PROFITABILITY AND RISK ANALYSIS OF PHARMACEUTICAL COMPANIES LISTED ON THE BUCHAREST STOCK EXCHANGE

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Abstract: This article addresses a very topical issue, namely that of profitability and risk of capital investments in shares of pharmaceutical companies listed on the Bucharest Stock Exchange. Thus, for a five-year time horizon that we consider representative, we determined the profitability taking into account the net dividends distributed by the companies in this period and the increase or decrease of the value of the share. For the risk analysis we used the β coefficient. We believe that the obtained results can be a useful tool for individual and institutional investors in the stock market when they constitute their portfolios.

JEL classification: G32, G12

Key words: risk, volatility, investment , share, portfolio

1. INTRODUCTION

At present, the capital market offers investors a wide range of financial instruments. Each of these instruents generate a potential gain while assuming a certain risk. In fact, the essence of the investment decision, either in financial assets or real assets, involves investing a certain present amount in the hope of higher future, but uncertain, cash flows.

Therefore, time is the key criterion in the financial decision-making, in general, and in the investment decision-making, in particular, in accordance with the size of the risk.

Therefore, such an approach leads investors to choose between financial instruments that offer greater potential gain such as equity securities as shares that are riskier and instruments that provide a lower but safer gain such as debt securities (corporate bonds, state bonds or municipal bonds).

We can say, therefore, that the capital investment decision is influenced largely by the investors' perception on the investment yield and the risks involved and the way they understand to take those risks.

2. OBJECTIVES

In our study we aim to determine the profitability and the risk of the investment in the shares of companies in the pharmaceutical field listed on the Bucharest Stock Exchange, namely: S.C. Antibiotice S.A. Iasi (ATB symbol), S.C. Biofarm S.A. Bucharest (BIO symbol), S.C. Farmaceutica Remedia S.A. Deva (RMAH symbol) and S.C. Zentiva S.A. Bucharest (SCD symbol).

Investors generally like to have a bigger yield. Investors hold securities because they hope for positive returns. Purchasers of ordinary shares are attracted by two elements: the anticipated dividends payable during the holding period and the expected capital gain. Taken together, these elements make up the Total Shareholder Return (TSR).

However, the TSR data relate to just one year, may be influenced in either direction by random factors. A more meaningful measure of shareholder return would remove these dhort term fluctuations, adverse or favorable. This is done by taking the overall return over a specific period, commonly five years, and converting this into an average annual or annualised equivalent rate of return.

Given that the interest rate on deposits from banks became modest (2-3% per year), it seems appropriate that investors' attention is directed toward investments in shares. Given that the pharmaceutical sector is well represented on the capital market in Romania, we thought it useful to predict the risk of shares in this field, in the context of a portfolio, using the β coefficient.

We define risk of an asset as the likely variability of the asset's future profitability. Therefore, the risk is related to the probability of getting a lower than expected profitability. The lower it is the more risky the investment will be. In other words, riskier investments should have a higher expected return.

The risk of a share can be analyzed from two perspectives: individual share or share as part of a portfolio. Regarding the risk there is a significant difference between the two types of analysis, i.e. a share that has a higher risk when owned alone may be less risky as part of a wider portfolio.

When a share is individually owned (i.e., the portfolio consists of a single share) its risk can be measured by the standard deviation of expected return. To the extent that the share is part of a portfolio, as happens in most cases, the standard deviation is not a good measure of the risk. Therefore, it arises the question of measuring the risk of one share in the context of a portfolio.

The risk that remains when a share is part of a diversified portfolio is its contribution to market risk of the portfolio. This is commensurate to the extent of the share varies in relation to the market. The trend of a share to „move" in relation to the market is measured by the coefficient β.

3. METHODOLOGY

For our analysis, we considered that shares are in an investor's portfolio throughout the period 01.01.2010-31.12.2014 (5 years). Thus, given that dividends for 2014 are distributed in 2015 and at the registration date in 2015 he is not the owner of

these shares anymore, he will not benefit from dividends for 2014 but only for the 2010-2013 period.

In general, for any holding period, t, and company, i, the TSR is the percentage return, $R_{i,t}$, from holding its shares:

$$R_{i,t} = \frac{D_{i,t} + (P_{i,t} - P_{i,0})}{P_{i,0}} \cdot 100 \qquad \textbf{(1)}$$

where:

$D_{i,t}$ = dividend per share paid by company i in period t;

$P_{i,t}$ = share price for company i at the end of period t;

$P_{i,0}$ = share price for company i at the start of period t.

Therefore, to determine the profitability of a share we went through the following steps:

1) we collected the historical data on the gross dividends distributed by the four companies in the period 2010-2013;

2) we determined the total net dividend paid by each company in the period under review;

3) we determined the share price variation in the analyzed period;

4) we determined the TSR according to the relationship (1).

When we „build" a portfolio, in the initial phase, or we buy new shares it would be ideal to know how these will evolve in the future, compared with the market. But since we can not look into the future we are often forced to resort to historical data and assume that historic β of the share gives us enough information about how the share will ″move″, by reporting to the market. Therefore, while β does not measure risk in absolute terms, it is a risk indicator, reflecting the extend to which the return on the single asset moves with the return on the market, i.e. it is a measure of relative risk.

The β values of shares fall into three categories: "defensive", "neutral" and "aggressive". An aggressive shares has a β> 1. Its return move by a greater proportion than the market as a whole. For example, a shares with β = 1.2, for every percentage point change in the market's return, the return on share changes by 1.2 points. Such shares are highly desirable in a rising market, although the excess return is not guaranteed due to the possible impact of company-specific factors. A defensive share has β <1. So if β = 0.7, share movements in whose returns tend to understate those of the whole market. The returns on neutral shares with β = 1, parallel those on the market portofolio. Thus, since β share reflects its contribution to the risk of a portfolio, we believe that β is the correct measure of the risk of a share.

The equation for determining the β coefficient is:

$$\beta_{title} = \frac{Cov_{title, market}}{\sigma^2_{market}} \qquad \textbf{(2)}$$

A key question that occurs when using historical data is „how many years back" to go in order to collect the data. Basically, we believe it is better to consider a sufficient period of time so that we benefit from as much information as we can. We considered that the monthly data over the last five years are enough to determine a

relevant coefficient β. This is because from 2010 the market has never seen the "spectacular" variations regarding the BET index, recorded in the first two years of the crisis (2008: -70% and 2009: +62%). Thus, in the analyzed years, the BET index evolved as follows: 2010, BET = +12%, 2011, BET= -18%, 2012, BET = +19%, 2013, BET =+26%, 2014, BET =+9%,

Therefore, we collected historical data for monthly closing values of 60 months (January 2010-December 2014) for each of the five companies.

So, to determine β of a listed share we went through the following steps:

We collected historical data (five years) for the monthly closing price on the stock exchange of a share;

We collected historical data on the BET index reflecting the evolution of the 10 most liquid companies listed on the BSE regulated market and which we consider the most significant regarding the market evolution on the same amount of time;

We calculated the monthly return per share and per market according to the equation:

$$\mathrm{Re}\,turn = \frac{\mathrm{Pr}\,ice_1 - \mathrm{Pr}\,ice_0}{\mathrm{Pr}\,ice_0} \tag{3}$$

To obtain the necessary data we also needed the closing value at the end of December 2009.

We considered X_i-the return (variation) monthly of the share and Y_i- return (variation) monthly of the BET index.

1) Based on the obtained data series we calculated the covariance between share and market according to the equation:

$$Cov_{title,\,market} = \sum_{i=1}^{60} (X_i - X_{med}) \cdot (Y_i - Y_{med}) \tag{4}$$

where:

$$X_{med} = \frac{1}{60} \sum_{i=1}^{60} X_i \tag{5}$$

$$Y_{med} = \frac{1}{60} \sum_{i=1}^{60} Y_i \tag{6}$$

2) Based on the obtained data series we calculated the standard deviation of the market return according to the equation:

$$\sigma^2_{\,market} = \sum_{i=1}^{60} (Y_i - Y_{med})^2 \tag{7}$$

3) By dividing the covariance to the deviation we obtained β company.

4. ANALYSES

For reasons of space, in our article we presented the example for calculating β only company ATB (see table no.2).

Table no. 1 Determination of return

Company	Gross dividend				Total dividend		$P_{i,t}$	$P_{i,0}$	$P_{i,t}-P_{i,0}$	Return (%)
	2010	2011	2012	2013	Gross	Net				
ATB	0,000000	0,015200	0,036383	0,023027	0,074610	0,062672	0,5850	0,6300	-0,0450	2,8051
BIO	0,005500	0,010000	0,013000	0,000000	0,028500	0,023940	0,2801	0,2010	0,0791	51,2637
RMAH	0,010000	0,020000	0,020000	0,015000	0,065000	0,054600	0,2340	0,1570	0,0770	83,8217
SCD	0,299800	0,081200	0,048000	0,072000	0,501000	0,420840	1,5820	0,6850	0,8970	192,3854

Source: Calculated by the authors using data from www.bvb.ro

Table no. 2 Determination of Beta ATB

Date	Closing values ATB	Variation ATB (X_i)	Closing values BET	Variation BET(Y_i)	X_i-X_{med}	Y_i-Y_{med}	$(X_i-X_{med})(Y_i-Y_{med})$	$(Y_i-Y_{med})^2$
30.12.2014	0,5850	-0,4255	7083,00	2,1114	-0,5560	1,2751	-0,7089	1,6259
28.11.2014	0,5875	2,3519	6936,54	-1,3982	2,2215	-2,2345	-4,9638	4,9929
31.10.2014	0,5740	-1,0345	7034,90	-3,1436	-1,1649	-3,9799	4,6363	15,8400
30.09.2014	0,5800	-2,4390	7263,23	1,6446	-2,5695	0,8083	-2,0770	0,6534
29.08.2014	0,5945	3,5714	7145,71	3,2771	3,4410	2,4408	8,3987	5,9574
31.07.2014	0,5740	0,7018	6918,97	-1,3512	0,5713	-2,1875	-1,2497	4,7852
30.06.2014	0,5700	0,0000	7013,74	4,3319	-0,1304	3,4955	-0,4560	12,2189
30.05.2014	0,5700	-3,0612	6722,53	4,6401	-3,1917	3,8038	-12,1405	14,4689
30.04.2014	0,5880	-0,5076	6424,43	1,5923	-0,6381	0,7560	-0,4823	0,5715
31.03.2014	0,5910	-1,8272	6323,74	-1,7378	-1,9577	-2,5741	5,0394	6,6262
28.02.2014	0,6020	-0,4959	6435,58	0,8873	-0,6263	0,0510	-0,0319	0,0026
31.01.2014	0,6050	8,4229	6378,98	-1,7680	8,2925	-2,6043	-21,5961	6,7824
30.12.2013	0,5580	-1,2389	6493,79	2,5051	-1,3694	1,6688	-2,2852	2,7849
29.11.2013	0,5650	16,9772	6335,09	4,4307	16,8468	3,5944	60,5540	12,9197
31.10.2013	0,4830	2,9851	6066,31	0,3970	2,8546	-0,4393	-1,2540	0,1930
30.09.2013	0,4690	2,8509	6042,32	4,1679	2,7204	3,3316	9,0633	11,0994
30.08.2013	0,4560	-2,7304	5800,56	7,3462	-2,8608	6,5099	-18,6237	42,3789
31.07.2013	0,4688	-2,3333	5403,60	2,6955	-2,4638	1,8592	-4,5806	3,4565
28.06.2013	0,4800	3,4483	5261,77	-2,4784	3,3178	-3,3147	-10,9975	10,9870
31.05.2013	0,4640	0,8696	5395,49	1,0855	0,7391	0,2492	0,1842	0,0621
30.04.2013	0,4600	0,3928	5337,55	-5,3142	0,2624	-6,1505	-1,6139	37,8292
29.03.2013	0,4582	2,9663	5637,12	-0,3005	2,8358	-1,1368	-3,2238	1,2923
28.02.2013	0,4450	2,2989	5654,11	3,1529	2,1684	2,3166	5,0233	5,3667
31.01.2013	0,4350	15,5685	5481,29	6,4419	15,4381	5,6056	86,5399	31,4228
28.12.2012	0,3764	-1,3110	5149,56	7,4861	-1,4414	6,6497	-9,5850	44,2192
29.11.2012	0,3814	-3,6382	4790,91	-2,7274	-3,7686	-3,5637	13,4303	12,6998
31.10.2012	0,3958	4,1579	4925,24	4,2355	4,0275	3,3992	13,6899	11,5542
28.09.2012	0,3800	1,4415	4725,11	-1,8234	1,3111	-2,6597	-3,4872	7,0743
31.08.2012	0,3746	7,2738	4812,87	2,5466	7,1433	1,7103	12,2171	2,9251
31.07.2012	0,3492	2,7059	4693,35	3,6481	2,5754	2,8118	7,2415	7,9060
29.06.2012	0,3400	-10,5263	4528,16	-0,8600	-10,6568	-1,6963	18,0771	2,8774
31.05.2012	0,3800	-1,3756	4567,44	-14,1884	-1,5060	-15,0248	22,6272	225,7431
30.04.2012	0,3853	-6,3897	5322,64	-0,9277	-6,5201	-1,7640	11,5015	3,1117
30.03.2012	0,4116	-2,2560	5372,48	1,8843	-2,3864	1,0480	-2,5009	1,0982
29.02.2012	0,4211	5,5918	5273,12	7,8844	5,4613	7,0481	38,4920	49,6757
31.01.2012	0,3988	2,2564	4887,75	12,7002	2,1260	11,8639	25,2222	140,7513
30.12.2011	0,3900	-2,0101	4336,95	2,1581	-2,1405	1,3218	-2,8294	1,7472
30.11.2011	0,3980	-2,3313	4245,33	-7,2995	-2,4617	-8,1358	20,0282	66,1915
31.10.2011	0,4075	3,0341	4579,62	5,8350	2,9037	4,9987	14,5148	24,9874
30.09.2011	0,3955	-10,3175	4327,13	-9,9327	-10,4479	-10,7690	112,5136	115,9716
31.08.2011	0,4410	-11,6232	4804,33	-10,1169	-11,7537	-10,9533	128,7411	119,9737
29.07.2011	0,4990	0,0000	5345,09	-2,9700	-0,1304	-3,8063	0,4965	14,4882
30.06.2011	0,4990	1,4228	5508,7	0,7322	1,2923	-0,1041	-0,1346	0,0108
31.05.2011	0,4920	-15,6812	5468,66	-7,2211	-15,8117	-8,0574	127,4004	64,9210
29.04.2011	0,5835	-2,7500	5894,29	-0,5794	-2,8804	-1,4157	4,0778	2,0042
31.03.2011	0,6000	5,1709	5928,64	1,0949	5,0405	0,2586	1,3035	0,0669

Date	Closing values ATB	Variation ATB (X_i)	Closing values BET	Variation BET(Y_i)	X_i-X_{med}	Y_i-Y_{med}	$(X_i$-$X_{med})$ $(Y_i$-$Y_{med})$	$(Y_i$-$Y_{med})^2$
28.02.2011	0,5705	4,1058	5864,43	3,3806	3,9754	3,3806	13,4392	11,4285
31.01.2011	0,5480	-11,6129	5672,66	7,6690	-11,7433	6,8327	-80,2388	46,6858
30.12.2010	0,6200	11,7117	5268,61	3,4288	11,5813	2,5925	30,0241	6,7209
30.11.2010	0,5550	-6,7227	5093,95	-3,5677	-6,8531	-4,4040	30,1811	19,3951
29.10.2010	0,5950	-5,5556	5282,41	-1,0089	-5,6860	-1,8453	10,4921	3,4050
30.09.2010	0,6300	16,6667	5336,25	5,1903	16,5362	4,3540	71,9982	18,9571
31.08.2010	0,5400	-1,8182	5072,95	-0,0221	-1,9486	-0,8584	1,6727	0,7368
30.07.2010	0,5500	12,0163	5074,07	6,9608	11,8858	6,1245	72,7947	37,5093
30.06.2010	0,4910	-13,8596	4743,86	-3,8741	-13,9901	-4,7104	65,8993	22,1881
31.05.2010	0,5700	-19,7183	4935,05	-13,2104	-19,8488	-14,0467	278,8087	197,3087
30.04.2010	0,7100	6,7669	5686,22	-4,6792	6,6365	-5,5155	-36,6034	30,4206
31.03.2010	0,6650	7,2581	5965,35	11,9528	7,1276	11,1165	79,2343	123,5769
26.02.2010	0,6200	-2,3622	5328,45	5,1925	-2,4926	4,3561	-10,8584	18,9760
29.01.2010	0,6350	0,7937	5065,43	7,9918	0,6632	7,1555	4,7456	51,2008
24.12.2009	0,6300		4690,57					
		Media(X_{med})		Media(Y_{med})		Sum(X_i-X_{med})(Y_i-Y_{med})		Sum(Y_i-Y_{med})^2
		0,1304		0,8363			1177,7814	1742,8260
Beta ATB=Sum (X_i-X_{med})(Y_i-Y_{med})/Sum(Y_i-Y_{med})^2=1177,7814/1742,8260=0,6757								

Source: Calculated by the authors using data from www.bvb.ro

5. CONCLUSIONS

Centralizing highlighted results we will obtain the following tables:

Table no. 3 Return

COMPANY	RETURN (%)
ATB	2.8051
BIO	51.2637
RMAH	83.8217
SCD	192.3854

Table no. 4 Beta

COMPANY	BETA
ATB	0.6757
BIO	0.7465
RMAH	0.8226
SCD	0.6394

In terms of profitability, it is observed that the best yield on the five analyzed years was brought by the SCD share (192%). Yields above bank interest rates could also be obtained by investing in BIO and RMAH shares. The lowest yield was brought by the ATB share, of only 2.8% in five years. Considering that in the period under review the increase of the BET index was of 49%, it can be noticed that three of the four shares have had yields over thay of the BET index.

Regarding the risk, it is observed that for every analyzed share, $\beta <1$, as such they come under the defensive shares category. The lowest risk is found at the SCD share which, incidentally, has brought the highest yield. Which means that pharmaceutical shares are not very volatile, which recommends them to be part of the portfolios of investors who do not like very large fluctuations of the market, they fully manifesting both internally and externally during 2014 and early 2015.

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