2001;
- Coordinator of the international internships (2001) and national level during 2001 to 2012;
- President of the committee degree and dissertation committees in departments of the Business Administration, teaching foreign languages (FABIZ) and Department of the Finance, Insurance, Banking and Stock Exchange (FABBBV), ASE Bucharest.
If this happens, best practices recommend that shareholders should postpone the dividend distribution, because the company cannot provide enough return to cover for the shareholder’s expectations. Under this circumstances, the operating cash flow should be directed to cover principal financial needs (debt reimbursement) and perpetual investments in working capital (Fernandez, 2011). Using the 5-variable DuPont model, we can better understand the financial performance component (Melvin et al. (2004), Kasilingam and Jayabal (2012)), where the opposite effect of the leverage effect on financial return (the increase in the indebtedness degree implies the reduction of capitalization and, implicitly, the increase of the financial return by the basis effect) and the degree of the financial burden (the increase of the indebtedness feeds the increase of the interest and implicitly the erosion of the operational profit), like explained here:
long term investments in financial instruments, or short term speculative „held-for-trading”
stocks) will cap the economic performance because of increasing trading costs and volatility
(Miller and Bradford, 2001), or capital is not invested in the core activity of the company (Song,
2011). Moreover, when assets are overvalued with receivables not fully provisioned, perished
inventories or outdated equipments, the economic performance is undervalued due to the basis
effect and large asset base (Gerlach and Maurer, 2015).

3. METHODOLOGY AND SAMPLE DESCRIPTION

METHODOLOGY

To capture the impact of capital structure on economic return, the initial model used is a
multifactor regression with six independent variables to explain the return on equity:

\[
ROA_i = \alpha_1 + \alpha_2 \times X1_i + \alpha_3 \times X2_i + \alpha_4 \times X3_i + \alpha_5 \times X4_i + \alpha_6 \times X5_i + \alpha_7 \times X6_i + \mu_{ii};
\]

where:
- \( ROA = \frac{\text{Net Result}}{\text{Assets}} \)
- \( X1 = \frac{\text{Equity}}{\text{Assets}} \)
- \( X2 = \frac{\text{Turnover}}{\text{Assets}} \)
- \( X3 = \frac{\text{Debt from credit institutions on short term plus long term}}{\text{Assets}} \)
- \( X4 = \frac{\text{Commercial debt contracted from non-credit institutions (payables, fiscal, diverse)}}{\text{Assets}} \)
- \( X5 = \frac{\text{short term debt borrowed from credit institutions}}{\text{Assets}} \)
- \( X6 = \frac{\text{Interest expense}}{\text{Debt from credit institutions}} \)

Because of the multicolinearity issues (large R-squared coupled with small p-values for the t-
ertest related to financial debt independent variables (coefficients are not statistically
significant)), the initial model was adjusted with the following adjustments: general leverage
indicator was introduced as independent variable to replace the short term debt structure (bank
and non-credit institutions components of debt), and two new variables were introduced
(operating margin and asset rotation), in line with DuPont model 3 factors model. The second
model used is a multifactor regression equation with three independent variables:

\[
ROA_i = \alpha_1 + \alpha_2 \times X1_i + \alpha_3 \times X2_i + \alpha_4 \times X3_i + \alpha_5 \times X4_i + \alpha_6 \times X5_i + \mu_{ii};
\]

where:
- \( ROA = \frac{\text{Net Result}}{\text{Equity}} \)
- \( X1 = \frac{\text{EBIT}}{\text{Turnover}} \)
- \( X2 = \frac{\text{Equity}}{\text{Assets}} \)
- \( X3 = \frac{\text{Turnover}}{\text{Assets}} \)
- \( X4 = \text{Commercial debt (non-financial)} \)
- \( X5 = \text{Financial debt borrowed from credit institutions on both long and short term} \)

As illustrated and explained in the results section, the second improved model generates better
results from both coefficient of determination and statistical significance of coefficients.
Sample description

For the analysis of the components of the economic return according to the variables previously explained in the methodology section, the information in the extended financial statements (particularly with regard to the profit and loss account) is required. For this reason, companies that are active in the wholesale of motor vehicle parts and accessories (NACE: 4531) were selected and for which the financial statements are available in extended format for 2016 financial exercise (the latest available year for large sample of companies at this moment). Thus, 194 companies have been identified that meet the criteria mentioned above, being companies with a turnover of more than 1 mil euro and generating a consolidated market share of about 85% for the entire selected sector. The descriptive statistics for the return on assets computed for all selected companies is illustrated next.

As observed, the mean value of economic performance is 0.084, above the median value of 0.07, indicating the existence of large values overstating the arithmetic average. The negative skewness value indicate the negative asymmetry, indicating the return on assets tendency to decrease in the selected sample of companies. The kurtosis value of 12.73 is above 3, indicating the distribution is leptokurtotic, with higher probability of extreme events as compared to the normal distribution (higher height). As we will observe further, both negative skewness and leptokurtotic distribution are explained by high values of leverage observed for the appraised companies.

\[
S = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{y_i - \bar{y}}{\sigma} \right)^3
\]

\[
K = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{y_i - \bar{y}}{\sigma} \right)^4
\]

Where:

- \( S \) = skewness
- \( K \) = kurtosis
- \( \sum \) = standard deviation
- \( N \) = number of observations (194 in our case)
4. RESULTS

Applying the first multifactor regression equation previously described on the data panel in E-Views, we obtain the following result:

\[
ROA_i = 0.0344 + 0.1128 \times X1_i + 0.0108 \times X2_i - 0.2624 \times X3_i - 0.00039 \times X4_i + 0.1637 \times X5_i + 0.0214 \times X6_i + \mu_{it};
\]

where:

Interpretation of elasticities (without any simultaneous changes to other variables):
- if \( X1 \) (equity /assets) raises with 100bp, then economic return increases with 11bp,
- if \( X2 \) (turnover /assets) raises with 100bp, then economic return increases with 1bp,
- if \( X3 \) (bank loans /assets) raises with 100bp, then economic return decreases with 26bp,
- if \( X4 \) (operating debt /assets) raises with 100bp, then economic return decreases with 0,3bp,
- if \( X5 \) (bank loans on short term /assets) raises with 100bp, then economic return raises with 16bp,
- if \( X6 \) (interest cost / bank loans) raises with 100bp, then economic return increase with 2bp.

The explanation for the modest impact of operating debt component on economic return, coupled with the coefficients not relevant from statistical point of view (according to the t-test employed next), can relate low cost of capital generated by trade credit. Usually, if invoices are delayed on payment, suppliers will not invoice penalties because of poor collection perspectives and high fiscal burden (VAT is not carried by penalties, but tax on profit / revenue is liable). The finding that interest rates are positively correlated with economic return is intriguing, because it contradicts the financial logic and cost and effect. Although the elasticity is modest, the model applied to the selected pool of companies indicates the higher the interest rates the better the economic return. To better understand the phenomenon, we have evaluated the performance of all long term investments in fixed assets with cost of borrowed funds. More
specifically, all companies active in Romania with CAPEX values exceeding 100,000 RON were included in the analysis, and economic return for the next 3-5 years following the initial investments have been correlated with the cost of interest valid in the initial investment moment. Results are displayed in the next graph, and reflect that higher interest rates favor good investments, and low interest rates finance investments with low economic return.

**Graph 1.** Economic return vs Interest cost for new loans – all companies in Romania

![Graph showing economic return vs Interest cost](source)

This finding is very important, especially considering the context of QE (Quantitative Easing) program coordinated by the ECB (European Central Bank), generating almost 2.500 bn EUR injected in the economy through consecutive bond repurchases. Hence, the excess of liquidity kept EURIBOR (3 months maturity) rates close to zero during 2015, and further negative in the consecutive years, to encourage investments and consumption, avoiding thus the deflationary spiral. The Romanian Central Bank policy was relaxed and correlated with the ECB, given that the key rate was lowered from 6% (2012) down to 1,75% (December 2017) after 15 consecutive cut actions, lowering thus ROBOR 3 months maturity rates from 6,04% (maximum level recorded in December 2012) down to 0,7% (minimum level in October 2016). Hence, it is yet to see what will the “cheap money policy” results will be in terms of the quality of investments, given the current study indicate a negative correlation between the two variables, with negative impact over the long term strength of the business environment.
Testing the key assumptions of the classical multifactorial regression are:

- Homoscedasticity: the variance of the error terms is constant. If not, the regression equations has a problem of heteroscedasticity (effect indicates the incorrect values of the standard error for the initial regression equation and can create significant disturbances to the regression estimates);
- There is no multicollinearity among the multiple independent variables;
- Error terms are independently distributed;
- Normality: the error terms are distributed normally;
- The expected value of the error terms equals zero.

A very important indicator that shows if the model is well-specified is R-squared. This indicates how many percent of the total dependent variable variance is explained by the independent variables using the following formula

\[ R^2 = \frac{TSS - SSE}{TSS} = \frac{RSS}{TSS} = 0.4115 \]

The higher the value of this indicator aims to 1, the better the model. In our case, 41.15% of the return on assets is explained by the six independent variables of the model. This is relatively acceptable, considering the F-test (further explained) is statistically relevant, with all the independent variable not equal to zero simultaneously and jointly explaining the variation of the economic return. The R-squared indicator increases as new independent variables are added to the multifactorial regression equation, but it also causes loss of degrees of freedom (Gujarati, pag 637). Therefore, an adjusted measure of R-squared is better because it takes into account the number of independent variables included in the regression (Codarlasu and Ghidesciuc, pp. 44). The latter is calculated using the following formula:

\[ \bar{R}^2 = 1 - \left( \frac{n - 1}{n - k} \right) \cdot (1 - R^2), \]
Where:

- $n$ is the number of observations,
- $k$ - the number of independent variables included in the regression.

The E-Views results indicate a value of 39.26% for the adjusted R-squared coefficient, very close to the R-squared coefficient.

**t-Test**

To test if the estimated coefficients are relevant from the statistical point of view (different from zero), we can use the t-test, with the following assumptions:

- $H_0: \beta_1 = 0$
- $H_1: \beta_1 \neq 0$

According to the E-Views results, the t-test value for the six exogenous (independent) variables, are presented next, using the previous formula (example illustrated for the first independent variable):

$$t = \frac{\bar{\beta}_1 - \beta_0}{se(\bar{\beta}_1)} = \frac{0.1128 - 0}{0.0478} = 2.3566 \text{ (for X1)}$$

Considering that the probability associated is above compared to the relevant level employed (5%), then the null hypothesis cannot be rejected and the coefficient is not considered to be significant statistically. This can be verified if the displayed value of the t-test is below the critical value. The latter, can be calculated using the following formula:

$$t_c = \frac{2 \alpha}{\sqrt{n - m}}$$

where $\alpha$ represents the relevance level (5%) divided by 2 (because the test checks if the estimated value is equal or different from 0), $n$ represents the observations number (194), and $m$ represents the number of estimated parameters (6). So the $t_{0.025,188}$ value is approximately 1.980. We observe that only for the equity rate and asset rotation (turnover / assets) independent variables the t value computed is above the $T_c (2,052)$, meaning the null hypothesis is rejected only for this two variables. Instead, the probability associated with the other four independent variables is above the relevant level (5%), which implies that the null hypothesis is accepted and the coefficients aren’t statistically significant, (not different from zero value).

**F-test**

This test indicates to what extent a set of independent variables explains, as a group, the variation of the dependent variable, and determines the extent to which all coefficients of the regression equation simultaneously have zero values. The hypotheses are:

- $H_0: \alpha_1 = \alpha_2 \ldots = \alpha_6 = 0$,
- $H_1: \alpha_1 \neq \alpha_2 \neq \ldots \neq \alpha_6 \neq 0$,

The value of the F-test calculated by E-views is 2,2561 and is obtained using the formula:
The F test follows a distribution $F$, and the critical value is determined as follows: $F_c = F_{\alpha, m-1, n-m} = F(0.05; 5; 187) = 2.08$. Since the calculated value (21,7952) is above than the critical value (2,08), then the null hypothesis is rejected. The same conclusion is reached if we observe that the associated probability is inferior to the level of relevance to which it is being worked (5%). The small values of t-statistic related to four out of six variable independently selected, coupled with the relevant F-statistic test (all variable jointly together are different than zero) and high R-squared indicates issues of multicollinearity. This is expected, given the multitude of capital structure components included among the independent variables. For example, if debt contracted from banks and credit institutions increases (the 3rd independent variable), normally interest expense will increase (the 6th independent variable), short term bank loans can also increase (if the additional debt is contracted on short term) and operational debt (non-financial liabilities) might decrease as a percentage from total assets. So, there is both positive and negative correlation among independent variables.

**Durbin-Watson test**

Another statistical alternative to determine if the residuals are autocorrelated is to use the Durbin-Watson stat, with the value from the regression analysis of 1,74 below 2 indicating positive autocorrelation.

**Normality test**

Jarque-Bera tests is employed for normal distribution analysis of the residuals, by using the difference between the skewness and kurtosis. The null hypothesis is that residuals are normally distributed, which is accepted if the probability is above the significance level (5% used in our case). As the p-value (0,00000) is less than the 0,05 significance level considered, the null hypothesis is rejected, showing that residuals are not normally distributed, most likely due to statistical outliers (which can be solved by using dummy variables to account for structural changes.)
Because of the multicollinearity issues (small p-values for the t-test related to financial debt independent variables (coefficients are not statistically significant) coupled with relevant F-test and large R-square), the initial model is modified with the following adjustments: eliminate the short term debt from financial institutions and interest expense (correlated between), add operating margin (EBIT divided to turnover). The results of new adjusted model are illustrated next:

\[
ROA_i = -0.0096 + 0.4848 \times X1_i + 0.0989 \times X2_i + 0.0121 \times X3_i + 0.0142 \times X4_i - 0.00552 \times X5_i + \mu_{it}.
\]

Interpretation of elasticities (without any simultaneous changes to other variables):
- if \( X1 \) (EBIT / turnover) raises with 100bp, then economic return increases with 48.48bp
- if \( X2 \) (equity /assets) raises with 100bp, then economic return increases with 9.89bp
- if \( X3 \) (turnover /assets) raises with 100bp, then economic return increases with 1.2bp
- if \( X4 \) (operating debt /assets) raises with 100bp, then economic return increases with 1.4bp
- if \( X5 \) (financial debt /assets) raises with 100bp, then economic return decreases with 5.5bp

As we can observe in the new model, the R-squared value improved and increased to 62\%, with three out of five independent variables statistically different from zero (operating margin, capitalization ratio and asset turnover), whereas the debt structure components (banks and non-financial institutions) aren’t statistically different from zero since the associated p-value is superior to the level of relevance to which it is being worked (5\%). F-test value is 61.39, above the critical value \( F_{0.05; 2; 188} = 8.54 \), and with associated probability bellow the level of significance, indicating that all independent variables are jointly different from zero (rejecting the null hypothesis).
5. CONCLUSIONS

The literature reviewed demonstrates the critical role that the economic return has over the long term sustainable development of any company. Large return on assets coupled reflect asset performance to generate sales and profits, and further cover the cost of capital (debt and equity) necessary to cover the initial cash outlay when the investment is done. Therefore, understanding the components and key drivers of the return on assets is of principal interest to highlight the future development of any business and improve investment strategy. To this respect, two models have been applied to all the companies active in the wholesale of motor vehicle parts and accessories, NACE 4531, with extended financial statements submitted for 2016, resulting a total number of 194 firms with turnover above 1 mil EUR and concentrated market share of 85%. By applying a multifactor regression equation in E-views, we observe that debt components (credit institutions, commercial debt) coupled with interest cost, leverage and asset turnover explain almost 41% of the economic return. Nevertheless, the small t-test value coupled with statistically relevant F-test and large R-square, indicating the model might not be well specified due to multicollinearity (independent variables are correlated between). Therefore, a second model was used, by eliminating the short term debt from financial institutions and interest expense (correlated between) and adding operating margin (EBIT divided to turnover). The second model indicate better results, with improved R-squared up to 62%, better coefficients of significance for the estimated slopes of the independent variables and F-test.

Future research to evaluate return on assets sensitivity under stress test scenarios would be very useful to provide an insight of economic return amid increasing interest rates and different fiscal tax on dividend. This is very necessary especially given the very unpredictable fiscal environment in Romania. The pro-cyclical fiscal measures cause GDP growth to reach 7% during 2017 in Romania, significantly above the potential level of 3%-3.5%. The rapid growth of GDP, coupled with large fiscal deficit of -3% during last year (due to low public revenues (modest VAT revenue increase of only 3% although consumption growth was 10%) and large social expenses (public wage increase by 23%, social help expenses +12%) is fueling increasing inflationary pressure, steaming to almost 5% during the first semester of 2018 and 3,2% Central Bank of Romania latest estimate for 2018 full year. That will force the Central Bank to launch an restrictive pace of the monetary policy, already visible with monetary rate hike from 1,75% to 2% during January 2018, reaching 2,5% in May 2018. Under this context, increasing financial burden of companies with translate in lower operating margins. Moreover, the proposal of dividend tax cut down to zero starting 2019 (according to the latest government plan) would motivate shareholders to distribute profits as dividends and lower the retained earnings, Both factors will have an important impact over the economic return and sustainable growth rates of companies on the long term. Therefore, testing the elasticity of economic return amid such scenarios would be useful to provide an additional insight over the researched topic. Moreover, panel data models for 5 or 10 years of historical data would reflect if the impact of capital structure on the economic return would change under volatile interest rates framework. Ultimately, the impact of capital structure on the return on assets can be evaluated by using different clusters of companies divided by turnover range, to understand of the impact changes depending on company dimension.
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