

# **RISK MEASUREMENT USING THE B (BETA) COEFFICIENT FOR FINANCIAL INVESTMENT COMPANIES**

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**Abstract:** This article addresses, in the current context, a very topical issue, namely that of the risk estimation by using the  $\beta$  coefficient at financial investment companies (FICs). Thus, of the 82 companies listed on the first three categories of the Bucharest Stock Exchange and the international securities section, the FICs are found in the structure of portfolios held by many investors. Therefore, we considered interesting to calculate the  $\beta$  coefficient for the five FICs, using historical data for the past four years to measure risk using the „volatility” of these securities in relation to the market. We consider the results obtained to be a useful tool for current and future capital market investors when „establishing” portfolios, according to the profile of each of them, reminding them at the same time that „the past is no guarantee of future”.

**JEL classification: G32, G12**

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

## **1. INTRODUCTION**

By object, the investments can be grouped into: investments in financial assets, especially shares and bonds, and investments in real assets that consist in allocating capital for the creation or acquisition of tangible or intangible assets.

The success of an investment largely depends on the skill of the decision maker in directing the future for the purposes of fulfilling the events they predict, although there are likely to be other unexpected events which, in a decisive way, can influence the expected results from an investment. So, the future is full with the unknown, and therefore, the investment no matter what type it is, involves the „risk” that must be commensurate and integrated into the investment process.

We generally define risk, as the variability of possible outcomes from what was expected, and the 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.

There is no news that investors like to have as big as possible output and they do not like the „risk”, i.e. they will invest in risky assets only if these assets offer a higher expected return. Therefore, the expectations of a particular investment are

commensurate in terms of return and risk, concept which is the essence of logic of the investment decision.

## 2. OBJECTIVES

The risk can be measured in several ways, and depending on the measurement method can be drawn different conclusions about how risky is a particular asset.

What is noteworthy is that from all investments, whether in real or financial assets, we expect to produce cash flows and the risks of assets are based on the risks of cash flows. The riskier the cash flows are, the riskier the assets are.

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. In the context of a portfolio, the risk of a share can be divided in two components: diversified risk and undiversified risk.

That part of a security risk which can be eliminated by diversification is called diversifiable risk, company's specific risk (risk of business) or unsystematic risk. That part of a security risk which can not be eliminated through diversification is called undiversified risk, market risk or systematic risk. The name is less important. Important is that a large part of any individual security risk can be removed. A graphical representation of the statements is illustrated in Figure 1.

The specific risk is due to legal actions, strikes, success or failure of advertising programs, the gain or the loss of major contracts, as well as other events that take place within the company. Since these events are essentially random, their effects on the portfolio can be eliminated by diversification, negative events in a company being compensated by positive events in another firm.

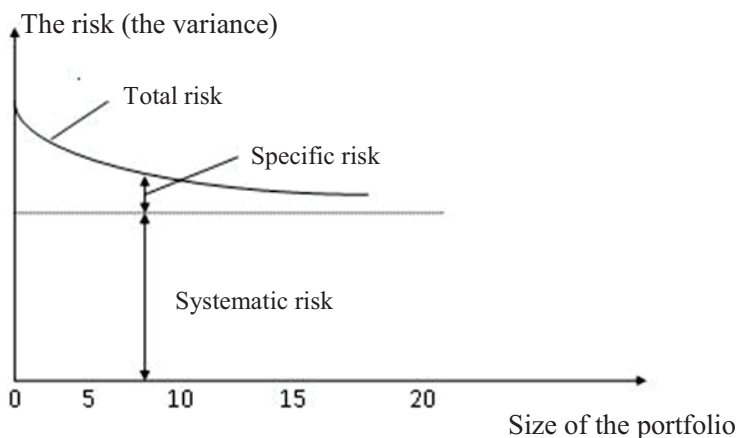


Figure 1. The total risk of an assets portfolio

The systematic risk is due to inflation, recession and interest rate variations, and military conflicts. It is clear that this type of risk does not depend on the company, affecting simultaneously and in the same direction all firms. This type of risk can not be eliminated through diversification. In fact, this is the only relevant risk to a reasonable

diversified investor, since was already eliminated the specific risk through diversification.

By summing specific risk and systematic risk we obtain the total risk. As the size of the portfolio increases, the total risk decreases. But over a certain number of assets (securities), 15-20 specifically, as we add more securities, the total risk will be reduced very slightly or not at all. Moreover, the extent to which the addition of new securities to the portfolio reduces its risk depends on the degree of correlation between securities. Generally, a portfolio of investments in the same industry is more risky than a portfolio of investments in projects belonging to different branches. Thus, for a risk mitigation is required a portfolio diversification in several industries.

One share with a high market risk can provide a higher expected return to attract investors. Investors generally have risk aversion, so they will not buy risky shares if they do not receive in compensation higher profitability.

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  $\beta$ .

Given the fact that FICs shares are part of most investors' portfolios, as demonstrated by the fact that these shares have one of the largest turnovers on the capital market, and have a free float high, we considered useful to determine the risk for each of them, in the context of a portfolio, by using the coefficient  $\beta$ .

### 3. METHODOLOGY

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  $\beta$  of the share gives us enough information about how the share will "move", by reporting to the market.  $\beta$  measures the volatility of a share by comparing it with the market.

If  $\beta = 1$ , then the share is defined as a medium-risk share, that moves up and down in pace with the market. So, this kind of share generally increases by 10% when the market increases by 10% and decreases by 10% when the market drops 10%.

A share with  $\beta = 2$  is two times more volatile than an average share which means it is twice risky. This means that on a rising market you can quickly get rich and on a decreasing market you can impoverish just as fast.

On the other hand, a share with  $\beta = 0.5$  is only half volatile compared with a medium share and such a portfolio will increase and decrease only half compared with the market. Most shares have  $\beta$  between 0.5 and 1.5, the average  $\beta$  for all shares is 1. If a share whose  $\beta > 1$  is added to a portfolio with  $\beta = 1$ , then  $\beta$  portfolio and its default risk will increase. Vice versa, if a share with  $\beta < 1$  is added to a portfolio with  $\beta = 1$ , then  $\beta$  portfolio and its default risk will decrease. Thus, since  $\beta$  share reflects its contribution to the risk of a portfolio, we believe that  $\beta$  is the correct measure of the risk of a share.

The equation for determining the  $\beta$  coefficient is:

$$\beta_{title} = \frac{Cov_{title, market}}{\sigma^2_{market}} \quad (1)$$

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 four years are enough to determine a relevant coefficient  $\beta$ . 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%.

Therefore, we collected historical data for monthly closing values of 48 months (January 2010-December 2013) for each of the five FICs.

So, to determine  $\beta$  of a listed share we went through the following steps:

- 1) We collected historical data (four years) for the monthly closing price on the stock exchange of a FIC share;
- 2) 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;
- 3) We calculated the monthly return per share and per market according to the equation:

$$\text{Return} = \frac{\text{Price}_1 - \text{Price}_0}{\text{Price}_0} \quad (2)$$

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.

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

$$Cov_{title, market} = \sum_{i=1}^{48} (X_i - X_{med}) \cdot (Y_i - Y_{med}) \quad (3)$$

where:

$$X_{med} = \frac{1}{48} \sum_{i=1}^{48} X_i \quad (4)$$

$$Y_{med} = \frac{1}{48} \sum_{i=1}^{48} Y_i \quad (5)$$

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

$$\sigma^2_{market} = \sum_{i=1}^{48} (Y_i - Y_{med})^2 \quad (6)$$

6) By dividing the covariance to the deviation we obtained  $\beta$  company.

#### 4. ANALYSES

For each of the 5 titles we completed the steps above, as demonstrated in Tables 1, 2, 3, 4 and 5.

**Table no. 1 Determination of Beta FIC1**

Date	Closing values FIC1	Variation FIC1(X <sub>t</sub> )	Closing values BET(Y <sub>t</sub> )	Variation BET	X <sub>t</sub> -X <sub>med</sub>	Y <sub>t</sub> -Y <sub>med</sub>	(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
30.12.2013	1,2920	5,0407	6493,79	2,51	4,0470	1,65	6,6735	2,7192
29.11.2013	1,2300	16,0377	6335,09	4,43	16,0377	4,43	71,0584	19,6311
31.10.2013	1,0600	-2,3041	6066,31	0,40	-3,2978	0,40	-1,3093	0,1576
30.09.2013	1,0850	3,3333	6042,32	4,17	3,3333	4,17	13,8929	17,3712
30.08.2013	1,0500	1,9417	5800,56	7,35	1,9417	7,35	14,2645	53,9669
31.07.2013	1,0300	-9,6491	5403,60	2,70	-9,6491	2,70	-26,0090	7,2656
28.06.2013	1,1400	-8,0645	5261,77	-2,48	-8,0645	-2,48	19,9868	6,1423
31.05.2013	1,2400	22,7723	5395,49	1,09	22,7723	1,09	24,7197	1,1783
30.04.2013	1,0100	-21,4008	5337,55	-5,31	-21,4008	-5,31	113,7288	28,2411
29.03.2013	1,2850	-4,1045	5637,12	-0,30	-4,1045	-0,30	1,2334	0,0903
28.02.2013	1,3400	5,6782	5654,11	3,15	5,6782	3,15	17,9029	9,9408
31.01.2013	1,2680	4,5342	5481,29	6,44	4,5342	6,44	29,2090	41,4982
28.12.2012	1,2130	6,2172	5149,56	7,49	6,2172	7,49	46,5420	56,0410
29.11.2012	1,1420	-3,4658	4790,91	-2,73	-3,4658	-2,73	9,4525	7,4386
31.10.2012	1,1830	3,9543	4925,24	4,24	3,9543	4,24	16,7483	17,9391
28.09.2012	1,1380	1,6979	4725,11	-1,82	1,6979	-1,82	-3,0961	3,3249
31.08.2012	1,1190	11,9000	4812,87	2,55	11,9000	2,55	30,3043	6,4851
31.07.2012	1,0000	11,1111	4693,35	3,65	11,1111	3,65	40,5340	13,3083
29.06.2012	0,9000	5,8824	4528,16	-0,86	5,8824	-0,86	-5,0588	0,7396
31.05.2012	0,8500	-20,6349	4567,44	-14,19	-20,6349	-14,19	292,7775	201,3121
30.04.2012	1,0710	0,3749	5322,64	-0,93	0,3749	-0,93	-0,3478	0,8606
30.03.2012	1,0670	-13,8126	5372,48	1,88	-13,8126	1,88	-26,0267	3,5505
29.02.2012	1,2380	24,3596	5273,12	7,88	24,3596	7,88	192,0611	62,1638
31.01.2012	0,9955	10,2436	4887,75	12,70	10,2436	12,70	130,0959	161,2943
30.12.2011	0,9030	1,4607	4336,95	2,16	1,4607	2,16	3,1523	4,6576
30.11.2011	0,8900	16,3399	4245,33	-7,30	16,3399	-7,30	-119,2731	53,2829
31.10.2011	0,7650	-5,4972	4579,62	5,84	-5,4972	5,84	-32,0765	34,0478
30.09.2011	0,8095	-9,0449	4327,13	-9,93	-9,0449	-9,93	89,8408	98,6587
31.08.2011	0,8900	-10,1010	4804,33	-10,12	-10,1010	-10,12	102,1914	102,3526
29.07.2011	0,9900	-3,5088	5345,09	-2,97	-3,5088	-2,97	10,4212	8,8211
30.06.2011	1,0260	-1,4409	5508,7	0,73	-1,4409	0,73	-1,0550	0,5361
31.05.2011	1,0410	-16,3855	5468,66	-7,22	-16,3855	-7,22	118,3209	52,1437
26.04.2011	1,2450	-2,5822	5894,29	-0,58	-2,5822	-0,58	1,4961	0,3357
31.03.2011	1,2780	19,4393	5928,64	1,09	19,4393	1,09	21,2842	1,1988
28.02.2011	1,0700	7,5377	5864,43	3,38	7,5377	3,38	25,4819	11,4285
31.01.2011	0,9950	-1,8738	5672,66	7,67	-1,8738	7,67	-14,3699	58,8136
30.12.2010	1,0140	3,4694	5268,61	3,43	3,4694	3,43	11,8957	11,7565
30.11.2010	0,9800	-14,7826	5093,95	-3,57	-14,7826	-3,57	52,7398	12,7284
29.10.2010	1,1500	0,8772	5282,41	-1,01	0,8772	-1,01	-0,8850	1,0180
30.09.2010	1,1400	8,5714	5336,25	5,19	8,5714	5,19	44,4881	26,9389
31.08.2010	1,0500	-7,8947	5072,95	-0,02	-7,8947	-0,02	0,1743	0,0005
30.07.2010	1,1400	15,1515	5074,07	6,96	15,1515	6,96	105,4665	48,4526
30.06.2010	0,9900	-1,0000	4743,86	-3,87	-1,0000	-3,87	3,8741	15,0088
31.05.2010	1,0000	-31,9728	4935,05	-13,21	-31,9728	-13,21	422,3720	174,5135
28.04.2010	1,4700	-9,2593	5686,22	-4,68	-9,2593	-4,68	43,3258	21,8948
31.03.2010	1,6200	14,0845	5965,35	11,95	14,0845	11,95	168,3496	142,8699
26.02.2010	1,4200	6,7669	5328,45	5,19	6,7669	5,19	35,1369	26,9616
29.01.2010	1,3300	17,6991	5065,43	7,99	17,6991	7,99	141,4474	63,8685
24.12.2009	1,1300		4690,57					
		<b>Media(X<sub>med</sub>)</b>		<b>Media(Y<sub>med</sub>)</b>			<b>Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)</b>	<b>Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup></b>
		<b>0,9937</b>		<b>0,8561</b>			<b>2243,1369</b>	<b>1694,9496</b>
							<b>Beta SIF1= Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)/Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup>=2243,1369/1694,9496=1,3234</b>	

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

**Table no. 2 Determination of Beta FIC2**

Date	Closing values FIC2	Variation FIC2(X <sub>t</sub> )	Closing values BET(Y <sub>t</sub> )	VariationBET	X <sub>t</sub> -X <sub>med</sub>	Y <sub>t</sub> -Y <sub>med</sub>	(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
30.12.2013	1,4700	2,2253	6493,79	2,51	0,9714	1,65	1,6019	2,7192
29.11.2013	1,4380	15,9677	6335,09	4,43	15,9677	4,43	70,7483	19,6311
31.10.2013	1,2400	-1,0375	6066,31	0,40	-2,2914	0,40	-0,9098	0,1576
30.09.2013	1,2530	1,7872	6042,32	4,17	1,7872	4,17	7,4487	17,3712
30.08.2013	1,2310	4,3220	5800,56	7,35	4,3220	7,35	31,7506	53,9669
31.07.2013	1,1800	-4,8387	5403,60	2,70	-4,8387	2,70	-13,0426	7,2656
28.06.2013	1,2400	-1,5873	5261,77	-2,48	-1,5873	-2,48	3,9339	6,1423
31.05.2013	1,2600	17,8672	5395,49	1,09	17,8672	1,09	19,3951	1,1783
30.04.2013	1,0690	-27,9164	5337,55	-5,31	-27,9164	-5,31	148,3543	28,2411
29.03.2013	1,4830	0,1350	5637,12	-0,30	0,1350	-0,30	-0,0406	0,0903
28.02.2013	1,4810	2,8472	5654,11	3,15	2,8472	3,15	8,9770	9,9408
31.01.2013	1,4400	-0,6897	5481,29	6,44	-0,6897	6,44	-4,4427	41,4982
28.12.2012	1,4500	3,5714	5149,56	7,49	3,5714	7,49	26,7359	56,0410
29.11.2012	1,4000	0,7194	4790,91	-2,73	0,7194	-2,73	-1,9621	7,4386
31.10.2012	1,3900	5,3030	4925,24	4,24	5,3030	4,24	22,4608	17,9391
28.09.2012	1,3200	0,6865	4725,11	-1,82	0,6865	-1,82	-1,2518	3,3249
31.08.2012	1,3110	1,6279	4812,87	2,55	1,6279	2,55	4,1456	6,4851
31.07.2012	1,2900	2,3810	4693,35	3,65	2,3810	3,65	8,6859	13,3083
29.06.2012	1,2600	19,7719	4528,16	-0,86	19,7719	-0,86	-17,0038	0,7396
31.05.2012	1,0520	-7,2310	4567,44	-14,19	-7,2310	-14,19	102,5972	201,3121
30.04.2012	1,1340	-13,1034	5322,64	-0,93	-13,1034	-0,93	12,1359	0,8606
30.03.2012	1,3050	-8,7413	5372,48	1,88	-8,7413	1,88	-16,4709	3,5505
29.02.2012	1,4300	6,0044	5273,12	7,88	6,0044	7,88	47,3415	62,1638
31.01.2012	1,3490	24,9074	4887,75	12,70	24,9074	12,70	316,3283	161,2943
30.12.2011	1,0800	13,9241	4336,95	2,16	13,9241	2,16	30,0500	4,6576
30.11.2011	0,9480	18,7226	4245,33	-7,30	18,7226	-7,30	-136,6659	53,2829
31.10.2011	0,7985	-2,3839	4579,62	5,84	-2,3839	5,84	-13,9099	34,0478
30.09.2011	0,8180	-11,6631	4327,13	-9,93	-11,6631	-9,93	115,8458	98,6587
31.08.2011	0,9260	-22,1849	4804,33	-10,12	-22,1849	-10,12	224,4432	102,3526
29.07.2011	1,1900	-5,1037	5345,09	-2,97	-5,1037	-2,97	15,1580	8,8211
30.06.2011	1,2540	-5,6433	5508,7	0,73	-5,6433	0,73	-4,1319	0,5361
31.05.2011	1,3290	-6,4085	5468,66	-7,22	-6,4085	-7,22	46,2758	52,1437
26.04.2011	1,4200	-3,5326	5894,29	-0,58	-3,5326	-0,58	2,0468	0,3357
31.03.2011	1,4720	10,2622	5928,64	1,09	10,2622	1,09	11,2361	1,1988
28.02.2011	1,3350	10,2395	5864,43	3,38	10,2395	3,38	34,6156	11,4285
31.01.2011	1,2110	4,2169	5672,66	7,67	4,2169	7,67	32,3392	58,8136
30.12.2010	1,1620	13,9216	5268,61	3,43	13,9216	3,43	47,7339	11,7565
30.11.2010	1,0200	-18,4000	5093,95	-3,57	-18,4000	-3,57	65,6455	12,7284
29.10.2010	1,2500	5,0420	5282,41	-1,01	5,0420	-1,01	-5,0871	1,0180
30.09.2010	1,1900	14,4231	5336,25	5,19	14,4231	5,19	74,8597	26,9389
31.08.2010	1,0400	0,9709	5072,95	-0,02	0,9709	-0,02	-0,0214	0,0005
30.07.2010	1,0300	9,5745	5074,07	6,96	9,5745	6,96	66,6458	48,4526
30.06.2010	0,9400	3,2967	4743,86	-3,87	3,2967	-3,87	-12,7718	15,0088
31.05.2010	0,9100	-31,0606	4935,05	-13,21	-31,0606	-13,21	410,3217	174,5135
28.04.2010	1,3200	-12,0000	5686,22	-4,68	-12,0000	-4,68	56,1503	21,8948
31.03.2010	1,5000	7,1429	5965,35	11,95	7,1429	11,95	85,3773	142,8699
26.02.2010	1,4000	6,0606	5328,45	5,19	6,0606	5,19	31,4694	26,9616
29.01.2010	1,3200	15,7895	5065,43	7,99	15,7895	7,99	126,1860	63,8685
24.12.2009	1,1400		4690,57					
		<b>Media(X<sub>med</sub>)</b>		<b>Media(Y<sub>med</sub>)</b>			<b>Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)</b>	<b>Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup></b>
		<b>1,2539</b>		<b>0,8561</b>			<b>2081,3485</b>	<b>1694,9496</b>
		<b>Beta SIF2= Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)/Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup>=2081,3485/1694,9496=1,2279</b>						

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

**Table no. 3 Determination of Beta FIC3**

Date	Closing values FIC3	Variation FIC3(X)	Closing values BET(Y <sub>t</sub> )	Variation BET	X <sub>t</sub> -X <sub>med</sub>	Y <sub>t</sub> -Y <sub>med</sub>	(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
30.12.2013	0,6715	1,2821	6493,79	2,51	0,6128	1,65	1,0106	2,7192
29.11.2013	0,6630	10,5000	6335,09	4,43	10,5000	4,43	46,5224	19,6311
31.10.2013	0,6000	-0,2494	6066,31	0,40	-0,9186	0,40	-0,3647	0,1576
30.09.2013	0,6015	3,8860	6042,32	4,17	3,8860	4,17	16,1964	17,3712
30.08.2013	0,5790	7,3216	5800,56	7,35	7,3216	7,35	53,7860	53,9669
31.07.2013	0,5395	0,3721	5403,60	2,70	0,3721	2,70	1,0030	7,2656
28.06.2013	0,5375	-4,0179	5261,77	-2,48	-4,0179	-2,48	9,9577	6,1423
31.05.2013	0,5600	-14,1104	5395,49	1,09	-14,1104	1,09	-15,3171	1,1783
30.04.2013	0,6520	-7,2546	5337,55	-5,31	-7,2546	-5,31	38,5528	28,2411
29.03.2013	0,7030	-4,2886	5637,12	-0,30	-4,2886	-0,30	1,2887	0,0903
28.02.2013	0,7345	0,2046	5654,11	3,15	0,2046	3,15	0,6452	9,9408
31.01.2013	0,7330	3,0218	5481,29	6,44	3,0218	6,44	19,4661	41,4982
28.12.2012	0,7115	11,2588	5149,56	7,49	11,2588	7,49	84,2839	56,0410
29.11.2012	0,6395	4,1531	4790,91	-2,73	4,1531	-2,73	-11,3271	7,4386
31.10.2012	0,6140	9,9373	4925,24	4,24	9,9373	4,24	42,0891	17,9391
28.09.2012	0,5585	4,0037	4725,11	-1,82	4,0037	-1,82	-7,3006	3,3249
31.08.2012	0,5370	12,7441	4812,87	2,55	12,7441	2,55	32,4538	6,4851
31.07.2012	0,4763	6,3882	4693,35	3,65	6,3882	3,65	23,3046	13,3083
29.06.2012	0,4477	1,0838	4528,16	-0,86	1,0838	-0,86	-0,9320	0,7396
31.05.2012	0,4429	-40,9073	4567,44	-14,19	-40,9073	-14,19	580,4107	201,3121
30.04.2012	0,7495	5,1192	5322,64	-0,93	5,1192	-0,93	-4,7490	0,8606
30.03.2012	0,7130	0,9200	5372,48	1,88	0,9200	1,88	1,7336	3,5505
29.02.2012	0,7065	13,9516	5273,12	7,88	13,9516	7,88	110,0002	62,1638
31.01.2012	0,6200	9,3474	4887,75	12,70	9,3474	12,70	118,7141	161,2943
30.12.2011	0,5670	9,2486	4336,95	2,16	9,2486	2,16	19,9596	4,6576
30.11.2011	0,5190	15,3333	4245,33	-7,30	15,3333	-7,30	-111,9259	53,2829
28.10.2011	0,4500	2,7397	4579,62	5,84	2,7397	5,84	15,9864	34,0478
30.09.2011	0,4380	-8,7310	4327,13	-9,93	-8,7310	-9,93	86,7223	98,6587
31.08.2011	0,4799	-1,2551	4804,33	-10,12	-1,2551	-10,12	12,6982	102,3526
29.07.2011	0,4860	-5,2632	5345,09	-2,97	-5,2632	-2,97	15,6317	8,8211
30.06.2011	0,5130	-7,4842	5508,7	0,73	-7,4842	0,73	-5,4797	0,5361
31.05.2011	0,5545	-6,0169	5468,66	-7,22	-6,0169	-7,22	43,4487	52,1437
26.04.2011	0,5900	-5,1447	5894,29	-0,58	-5,1447	-0,58	2,9808	0,3357
31.03.2011	0,6220	13,5036	5928,64	1,09	13,5036	1,09	14,7852	1,1988
28.02.2011	0,5480	3,8863	5864,43	3,38	3,8863	3,38	13,1379	11,4285
31.01.2011	0,5275	-2,9439	5672,66	7,67	-2,9439	7,67	-22,5766	58,8136
30.12.2010	0,5435	6,5686	5268,61	3,43	6,5686	3,43	22,5223	11,7565
30.11.2010	0,5100	-12,8205	5093,95	-3,57	-12,8205	-3,57	45,7396	12,7284
29.10.2010	0,5850	0,0000	5282,41	-1,01	0,0000	-1,01	0,0000	1,0180
30.09.2010	0,5850	7,3394	5336,25	5,19	7,3394	5,19	38,0938	26,9389
31.08.2010	0,5450	-3,5398	5072,95	-0,02	-3,5398	-0,02	0,0781	0,0005
30.07.2010	0,5650	19,7034	5074,07	6,96	19,7034	6,96	137,1511	48,4526
30.06.2010	0,4720	-8,3495	4743,86	-3,87	-8,3495	-3,87	32,3471	15,0088
31.05.2010	0,5150	-31,3333	4935,05	-13,21	-31,3333	-13,21	413,9245	174,5135
28.04.2010	0,7500	-12,7907	5686,22	-4,68	-12,7907	-4,68	59,8501	21,8948
31.03.2010	0,8600	2,9940	5965,35	11,95	2,9940	11,95	35,7869	142,8699
26.02.2010	0,8350	6,3694	5328,45	5,19	6,3694	5,19	33,0729	26,9616
29.01.2010	0,7850	15,4412	5065,43	7,99	15,4412	7,99	123,4025	63,8685
24.12.2009	0,6800		4690,57					
		<b>Media(X<sub>med</sub>)</b>		<b>Media(Y<sub>med</sub>)</b>			<b>Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)</b>	<b>Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup></b>
		<b>0,6692</b>		<b>0,8561</b>			<b>2168,7659</b>	<b>1694,9496</b>
							<b>Beta SIF3= Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)/Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup>=2168,7659/1694,9496=1,2795</b>	

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

**Table no. 4 Determination of Beta FIC4**

Date	Closing values FIC4	Variation FIC4(X <sub>t</sub> )	Closing values BET(Y <sub>t</sub> )	Variation BET	X <sub>t</sub> -X <sub>med</sub>	Y <sub>t</sub> -Y <sub>med</sub>	(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
30.12.2013	0,8820	6,1372	6493,79	2,51	5,1740	1,65	8,5319	2,7192
29.11.2013	0,8310	22,2059	6335,09	4,43	22,2059	4,43	98,3876	19,6311
31.10.2013	0,6800	-2,7182	6066,31	0,40	-3,6814	0,40	-1,4616	0,1576
30.09.2013	0,6990	2,2677	6042,32	4,17	2,2677	4,17	9,4517	17,3712
30.08.2013	0,6835	7,2157	5800,56	7,35	7,2157	7,35	53,0080	53,9669
31.07.2013	0,6375	-7,0700	5403,60	2,70	-7,0700	2,70	-19,0570	7,2656
28.06.2013	0,6860	-3,3803	5261,77	-2,48	-3,3803	-2,48	8,3776	6,1423
31.05.2013	0,7100	-3,9242	5395,49	1,09	-3,9242	1,09	-4,2598	1,1783
30.04.2013	0,7390	-16,2132	5337,55	-5,31	-16,2132	-5,31	86,1606	28,2411
29.03.2013	0,8820	-0,2826	5637,12	-0,30	-0,2826	-0,30	0,0849	0,0903
28.02.2013	0,8845	1,4335	5654,11	3,15	1,4335	3,15	4,5196	9,9408
31.01.2013	0,8720	13,2468	5481,29	6,44	13,2468	6,44	85,3344	41,4982
28.12.2012	0,7700	8,4507	5149,56	7,49	8,4507	7,49	63,2624	56,0410
29.11.2012	0,7100	-0,2809	4790,91	-2,73	-0,2809	-2,73	0,7661	7,4386
31.10.2012	0,7120	-1,0424	4925,24	4,24	-1,0424	4,24	-4,4150	17,9391
28.09.2012	0,7195	0,6294	4725,11	-1,82	0,6294	-1,82	-1,1476	3,3249
31.08.2012	0,7150	10,0000	4812,87	2,55	10,0000	2,55	25,4658	6,4851
31.07.2012	0,6500	-9,0909	4693,35	3,65	-9,0909	3,65	-33,1642	13,3083
29.06.2012	0,7150	-8,9172	4528,16	-0,86	-8,9172	-0,86	7,6688	0,7396
31.05.2012	0,7850	3,9735	4567,44	-14,19	3,9735	-14,19	-56,3779	201,3121
30.04.2012	0,7550	4,1379	5322,64	-0,93	4,1379	-0,93	-3,8387	0,8606
30.03.2012	0,7250	-7,7021	5372,48	1,88	-7,7021	1,88	-14,5129	3,5505
29.02.2012	0,7855	19,5586	5273,12	7,88	19,5586	7,88	154,2079	62,1638
31.01.2012	0,6570	15,0613	4887,75	12,70	15,0613	12,70	191,2810	161,2943
30.12.2011	0,5710	5,9369	4336,95	2,16	5,9369	2,16	12,8127	4,6576
30.11.2011	0,5390	7,8000	4245,33	-7,30	7,8000	-7,30	-56,9362	53,2829
31.10.2011	0,5000	-1,9608	4579,62	5,84	-1,9608	5,84	-11,4413	34,0478
30.09.2011	0,5100	-5,2925	4327,13	-9,93	-5,2925	-9,93	52,5686	98,6587
31.08.2011	0,5385	-18,6556	4804,33	-10,12	-18,6556	-10,12	188,7376	102,3526
29.07.2011	0,6620	-3,9884	5345,09	-2,97	-3,9884	-2,97	11,8457	8,8211
30.06.2011	0,6895	-4,1029	5508,7	0,73	-4,1029	0,73	-3,0040	0,5361
31.05.2011	0,7190	-15,2123	5468,66	-7,22	-15,2123	-7,22	109,8486	52,1437
26.04.2011	0,8480	0,3550	5894,29	-0,58	0,3550	-0,58	-0,2057	0,3357
31.03.2011	0,8450	29,7007	5928,64	1,09	29,7007	1,09	32,5195	1,1988
28.02.2011	0,6515	3,7420	5864,43	3,38	3,7420	3,38	12,6503	11,4285
31.01.2011	0,6280	-2,4845	5672,66	7,67	-2,4845	7,67	-19,0534	58,8136
30.12.2010	0,6440	9,1525	5268,61	3,43	9,1525	3,43	31,3820	11,7565
30.11.2010	0,5900	-13,2353	5093,95	-3,57	-13,2353	-3,57	47,2194	12,7284
29.10.2010	0,6800	4,6154	5282,41	-1,01	4,6154	-1,01	-4,6567	1,0180
30.09.2010	0,6500	5,6911	5336,25	5,19	5,6911	5,19	29,5381	26,9389
31.08.2010	0,6150	-2,3810	5072,95	-0,02	-2,3810	-0,02	0,0526	0,0005
30.07.2010	0,6300	5,0000	5074,07	6,96	5,0000	6,96	34,8039	48,4526
30.06.2010	0,6000	-6,2500	4743,86	-3,87	-6,2500	-3,87	24,2133	15,0088
31.05.2010	0,6400	-21,9512	4935,05	-13,21	-21,9512	-13,21	289,9835	174,5135
28.04.2010	0,8200	-9,8901	5686,22	-4,68	-9,8901	-4,68	46,2777	21,8948
31.03.2010	0,9100	7,0588	5965,35	11,95	7,0588	11,95	84,3728	142,8699
26.02.2010	0,8500	6,9182	5328,45	5,19	6,9182	5,19	35,9226	26,9616
29.01.2010	0,7950	11,9718	5065,43	7,99	11,9718	7,99	95,6762	63,8685
24.12.2009	0,7100		4690,57					
		<b>Media(X<sub>med</sub>)</b>		<b>Media(Y<sub>med</sub>)</b>			<b>Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)</b>	<b>Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup></b>
		<b>0,9632</b>		<b>0,8561</b>			<b>1703,4014</b>	<b>1694,9496</b>
		<b>Beta SIF4= Σ(X<sub>t</sub>-X<sub>med</sub>)(Y<sub>t</sub>-Y<sub>med</sub>)/Σ(Y<sub>t</sub>-Y<sub>med</sub>)<sup>2</sup>=1703,4014/1694,9496=1,0049</b>						

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



**Table no. 5 Determination of Beta FIC5**

Date	Closing values FIC5	Variation FIC5 (X <sub>t</sub> )	Closing values BET	Variation BET(Y <sub>t</sub> )	X <sub>t</sub> -X <sub>med</sub>	Y <sub>t</sub> -Y <sub>med</sub>	(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
30.12.2013	1,9840	4,9735	6493,79	2,51	3,3987	1,65	5,6045	2,7192
29.11.2013	1,8900	12,4331	6335,09	4,43	12,4331	4,43	55,0872	19,6311
31.10.2013	1,6810	4,4099	6066,31	0,40	2,8351	0,40	1,1256	0,1576
30.09.2013	1,6100	5,2288	6042,32	4,17	5,2288	4,17	21,7928	17,3712
30.08.2013	1,5300	6,7690	5800,56	7,35	6,7690	7,35	49,7266	53,9669
31.07.2013	1,4330	0,0698	5403,60	2,70	0,0698	2,70	0,1882	7,2656
28.06.2013	1,4320	-0,2786	5261,77	-2,48	-0,2786	-2,48	0,6904	6,1423
31.05.2013	1,4360	5,9779	5395,49	1,09	5,9779	1,09	6,4891	1,1783
30.04.2013	1,3550	-5,9028	5337,55	-5,31	-5,9028	-5,31	31,3688	28,2411
29.03.2013	1,4400	-0,3460	5637,12	-0,30	-0,3460	-0,30	0,1040	0,0903
28.02.2013	1,4450	-3,0201	5654,11	3,15	-3,0201	3,15	-9,5222	9,9408
31.01.2013	1,4900	6,2010	5481,29	6,44	6,2010	6,44	39,9463	41,4982
28.12.2012	1,4030	3,1618	5149,56	7,49	3,1618	7,49	23,6691	56,0410
29.11.2012	1,3600	-4,2254	4790,91	-2,73	-4,2254	-2,73	11,5241	7,4386
31.10.2012	1,4200	2,0115	4925,24	4,24	2,0115	4,24	8,5196	17,9391
28.09.2012	1,3920	2,0528	4725,11	-1,82	2,0528	-1,82	-3,7431	3,3249
31.08.2012	1,3640	10,0000	4812,87	2,55	10,0000	2,55	25,4658	6,4851
31.07.2012	1,2400	10,7143	4693,35	3,65	10,7143	3,65	39,0864	13,3083
29.06.2012	1,1200	7,7960	4528,16	-0,86	7,7960	-0,86	-6,7045	0,7396
31.05.2012	1,0390	-26,0498	4567,44	-14,19	-26,0498	-14,19	369,6065	201,3121
30.04.2012	1,4050	0,3571	5322,64	-0,93	0,3571	-0,93	-0,3313	0,8606
30.03.2012	1,4000	-2,0979	5372,48	1,88	-2,0979	1,88	-3,9530	3,5505
29.02.2012	1,4300	15,4157	5273,12	7,88	15,4157	7,88	121,5433	62,1638
31.01.2012	1,2390	17,2185	4887,75	12,70	17,2185	12,70	218,6784	161,2943
30.12.2011	1,0570	1,5370	4336,95	2,16	1,5370	2,16	3,3174	4,6576
30.11.2011	1,0410	13,3987	4245,33	-7,30	13,3987	-7,30	-97,8039	53,2829
31.10.2011	0,9180	-1,2903	4579,62	5,84	-1,2903	5,84	-7,5291	34,0478
30.09.2011	0,9300	-11,9318	4327,13	-9,93	-11,9318	-9,93	118,5152	98,6587
31.08.2011	1,0560	-20,6015	4804,33	-10,12	-20,6015	-10,12	208,4244	102,3526
29.07.2011	1,3300	-2,9197	5345,09	-2,97	-2,9197	-2,97	8,6716	8,8211
30.06.2011	1,3700	-3,5890	5508,7	0,73	-3,5890	0,73	-2,6278	0,5361
31.05.2011	1,4210	-10,0633	5468,66	-7,22	-10,0633	-7,22	72,6676	52,1437
26.04.2011	1,5800	-4,7045	5894,29	-0,58	-4,7045	-0,58	2,7257	0,3357
31.03.2011	1,6580	13,6395	5928,64	1,09	13,6395	1,09	14,9339	1,1988
28.02.2011	1,4590	8,2344	5864,43	3,38	8,2344	3,38	27,8373	11,4285
31.01.2011	1,3480	6,9841	5672,66	7,67	6,9841	7,67	53,5613	58,8136
30.12.2010	1,2600	0,8000	5268,61	3,43	0,8000	3,43	2,7430	11,7565
30.11.2010	1,2500	-14,9660	5093,95	-3,57	-14,9660	-3,57	53,3940	12,7284
29.10.2010	1,4700	-2,6490	5282,41	-1,01	-2,6490	-1,01	2,6727	1,0180
30.09.2010	1,5100	14,3939	5336,25	5,19	14,3939	5,19	74,7085	26,9389
31.08.2010	1,3200	-0,7519	5072,95	-0,02	-0,7519	-0,02	0,0166	0,0005
30.07.2010	1,3300	12,7119	5074,07	6,96	12,7119	6,96	88,4846	48,4526
30.06.2010	1,1800	2,6087	4743,86	-3,87	2,6087	-3,87	-10,1064	15,0088
31.05.2010	1,1500	-36,4641	4935,05	-13,21	-36,4641	-13,21	481,7036	174,5135
28.04.2010	1,8100	0,0000	5686,22	-4,68	0,0000	-4,68	0,0000	21,8948
31.03.2010	1,8100	13,8365	5965,35	11,95	13,8365	11,95	165,3849	142,8699
26.02.2010	1,5900	3,2468	5328,45	5,19	3,2468	5,19	16,8586	26,9616
29.01.2010	1,5400	21,2598	5065,43	7,99	21,2598	7,99	169,9040	63,8685
24.12.2009	1,2700		4690,57					
		Media(X <sub>med</sub> )		Media(Y <sub>med</sub> )			Σ(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )	Σ(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup>
		1,5748		0,8561			2454,4200	1694,9496
							Beta SIF5= Σ(X <sub>t</sub> -X <sub>med</sub> )(Y <sub>t</sub> -Y <sub>med</sub> )/Σ(Y <sub>t</sub> -Y <sub>med</sub> ) <sup>2</sup> =2454,4200/1694,9496=1,4481	

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

## 5. CONCLUSIONS

Centralizing highlighted results we will obtain the following table:

**Table no. 6 Beta of FICs**

COMPANY	BETA
FIC 1	1.3234
FIC 2	1.2279
FIC 3	1.2795
FIC 4	1.0049
FIC 5	1.4481

Given the theoretical considerations it is observed that  $\beta$  for each of the analyzed shares is  $> 1$  which means that these are more risky than the market average and therefore more volatile, fully proved at the beginning of 2014, when contrary to the market expectations the market capital has not benefited from the „January effect”. However, it is observed that between the FICs titles exists a significant difference, meaning that FIC4 is very close to the average market with a value of 1.0049, while FIC5 is the most volatile with a value of 1.4481.

In fact this was proven in 2013 when we can say that FIC5 was the „star” with an increase in value addition of 41.4% and a dividend yield of 9.3% which has led to the total gain of 50 7%. This was possible due to the fact that 2013 was a good year for investors in the stock exchange with an average increase of the market of over 26%. The other three FICs recorded values between 1.2279 and 1.3234. As we have noted on other occasions „the past is no guarantee of the future”, especially since the beginning of 2014 there was a regulation which directly affects FICs titles and that is, they are allowed to buy amongst them (23 AFS Decision from 05.02.2014). This can generate an increased „volatility” in the future, in the light of the new „rearrangements” of the shareholders of those companies.

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