The Effect of Leverage on Profitability of Pharmaceutical Companies

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ARTICLE INFO	ABSTRACT
	The capital structure problem is important and because of the influence of leverage effect on return on equity. This paper aims to study the influence of financial leverage effect on company profitability, using financial data of three large companies from Romania, acting in pharmaceutical sector, in entire production-distribution chain. To carry out this study have been completed three stages: analyses of the profitability of the companies, analyses of the indebtedness and then the effect of leverage on return on equity, using data from 2008-2012 period. The conclusion that emerges in this study is that leverage effect is an important factor that influences the return on equity in function of degree of debts, but not entirely.

1. Introduction

The pharmaceutical sector was chosen to be analysed in this paper because the pharmaceutical industry is among the first industries that invest in research and development. In recent years, the pharmaceutical industry has invested in research and development more than any other industry, even more than IT&C. According to the annual report of the European Federation of Pharmaceutical Industries and Associations (EFPIA), in 2009 to global level, pharmaceutical industry invested 15.9% of the total sector. IT sector is on the second place with 9.9% investments in software and informatics services; on the third place is the same IT sector, but with 8.7% investments in hardware and equipments. The fourth place is held by pharmaceutical research and development industry, with 6.2% investments in equipments and health services (CEGEDIM, 2012).

The pharmaceutical companies were analysed under different point of views. For example, a study estimates and analyzes the relationship between intellectual capital and corporate conventional financial performance measures of Indian software and pharmaceutical companies for a period of five years from 2002 to 2006 (Ghosh & Mondal, 2009).

Also, sustainability has been on the radar screen of the major pharmaceutical companies for the last two decades (Esteban, 2008). As an industry, pharmaceutical companies have been recognized as the leader in sustainability (Knoepfel, 2001); therefore, examining the evolving stance of this sector may demonstrate the leading edge of actual corporate sustainable performance. This is especially true for this industry, where efforts related to sustainability are held up by the corporations themselves as indicative of their ethics (Schneider *et al.*, 2010).

Furthermore, it is well known that the pharmaceutical sector is another gold mine after the IT boom. Its importance has been noticed worldwide. Owing to the extremely intense competition among the global manufactures, finding new markets becomes a new challenge. Emerging economies are new targets for multinational pharmaceutical companies. In this sense, Chan and Daim analyzed the Chinese pharmaceutical sector through three levels: policy level, enterprise level, and technology level. The results were clearly indicated that China is emerging in the biopharmaceutical industry. However, there are several steps to be taken at different levels including policy, enterprise, and technology. Their paper provides a very good outline for any emerging economy to review its potential in the pharmaceutical industry. Their study can be expanded by assessing other emerging economies and technologies (Chan & Daim, 2011).

Related to studies on leverage effect, we found that Moon and Tandon (2007) investigates whether the association between ownership structure and leverage varies with the magnitude of growth opportunities. Considering the disciplinary role of leverage on the over-investment problem and ownership structure as a control mechanism to affect funding decisions, they hypothesize that the association between ownership structure and leverage is stronger for companies with fewer growth opportunities. They found that the

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association between equity ownership and leverage is significant for low-growth companies, but not for high-growth companies (Moon & Tandon, 2007).

Other studies aim to find the factors that influence financial leverage of the companies. Gill and Mathur (2011) realized a study on a sample of 166 Canadian firms listed on the Toronto Stock Exchange for a period of 3 years (from 2008-2010). Their study applied co-relational and non-experimental research design and the results show that financial leverage of Canadian firms is influenced by the collateralized assets, profitability, effective tax rate, firm size, growth opportunities, number of subsidiaries, and industry dummy (Gill & Mathur, 2011).

Other study examines the profit profile of firms in Nigeria and analyzes the impact of leverage on profitability for the period 1999-2007. The results show that aggregate profit level for the firms decreased by 0.02% yearly over the study period. However, when disaggregated into sectors, a few firms actually experienced an increased profit level. The results show that firm size has a significant positive effect on profitability, while leverage has negative effect. This study suggests that expansion, increased sales and low debt ratios enhance firm profitability (Akinlo & Asaolu, 2012).

Taking into account these studies, in this paper we try to analyze the impact of leverage effect on profitability of three companies acting in pharmaceutical sector. Thus, in the second section is presented the methodology of the study and why was chosen pharmaceutical sector; in the third section is analyzed the profitability of the company in the period 2008-2012; the forth section presents the indebtedness analyze and the last section presents the effects of leverage on company performance, expressed by return on equity.

2. Methodology

The aim of this paper is to analyze the leverage effect on profitability in the case of three companies acting in the pharmaceutical sector, studding effectively the influence of leverage on return on equity. It was chosen the pharmaceutical sector because it had an ascending evolution in the last years compared with other sectors.

In the period 2001-2007, in Romania, the pharmaceutical market has registered a growth rate of 22.5%, and in 2008-2010 the average growth rate has fallen to about 6%. In 2000, the pharmaceutical market was valued at 473 million euros, while the latest official data for 2010 indicates a level of 1.9 billion Euros, so four times higher. Although, this sector recorded a substantial advance in the past 12 years, the pharmaceutical market in Romania is one of the lowest in the European Union.

According to Cegedim in 2009, a Romanian spends in average about $ 130 on medicines per year, compared to the European average which is $ 560 /person/year. According to OECD data updated to 2008, the average medicines consumption per capita in the Czech Republic, Hungary, Slovakia, Slovenia and Estonia is $ 400. From this perspective it can be concluded that the market in Romania still has a growth potential. Another reason in this respect is the aging process of the population that will most likely lead to an increase in demand for medicines (Tradeville, 2010).

The year 2010 was very good for the pharmaceutical industry in Romania. Medicines sales to final consumers reached amount of RON 12 billion, marking a dramatic increase of 18%. Analyzing the evolution of the pharmaceutical industry in the last 3 years, it is confirmed that this market proved more resistant on crisis than other sectors. Several studies indicate a number of factors that may that can hinder pharmaceutical market to repeat the growth registered in 2010. Between these factors are included: decreasing public support, damaging the hospital sector, extension of payment term, rising debt in the system etc. (SSIF Broker, 2011). Compared to 1999, pharmaceutical market trend is presented in Figure 1, which shows an increase of over 6 times in this period.

Figure 1. Evolution of Romanian pharmaceutical market in the period 2000-2011
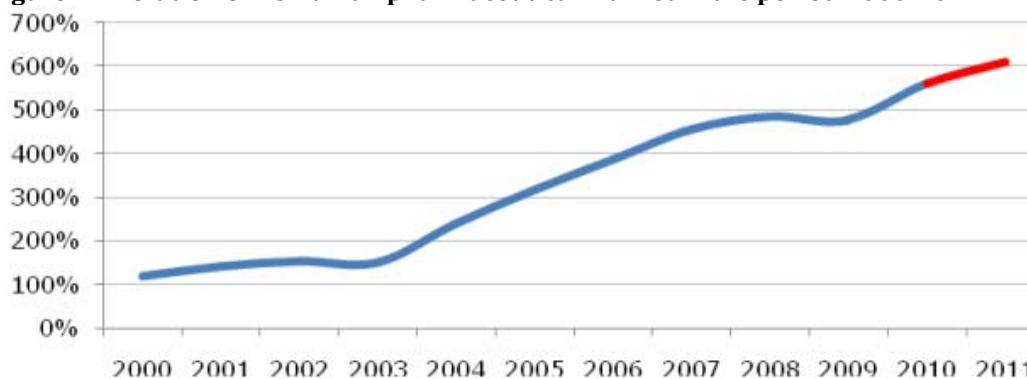
Source: SSIF Broker, Estimări rezultate sector farmaceutic, Sem. I., 2011, p. 2,
http://www.tranzactiibursiere.ro/static/comunicate_analiza/Estimari_S1_2011.pdf

In the year 2012, Romanian pharmaceutical market was situated to 2.63 billion euros, in increase with 3.1% compared with 2011, according to the data of the analysis and market studies realized by Cegedim Romania. Difficulties began to affect the market and the most powerful companies, and prognosis remain subdued the overall level for 2013, an increase of 1.4% in RON probably meaning a drop in euro or dollars. The most important problem, however, is not necessarily at the level of companies, although the companies' problems have increased, but the quality and availability of medicines for patients, as health services in general. In RON, in 2012, the growth was of 8.3%, the market value reaching RON 11.71 billion (CEGEDIM, 2012). According to Cegedim, the market has suffered as a result of decreasing public support and extension of the period for payment, only some of the patients being able to maintain the previous level of treatment.

In this study, I used three companies acting in the pharmaceutical sector, and I analysed their indebtedness and profitability in the period 2008-2012. The information used in this study was collected from the Financial Statements of enterprises, obtained from the companies' websites. The companies cover the entire chain of *production* (Biofarm - production and marketing of human medicines) - *wholesale distribution* (Remedia - wholesale of pharmaceutical and parapharmaceutical products) - *retail distribution* (Ropharma - wholesale and retail distribution of indigenous and imported pharmaceuticals, technical-medical and hygienic-cosmetics products). For each company was analysed the *profitability* taking into account the return on assets and the return on equity; the *indebtedness* taking into account gearing ratio, leverage ratio, rate of financial debts, rate of financial independence and cost of debts. Then, it was analysed the *effect of leverage on return on equity* in order to reflect the differences between return on equity determined by bookkeeping data and that determined by leverage effect.

3. Analysis of the profitability of studied companies in the period 2008-2012

In this study profitability is studied taking into account 2 rates: return on assets and return on equity.

Return on assets is one of the most popular and useful of the financial ratios. Return on assets has been used in industry since at least 1919 when the DuPont Company used it as the top of its ratio triangle system. The ratio was called return on investment and was calculated as *Profit / Total assets* (Jewell & Mankin, 2011). The importance that academics and practitioners place on return on assets can be seen in many ways:

-at least one return on assets formula is presented in most business textbooks. It was the third most frequently presented ratio in a study of business textbooks, appearing in 70 of the 77 textbooks (Mankin & Jewell, 2010);

- at least one version of return on assets is used often in failure prediction studies. Some authors ranked the popularity of all financial ratios used in studies predicting business failures. Their study included 53 previous studies from 1966 to 2002 and ranked 48 separate ratios. The return on assets version *Net income / Total assets* was the single most common ratio in all the failure prediction studies (Hossari & Rahman, 2005). Also, these rates are frequently used in many econometric models (Radu, 2011);

- analysts often use return on assets in their investigation of a firm's financial position, performance, and future prospects. Gibson (1987) surveyed Chartered Financial Analysts (CFA) about the importance of many financial ratios. The study included four different versions of return on assets, and each version was selected by at least 90% of the CFA respondents as a primary measure of profitability.

In the specialty literature, the profitability was studied in different ways. Thus, some authors examine productivity analysis through financial statements in order to obtain the value drivers for return on operating assets from the viewpoint of productivity. They show that there is a functional relationship between return on operating assets and the main productivity indicators at a company level: total factor productivity and labour productivity. They found that both productivity indicators, together with price change of outputs and inputs, are the drivers that determine the value of return on operating assets, as the functional relationship (Bosch-Badia, 2010).

In our study, return on assets shows the performance of operating profit. The formula used is

$$\text{Return on assets} = \frac{\text{Operating Profit}}{\text{Total Assets}}$$. Return on assets must be in a constantly increase to cover the financial

result or even the extraordinary result. In terms of value, a good result is one that exceeds 15%, a value that shows a real return, which is higher than inflation rate and higher than the average rate of interest.

Table 1. Return on assets

Company / Year	2008	2009	2010	2011	2012
Biofarm	9.90	8.90	10.07	8.49	8.27
Remedia	1.61	4.76	2.61	3.42	2.28
Ropharma	-14.42	3.71	4.44	3.32	3.82

Source: Calculus performed by the author

In the analyzed companies, values of return on assets exceeding 15% didn't be recorded (table 1). The highest values were recorded by Biofarm. Their return on assets had a fluctuating trend and with decreasing tendency towards the end of the range and with values between 8.27% in 2012 and 10.07% in 2010. At the opposite pole is the Remedia Company that recorded fluctuating values of return on assets, ranging between 1.61% in 2008 and 4.76% in 2009. Instead, although the company Ropharma get loss from operating activities in 2008, it has recovered in the future, obtaining a relatively steady return on assets in the period 2009-2012, ranging from 3.32% in 2011 and 4.44% in 2010.

Return on equity shows the performance of own funds brought by investors or generated by current net profit or reserves and retained earnings. Its main function is to cover current interest rate. The formula used for return on equity is $\text{Return on equity} = \dfrac{\text{Net Profit}}{\text{Equity}}$. A high value of it may indicate a low equity compared to net income generated by the activity and it is recommended the capital adequacy. It is the easiest way to invest because we can refer to the current investment interest.

Table 2. Return on equity

Company / Year	2008	2009	2010	2011	2012
Biofarm	-16.43	14.43	9.89	9.24	12.78
Remedia	-14.37	3.57	7.19	10.24	8.59
Ropharma	5.77	8.59	13.31	11.72	8.62

Source: Calculus performed by the author

From the calculations (table 2) we see that in 2008, two of the companies (Biofarm and Remedia) had a negative net result, which shows that they have completed the activity with loss. Ropharma is the only company that obtained profit throughout the period, return on equity recorded having values fluctuating, between 5.77% in 2008 and 13.31% in 2010. Remedia and Biofarm also recorded fluctuating values of return on equity in 2009-2012, ranging from 3.57% in 2009 and 10.24% in 2011 and, respectively 9.24% in 2011 and 14.43% in 2009.

What is interesting to be noticed in 2008, is that although Biofarm and Remedia achieved operating profit, net result became negative due to higher financial expenses; while Ropharma, who got loss from operating activities, it succeeded to cover the profit from financial activities, generating net profit for the whole company. We notice, however, on the whole that there is no rule in respect of financial activity influence on the final result.

4. Indebtedness analysis of companies studied in the period 2008-2012

A high level of indebtedness increases the exposure to risk for creditors, but also that of indebtedness for owners. From the point of view of creditors, there is a variety of indicators related to total debts or only the long-term debts, in correspondence with the different components of the balance sheet, which provides a measure much more comprehensive of risk than financial leverage. These rates measure the risk exposure of lenders relating to the assets available over which the creditors' claims would reflect.

The first and most general indicator of the proportion between total debts and total assets is *indebtedness level* that is calculated as:

$$\text{Indebtedness level} = \frac{\text{Total Debts}}{\text{Total Assets}}$$

The ratio of total debts relative to total assets is used to describe the weight of "other people's money" in all claims related to the company's assets. The higher is this ratio, with so the greater risk is for creditors. However, this indicator is a measure of the actual capacity of the company to cover its debts.

Table 3. The indebtedness level and leverage ratio

Indebtedness level	2008	2009	2010	2011	2012
Biofarm	0.103	0.085	0.114	0.146	0.163
Remedia	0.787	0.762	0.799	0.744	0.790
Ropharma	0.685	0.744	0.717	0.765	0.719
Leverage ratio	**2008**	**2009**	**2010**	**2011**	**2012**
Biofarm	0.116	0.097	0.131	0.175	0.197
Remedia	3.700	3.195	3.965	3.041	3.828
Ropharma	2.182	2.918	2.535	3.257	2.553

Source: Calculus performed by the author

In the analyzed companies (table 3), Biofarm has the lower value of the indebtedness level, varying between 8.5% in 2009 and 16.3% in 2012. At the opposite pole is the Remedia Company that recorded fluctuating values of indebtedness level, with values varying between 74.4% in 2011 and 79.9% in 2010. The same fluctuating trend, but with decreasing tendency towards the end of the range was registered to Ropharma, where indebtedness level fluctuates between 68.5% in 2008 and 76.5% in 2011.

Total *coefficient of indebtedness* or "*leverage ratio*" (L) reflects the extent to which equity assure funding of company's activities, calculated as:

$$L = \frac{\text{Total Debts (on short and long term)}}{\text{Equity}}$$

This indicator can be interpreted as a rate of the company's financial autonomy, showing the extent to which commitments on short and long term are secured by the equity of the company. The leverage ratio is greater than 1, the company will depend more on its creditors. If leverage is less than 1, the bank will continue to provide loans under conditions of safe guarantee (Vintila, 2000).

As well as the indebtedness level, the leverage ratio has the same evolution in the companies analysed (table 3): Biofarm had the lowest leverage ratio with values between 0.097 in 2009 and 0.917 in 2012, with tendency of increase in the final of the analysed period; Remedia had the highest leverage ratio, with fluctuating values between 3.041 in 2011 and 3.965 in 2010; and Ropharma had a level high of leverage ratio with values between 2.182 in 2008 and 3,257 in 2011.

Rate of financial debts characterizes the degree of long-term indebtedness of the company; normally this indicator should be less than 0.5, and is determined by the formula (Ariton, 2006):

$$R_{DF} = \frac{\text{Financial debts (on medium and long term)}}{\text{Permanent capital}}.$$

Related to the pharmaceutical companies analysed we find that all companies registered reduced values, included in the normal interval lower than 0.5 (table 4). Thus, the lowest financial debts ratio is registered by the company Biofarm, with a decreasing trend from 0.027 in 2008 to 0.004 in 2012. Although, Remedia had the higher degree of indebtedness, the financial debts ratio has reducing value, with a fluctuating trend, between 0.016 in 2008 and 0.350 in 2009. Ropharma had registered values between 0.226 in 2012 and 0.329 in 2008.

Table 4. Financial debts and financial independence rates

Financial debts ratio	2008	2009	2010	2011	2012
Biofarm	0.027	0.019	0.013	0.007	0.004
Remedia	0.016	0.350	0.342	0.091	0.095
Ropharma	0.329	0.311	0.258	0.266	0.226
Financial independence ratio	2008	2009	2010	2011	2012
Biofarm	0.973	0.981	0.987	0.993	0.996
Remedia	0.984	0.650	0.658	0.909	0.905
Ropharma	0.671	0.689	0.742	0.734	0.774

Source: Calculus performed by the author

Rate of financial independence of the company, complementary to financial debts ratio, measure the share of equity in all permanent resources. Generally, the rate must be greater than or at least equal to 0.5 for the same reasons imposed by the bank, in credit relations with companies. The formula used is:

$$R_{IF} = \frac{\text{Equity}}{\text{Permanent Capital}}.$$

Related to financial independence ratio, the values registered are higher than 0.5 to all companies (table 4), that show a high level of financial independence, especially to Biofarm company.

The *cost of debts* or the average rate of return can be expressed by the ratio:

$$R_{DOB} = \frac{\text{Financial Expenses}}{\text{Total loans}}.$$

As far as the average interest rate is below the rate of return on assets of the analyzed company, the indebtedness favours financing by loans. In this situation appears the leverage effect with positive impact on return on equity.

Table 5. Cost of debts

Company / Year	2008	2009	2010	2011	2012
Biofarm	9.41	9.34	6.40	9.85	8.80
Remedia	7.74	1.34	1.31	4.90	1.63
Ropharma	2.11	2.89	2.04	2.32	7.05

Source: Calculus performed by the author

Analysing the cost of debts to the analysed companies (table 5) we found that the higher cost of debts is to Biofarm Company, with tendency of decreasing at the end of the interval, between 8.80% in 2012 and 6.40% in 2010. Fluctuating values was registered to companies Remedia and Ropharma, between 1.31% in 2010 and 7.74% in 2008, and respectively 2.04% in 2010 and 7.05% in 2012.

5. Study the effect of leverage on companies' profitability

Financial leverage aims to increase return on equity by changing the financial structure. Following the financial leverage is expected to increase the efficiency in using equity (of return on equity) by increasing the amount of borrowed capital. This is possible if there is a margin between the expected return on invested capital (own and borrowed), on the one hand, which should be as higher and the cost of borrowed capital, on the other hand, which should be as smaller (Bucataru, 2009).

The central idea of the financial leverage relationship is: the company that manages to attract resources from its creditors at an interest rate lower than the profitability of operating activity (return on assets) will obtain gains through this funding policy, increasing the return on equity (Dragota *et al.*, 2003).

Leverage effect may increase as a result of:
- increasing the rate of return on assets, which is possible by selecting the most efficient investments;
- reducing the real interest rate, i.e. by contracting the cheapest loans in the financial market and much lower than the return on investment in assets;
- increasing, at maximum possible, of the borrowing capital (obviously the cheapest). With this fact increases the financial risk. Undoubtedly, a balance between the desire to increase the leverage effect by increasing the borrowed capital, on the one hand and the company involvement in risky actions is required. Ongoing assessment of the size of financial risk can be achieved by comparing predicted profit with interest accruing on loans. If there is a substantial margin between the two indicators, meaning that the profit achieved is much greater than the interest paid, then we can consider that the company is protected against financial risk (Bucataru, 2010).

Table 6. Leverage effect

Company / Year	2008	2009	2010	2011	2012
Biofarm	0.0006	-0.0004	0.0048	-0.0024	-0.0010
Remedia	-0.2268	0.1095	0.0514	-0.0452	0.0249
Ropharma	-0.3606	0.0239	0.0609	0.0325	-0.0826

Source: Calculus performed by the author

The leverage effect to the analysed companies has fluctuating values, positive or negative, generating a positive or negative effect on the return on equity. Return on equity (R_f) is equal with return on assets after taxes $R_e \times (1-t)$ plus the leverage effect which is expressed by $(R_e - i) \times \dfrac{D}{CP} \times (1-t)$.

If, $R_e \succ i$ then $R_e - i \succ 0$, that means leverage effect is positive and return on equity may increase depending on $\dfrac{D}{CP}$ and/or taxation.

If, $R_e \prec i$ then $R_e - i \prec 0$, that means leverage effect is negative and return on equity tends to decrease depending on $\dfrac{D}{CP}$ and/or taxation.

In conclusion, by the financial leverage effect is defined the improvement or degradation of rate of return on equity, as a result of calling to a credit. Financial leverage effect measures the positive or negative incidence of the company leverage on its return on equity (Ariton, 2006).

Table 7. Return on equity influenced by the leverage effect

Company / Year	2008	2009	2010	2011	2012
Biofarm	8.37	7.44	8.86	6.94	6.86
Remedia	-17.70	13.20	6.51	-0.93	4.01
Ropharma	-42.40	5.12	8.84	5.52	-3.73

Source: Calculus performed by the author

Return on equity influenced only by the leverage effect is presented in table 7. Analysing concomitant data from the tables 1, 6 and 7, we can conclude that:

- to Biofarm, although leverage effect had a positive role, the return on equity reduced due to taxation in 2008 and 2010; in the rest of the interval, the return on equity reduced due to both taxation and negative leverage effect;

- to Remedia, in the years 2009, 2010 and 2012, the leverage effect had a positive effect and determined the increase in return on equity; in 2008 and 2011, the negative leverage effect had an important impact to return on equity, this becoming negative;

- to Ropharma, in the period 2009-2011, the leverage effect had a positive effect and determined the increase in return on equity; in 2008 and 2012, the leverage effect had an important negative impact to return on equity, this becoming negative.

6. Conclusions

Comparing the data from tables 2 and 7, we can found that are significant differences between real return on equity determined taking into account the financial date and return on equity determined by the leverage effect. Thus, although the leverage effect generates a return on equity positive in 2008 to Biofarm, by the accounting data results a negative value. This situation shows that, in practice, there are other financial or non-financial factors that influence return on equity, with an important impact, sometimes positive and sometimes negative. For Biofarm, the impact of these factors was negative in 2008, but to Ropharma, in 2008 and 2012, the impact was positive: leverage effect shows a negative return on equity, while bookkeeping data shows a positive return on equity.

In conclusion, when we intend to study the profitability of the companies we should take into account many other factors related to financial activity as: results of financial investments in shares and bonds, incomes generated by the investments in banking deposits, or other financial expenses that can appear at a certain moment. We mustn't lose of sight the human capital experience and skills (Moisescu et al., 2012), firm size, growth opportunities, number of subsidiaries, import and export relations, general investment climate (Ioan, 2010), the high quality of products, low costs (Boca, 2011) and others that can successfully contribute to increase the companies' performance.

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