

The Estimation of the Impact of Energy Intensity on a Company's Financial Performance in Petroleum Refining Industry

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Abstract

Purpose of the article The paper aims to investigate the impact of the energy intensity (EI) on a company's financial performance using the data from companies in USA and Eurozone which are working in the petroleum refining industry.

Methodology/methods The data collected from Thomson Reuters Datastream and includes companies working in the petroleum refining industry (SIC Division D, Major Group 29). Our data sample consists of 22 companies and the period is - 2002-2016. A total amount of the records is 157. The regression model estimation was applied to explore the impact of energy intensity on a company's performance. Shapiro-Wilk normality test was used to test whether data come from a normally distributed population. To be able test or energy intensity in the USA and Euro zona are equally Mann-Whitney U test was used. A ratio of the earnings before interest, taxes and total revenue (EBIT margin) used as a company's performance indicator. EI is described as – a ratio between the gross energy consumption and the gross incomes of the company. All statistical computation and model buildings were done using R programming language.

Scientific aim Scientific aim of this study is to discover whether energy efficiency has a significant impact on financial performance in the petroleum refining industry. The following hypotheses were advanced in the current study - H1: There is no significant difference between EI in USA and Eurozone petroleum refining industry. H2: The EI of USA and Eurozone petroleum refining industry has a significant impact on the EBIT margin of the companies. H3: There is no significant difference between EI affecting EBIT margin in USA and Eurozone.

Findings A Mann-Whitney U test indicated that the EI in petroleum refining industry in the USA (mean = 6,04) and Eurozone (mean = 6,35) did not differ significantly ($W = 3080$, $p\text{-value} = 0,9958$). We failed to reject hypothesis H1. To predict EBIT margin on EI and effect of the geographical region the multiple linear regression analysis was chosen (for the testing of the hypothesis H2 and H3). The analysis shows that EI is an important driver of petroleum refining company's profitability (adj. $R^2 = 0,536$, for USA companies and adj. $R^2 = 0,171$, for Eurozone companies). A significant regression equation for USA companies was found ($F(1, 79) = 93,4$, $p < 0,01$), as well as for Eurozone companies ($F(1, 74) = 16,5$, $p < 0,01$). It was found that EI (measured in GJ per 1000 USD of sales) significantly predicted EBIT margin for USA companies ($\beta_1 = 0,022$, $p < 0,001$) and for Eurozone companies ($\beta_1 = 0,013$, $p < 0,001$). We failed to reject hypothesis H2. We also founded a significant interaction in the relationship of EBIT profitability to EI for USA and Eurozone companies. We rejected H3 hypothesis.

Conclusions The empirical finding suggests that EI in USA and Eurozone petroleum refining industry did not differ significantly. This research confirms the hypothesis that EI has a significant impact on the EBIT margin of companies working in the petroleum refining industry. Therefore, we proved that there is a significant difference between efficiency indicator affecting profitability for the companies in USA and Eurozone. The impact of energy intensity on company profitability in USA industry is significantly bigger as in Eurozone.

Keywords: Energy intensity, profitability, manufacture industry

JEL Classification: L71, Q43, Q47

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