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The use of DuPont analysis in abnormal returns evaluation: Empirical study of Romanian market

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Abstract

This paper comprehensively explores the DuPont components in order to demonstrate which of three areas influences stock's abnormal behavior the most. The results show an interesting evolution: in 2007 the strong dependence between cumulated abnormal returns and profitability and ROA were founded. The 2008 and 2009 were a middle years which made investors to be unpredictable. The 2010 may be viewed as a returned year, all the data are extremely similar with 2007 year but with different elements. The research is indicating the fact that DuPont components represent an important and viable form of stock's abnormal returns analysis.

*Keywords:*Abnormal Returns, DuPont Analysis, Financial Statement Analysis, Romanian Capital Market;

1. Introduction

DuPont analysis is highlighting company's performances in three major areas: profitability, turnover, and leverage. These are the key indicator which can immediately show investors the company situation. In the previous research author found that during the financial statement announcement Romanian capital market registered abnormal returns. This paper comprehensively explores the DuPont components in order to demonstrate which of three areas influences stock's abnormal behaviour the most. First part of study is dedicated to the advanced research of financial literature. The second and the biggest part is dedicated to empirical study of Romanian market. The accurate financial analysis was performed for all companies. The results show an interesting evolution: in 2007 little before the beginning of financial crises the strong dependence between cumulated abnormal returns and profitability and turnover elements were founded. In 2008 investors paid all their attention to the leverage elements associated with stock's abnormal return evolution. The 2009 was a middle year which made investors to be unpredictable and to secure themselves as match as possible. In this year investors took care about all the DuPont elements associated with all measured returns. The 2010 may be viewed as a returned year, all the data are extremely similar with 2007 year. In conclusion, the research is indicating the fact that DuPont components represent an important and viable form of stock's abnormal returns analysis which supports market participants in making their investment decisions.

2. Advanced Research for DuPont Analysis

DuPont analysis was developed by E.I. du Pont de Nemours in 1919. It is one of oldest analyses which present the easier way for better understanding of return ratios and its changing's. The general profitability is represented by margin and turnover. It may be viewed as complex analysis because it includes elements from both the balance sheet and the income statement. The main evaluating performance is the return on equity variable which is considered to

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be one of the most important guides of company wealth. The latest studies started to research about return on equity (ROE) in order to find the most important characteristics of it. Lambert and Larcker study in 1987 and Banker and Datar study from 1989 was one of the first studies with evaluates the role of ROE.Lambert and Larcker analyzed correlations between CEO's cash compensation and ROE and stock returns performances. It was really interesting to see that studies confirmed the strong correlation between CEO's cash compensation and stock returns and less correlation with ROE.

ROE is the most important part of DuPont analysis. A lot of professional books underline DuPont method for financial ratio analysis (Bernstein and Wild 1998, Revsine, Collins and Johnson 1999, Stickney and Brown 1999). An interesting study was performed by Fairfield and Yohn (2001) where were checked return on assets (ROA)divided into asset turnover and profit margin may improve the forecasting of future profitability. The approach to breaking down was initially created as the DuPont three-component triangle, shown in Figure 1.

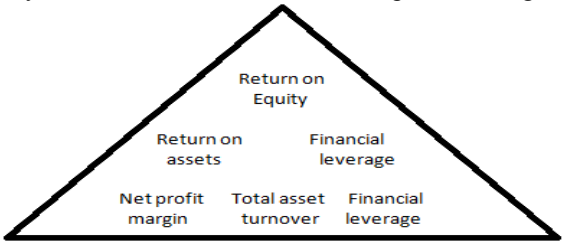


Figure 1. The DuPont three-component triangle

Selling and Stickney (1989) among with Nissam and Penman (2001) demonstrated that because of the fact that DuPont analysis shows the profit analysis its values differ across the industries. Even within the industry there are different strategies of improving the profitability. Usage of DuPont analysis supports us with dividing returns on investment capital measures such as ROA into two components: Net profit and Total asset turnover as it shown above in the DuPont three-component triangle. As per advanced research made by selling and Stickney in 1989 the Net profit and Total asset turnover are clustered by industry and because of it industry has high negative relationship. The similar researches were made by Nissam and Penman in 2001 and White, Sondhi and Fried in 1998 where the negative relationships were also found. Although these negative relationships the researches also highlighted that most of researched companies from different industries gain the appropriate level of ROA. Unfortunately the combination of Net Profit and Total asset turnover was relatively different. The reason of this result is the fact that the average of researched industries may be viewed as a normal average. This implies the fact that abnormal events within the industry should imply the additional components that will have different time series properties (compared with ROE components). This abnormal behaviour support author to create the next hypothesis:

Hypothesis 1: Abnormal events within the market should imply the additional ROE components that will have different time series components.

The next step in author's research was removal of normality within ROE components (Net profit and Total asset turnover) in order to highlight the part of abnormality which is remaining. It should be mentioned that abnormality in Net profits usually comes from pricing instability, product position, brand fluctuation, and market inflation. The abnormal Total asset turnover usually comes from efficient use of tangible assets (such as plant and equipment), efficient inventory evidence, and other working capital procedures. The expectation of abnormal Total asset turnover is more highly then expectation of abnormal Net profits. The reason is relatively simple: Total asset turnover is calculates as Company's turnover divided to Total assets, both of these have a low variance. However, Net profit divides Operational income to the Company's turnover, where the Operation income has higher volatility compared with any other variable (Company's turnover and Total assets). The expected different time series components lead to the next hypothesis:

Hypothesis 2: Abnormal Net profits are less durable that Total asset turnover.

All other studies highlighted the importance of ROE. However author still mention that as per Ohlson study in 1995 one important characteristic of ROE is highlighted: there is a possibility for ROE to be affected by the firm choice of capital structure, but the values from this change cannot be very relevant. Modigliani and Miller (1958) previously showed that operational values are important the most, but not the financial values which are made by company's management.

3. Romanian Market Caracteristics and Abnormal Behaviour

Bucharest Stock Exchange is the main securities exchange market in the Romania. It was re-launched in 1995 but for the first couple of years it role was insignificant. Starting with 1997 the foreign investors paid an increased interest in Romanian shares and the important of Bucharest Stock Exchange was increased a lot. Unfortunately, the initial forecast of Romanian market accelerate growth wasn't realized. There a lot of conditions which postpone capital market accelerate growth: for the first it was a macroeconomic instability which signalized to the international investors the higher risk as expected; for the second there wasn't a listed company transparency which created a big barriers in the capital gains, and third minority shareholders' right wasn't respected at all. Based on all that conditions market went down along this investor's interests until 2002, when an important growth of Romanian capital market was registered. In the 2004 the capital boom was taking place, the market turnover doubled and the investors' profits was the biggest since the Bucharest Stock Exchange opening. However the most important year should be viewed a 2005, as in this year the market liquidity went to its apogee. At the end of year total capitalization was over 15 billion euros, and turnover about 2.2 billion euro.

Nowadays Bucharest Stock Exchange is the most important financial market in the Romania. Unfortunately there are still a lot of companies which should become public in order to have a valid capital market which could coherently represent country performance.

The seven indices are issued in order to show the market performance. BET, the first index developed by BVB, is the reference index for the BVB market. BET is a index of the most liquid 10 companies. BET-C reflects the price movement of all the companies listed on the BVB regulated market. BET-FI is reflecting the price movements of the investment funds (SIFs), ROTX is reflecting the price movement of "blue chip" companies, BET-XT is reflecting the price evolution of the most liquid 25 shares, and BET-NG is reflecting the price movement of the companies which have the main business activity located in the energy sector and the related utilities.

Previous author's study identified the abnormal behavior of most representative public companies. The database selection was really important for the research output that is why author paid especially high attention to it. The selected companies should be respected two major criteria: to be Category I company (local market specification which divide companies based on company's equity into Category I or Category II company) or to represent at least 1% from BET-C index (BET-C is local market index); and to have at least 4 years history as a public company. The number of 18 companies respected assigned criteria. Author estimated event window which included day of announcement of financial result for each company plus 10 days before and ten days after the event. The total period was for 21 days for each company. The result of abnormal returns were comparatively low, additional risk associated to this event was about 5% which as per author's conclusion is the low value compared with event importance. The present paper continues previous research and highlight which element from DuPont analysis influence abnormal returns evolution the most.

4. Estimation Result and Their Interpretation

Research was organised in the next way: author performed deep financial analysis for the above mentioned companies for the whole studied period. The financial analysis included calculation of all components mention previously in Figure 1, The DuPont three-component triangle. These data were planning to be analysed along with market abnormal returns. Unfortunately after a carefully evaluation of the database the huge discrepancy between data's range were noticed. Based on this incompatibility the data standardization or normalization was performed.

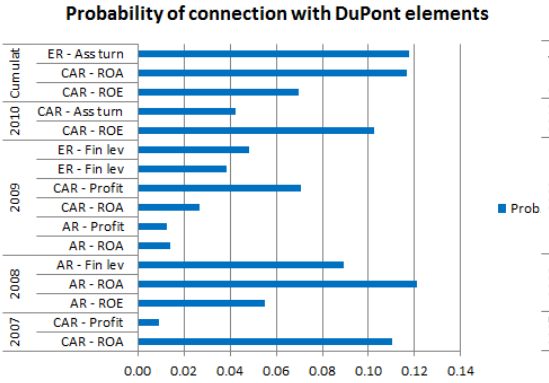
As per standardizing in mathematical statistics, each random variable X was standardized using the theoretical (population) mean and standard deviation:

$$Z = \frac{X - \mu}{\sigma} \quad (1),$$

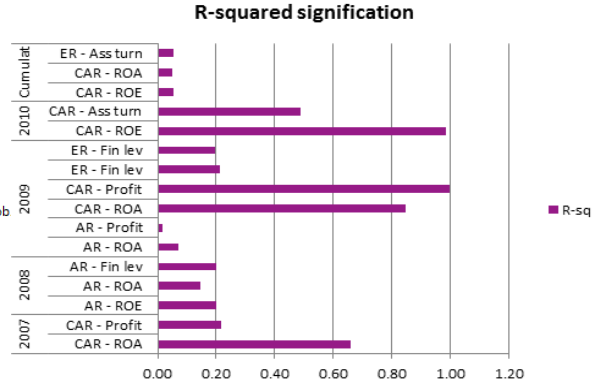
where $\mu = \mathrm{E}[X]$ is the mean and $\sigma = \sqrt{\mathrm{Var}(X)}$ the standard deviation of the probability distribution of X.

The next step in research was designation of systematic calculation. There were three types of returns which should be tested. First was abnormal returns values; second was cumulated abnormal returns; and last, as per author consideration, DuPont element was also tested with effective daily returns. Author created three testation models for each type of return. First model tested return with ROE, second return with ROA and Financial leverage, and third tested return with Net profit margin, Total asset turnover and Financial leverage (as it shown in Figure 1). The testation was performed with regression model, using least squares method (LS). This method has a very good econometric base which validates models only after the certain conditions were respected. Next presented graphics shows two important model's characteristics which were taken in consideration for models validation: the probability that certain DuPont components influence the evolution of abnormal returns and how deep is that influence. The bellow graphics present only the significantly result, all over DuPont element which did not pass the mandatory probability. As per econometric rules null hypothesis is usually stated that there are no connections between DuPont analysis elements and abnormal returns within Romanian market, with a probability of 12%. The other side, validation hypothesis is stated that there is a close connection between DuPont element and abnormal returns. Even more, knowing of these connections may help investors to predict future abnormal returns. That is why author extracted all DuPont element which passed this 12% barrier and it means that for them the null hypothesis was rejected, see Graphic 1, Probability of connection with DuPont elements. How deep is this connection shown in Graphic 2, R-squared signification.

As you can notice in graphics, author divides significant element for each year in order to make clear analysis separately for each year. In front of each significant DuPont element there are three abbreviations: CAR, AR and ER. As it was mentioned before all DuPont element were analysed in terms of Cumulated Abnormal Returns (CAR), Abnormal Returns (AR) and as per author suggestion Effective Return (ER). CAR shows abnormally for certain period. In very unstable period it doesn't give any signification because investors chaotically act. AR shows daily abnormally, it is very good for unstable periods because it shows exactly daily fluctuation. ER shows effective market returns, iti is really useful in order to get some market pulse.



Graphic 1, Probability of connection with DuPont elements



Graphic 2, R-squared signification

These graphics show us a really good picture of just passed unhappy crisis period. Crisis began in Romanian market at the end of September 2007 that is why the year of 2007 may be viewed as the year before crises because financial results are announced on the beginning of the year for the just passed year. The second analysing year was 2008, author believes that this year is not exactly significant because the crisis just begins, the investors did not believe in it persistence and reacted with a low significance regarding DuPont elements. Unfortunately the third study year – 2009 – combined all crises elements and as it shown in Graphic 1 made investors to take care about

almost all elements of DuPont analysis in order to protect themselves as much as possible. The last studding year 2010 may be viewed as a return year. The results are similar with the result from 2007 which lead author the conclusion that market have recovered from crises. The top column "cumulate" show the consolidation data for whole period, it is good to notice that the most significant elements connected with abnormal returns are: ROA and ROE for CAR (Cumulated Abnormal Return) model. As per author initiative the effective daily return (ER) were also tested, it is good to notice that on consolidated level Total effect turnover was strong connected with it.

Graphic 2 presented the model signification among the other variable which had a possibility to influence independent abnormal return. Even if some particular element where significant within particular years, the consolidated data shows that analysed DuPont elements have little influence on abnormal returns registered in Romanian market.

5. Conclusion

The results show an interesting evolution: in 2007 little before the beginning of financial crises the strong dependence between cumulated abnormal returns and profitability and ROA (Return on assets) were founded. In 2008 investors paid all their attention to the most DuPont elements associated with stock's abnormal return evolution. In this year investors did not pay attention to the accumulated data because all the conditions on the market changed very quickly and was no time and condition to take a long position. The 2009 was a middle year which made investors to be unpredictable and to secure themselves as match as possible. In this year investors took care about all the DuPont elements associated with all measured returns. The 2010 may be viewed as a returned year, all the data are extremely similar with 2007 year. In conclusion, the research is indicating the fact that DuPont components represent an important and viable form of stock's abnormal returns analysis which supports market participants in making their investment decisions.

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