THE CORRELATION BETWEEN THE MACROECONOMIC VARIABLES AND THE BUCHAREST STOCK EXCHANGE SHARE PRICES

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1. Introduction

Asset prices are commonly believed to react sensitively to economic news. Daily experience seems to support the view that individual asset prices are influenced by a wide variety of unanticipated events and that some events have a more pervasive effect on asset prices than do others.

The Romanian capital market experienced ups and downs since its founding. Currently, Romania is am emerging market. Emerging capital markets are considered to be segments of the global capital markets. Accordingly, it supported the idea that macroeconomic factors are the primary source of local price changes or these markets. The extant literature suggests that a wide range of factors may be relevant. Such variables include goods prices, money supply, exchange rates, interest rates, political risk, oil prices, and the trade sector indices. However, in emerging markets, there is argument that not all of these variables are either relevant or appropriate.

2. Methodology

After the collapse of communist and social regimes at the beginning of 1990s, a number of Central and Eastern Europe (CEE) countries started their journey into capitalism and privatization. The 1989 Revolution, which signified an important turning point in our national history, has imperatively imposed, through the resulting reform programme, the necessity to recover the capital market and its related institutions, including the Bucharest Stock Exchange. A group of specialists in various economic sectors benefited the chance, sometimes asserted as unique in a lifetime, to recover this market, the starting point of this process being represented by year 1992. The recovery process was not easy. Starting with the legislative area two years were necessary until the adoption of Law no. 5 /1994 on transferable securities and stock exchanges accompanied by measures of educating the general public. The process continues today, and all those involve learn every day, that Bucharest Stock Exchange is an essential institution of a market economy, and its presence in the economic landscape provides am additional element to the path that joined the Romanian economy after 1990s.

Generally CEE equity markets have attracted interest of academics due to a number of reasons. First, these markets provide a great possibility to test existing asset pricing models and pricing anomalies in special conditions of evolving markets. Second, in the light of growing interdependencies between world equity markets due to enhanced capital movements, it is interesting to test the extent of which emerging markets are integrated with global markets. Third, since the early 1990s, there have been implemented major economic and financial reforms, resulting in the growing number of new financial instruments. A related question in this respect is whether investors in this market react to news or unexpected changes in economy in a similar fashion as those in advanced market economies. Last, due to the

shocks that may have destabilizing effects on domestic financial markets. Although Romanian equity market has gained so much interest from foreign investors, there have not been so many quality analyses of Romanian equity market.

The market value of all stocks in Russian equity market has changed dramatically, but it is clearly smaller than in other emerging markets. It is generally considered that the equities are undervalued. This indicates problems in Romania's politics, and risks that are included in companies and macroeconomics. Despite of these risks, Romania has also made a strong progress in development of its economy and that has on the other hand raised equity prices. For example the period 2003-2006 when the stock market broke record after record.

The stock market in Romania has been structured from the outset on two distinct components: the Bucharest Stock Exchange an RASDAQ, which subsequently merged into a single market by absorbing RASDAQ by Bucharest Stock Exchange. The evolution of both markets was similar, being clearly influenced by economic developments, especially political. After an excellent start, overlapped to a high-level of policy changes (1996), with a maximum value and traded quotations set in the summer of 1997, followed a large decline in the Romanian market. The end of the year 2000 can be considered the year that marked the evolution of market shares reverse trend. So the exit from the financial crisis of 1999 and the political changes in 2000 were factors that boosted the overall stock market development. The summer of 2001 marked the return of market shares in a rising trend. Between the years 2003-2006 a boom period for the stock market followed. A common element for the period 2003-2004 was the repeated delisting of the stock exchanges companies. In the recent years, there have been a series of events that influenced the stock market, such as: privatization of various companies, the merger of the two exchanges and not least Romania's EU accession. The developments of the Bucharest Stock Exchange in 2007 were marked by foreign investor sentiment changes on the Romanian economy and its development prospects. The year 2008 represented for the Bucharest Stock Exchange and for all the participants one of the most difficult periods in modern history of capital market in Romania. The year 2008 was marked by the abrupt reversal of the upward trend of quotations and by the sensitive reduction of the general liquidity of the stock market. From the economic cycle theory viewpoint, the 2009 trends of the Bucharest Stock Exchange regulated market seem to suggest the end of an 11 years cycle. If the year 2009 would get a distinctive mark, one that would differentiate it from the BVB previous years, this certainly is „the year of fixed income". The domestic stock market developments in 2009 suggest that the domestic capital market is facing a new cycle. There are still many uncertainties about the economic and financial events 2010 and it is therefore difficult to elaborate how the capital market in Romania will grow this year. With a reasonable degree of probability, we could still say that the stock market has finally left behind the multiannual lows reached in 2009, but they will not return in the 2010 to the record levels marked during the peak year of the Romanian capital market – 2007.

Test assets are represented by the 30 companies listed on Bucharest Stock Exchange on the 1st and 2nd category. The macroeconomic factors that are used are the following: inflation, interest rate, unemployment rate, gold price, price index of industrial production, average net earnings and the exchange rate. We will also use the market as a factor.

The data for this study was collected from the monthly bulletins, respectively the annual reports published by the National Bank of Romania (NBR), the Bucharest Stock Exchange (BVB) and the National Institute of Statistics (INS). The observation period is January 2002 – June 2010. All data are calculated on a monthly interval.

3. Empirical results

The descriptive statistics for the 30 companies listed on Bucharest Stock Exchange, during 2002-2010 can be seen in the following table.

Table no. 1. Descriptive statistics for the 30 companies listed on Bucharest Stock Exchange, during 2002-2010

	Observations	Mean	Standard deviation	Skewness	Kurtosis	Jarque-Bera	Kolmogorov-Smirnov
ALR	102	3.64	2.21	1.18	3.74	26.18	1.39
AMO	102	0.04	0.03	0.52	1.93	9.41	1.92
ARM	102	0.40	0.19	0.16	1.85	5.99	1.26
ARS	102	4.96	5.26	1.74	4.98	68.36	2.85
ART	102	9.82	16.10	2.32	7.68	184.27	3.13
ATB	102	0.81	0.60	0.64	1.99	11.23	1.72
AZO	102	0.27	0.12	2.24	9.04	240.39	1.63
BRD	102	10.82	8.27	0.46	1.92	8.63	1.80
BRM	102	1.62	0.95	0.69	2.95	8.05	0.93
CBC	102	6.27	5.36	1.15	3.42	23.17	1.84
CMP	102	0.79	0.59	0.37	1.57	11.01	2.26
ELJ	102	0.31	0.13	0.41	2.45	4.09	1.36
EPT	102	0.29	0.31	2.47	8.75	244.26	3.21
IMP	102	0.49	0.24	0.67	4.11	12.88	1.14
MEF	102	2.54	1.20	0.37	2.54	3.26	0.63
MPN	102	0.36	0.30	7.16	65.57	17511.25	2.60
OIL	102	0.27	0.24	1.82	5.82	89.89	2.64
OLT	102	0.35	0.30	1.62	5.28	66.99	1.67
PEI	102	71.51	51.52	0.61	2.05	10.23	1.85
PPL	102	8.39	9.90	1.93	5.61	92.45	2.94
PTR	102	0.44	0.49	1.81	5.49	81.89	2.63
SCD	102	1.06	2.14	6.99	55.11	12373.64	3.48
SNO	102	6.02	3.95	1.62	5.90	80.57	2.19
SNP	102	0.32	0.17	0.18	1.64	8.40	1.13
SRT	102	0.15	0.18	3.18	14.18	702.73	2.49
STZ	102	0.32	0.22	0.90	3.79	16.30	2.96
TBM	102	0.53	4.31	1.36	3.95	35.48	2.38
TLV	102	0.85	0.50	0.85	3.40	13.04	1.12
UAM	102	0.69	2.25	9.69	96.66	38877.64	4.11
ZIM	102	2.17	1.01	0.09	1.92	5.06	1.50

So it can be observed that every equity has a positive mean excess return, and these values vary between 0.04 and 71.51. However, the riskiness of Romanian equity markets is shown in large standard deviations. In our case, Petrolimportexport (PEI) has standard deviation of 51.52, because its equity price has ranged between 3.3500 – 198 RON in our sample period. Almost every equity has a positive skewness. This implies that equities have had many large positive returns, because the mean is larger than median or mode, and distribution's tail is long to right. Also, it can be observed a very high degree of kurtosis. Bera-Jarque test shows that no equity is normally distributed, and Kolmogorov-Smirnov test showed that the amount of normally distributed equities grows to 2.

Also in Table no. 2 each macroeconomic variable has a positive mean return, and the standard deviation is relatively closed to the mean.

Table no. 2. Descriptive statistics for macroeconomic factors (2002 – 2010)

	Observations	Mean	Standard deviation	Skewness	Kurtosis	Jarque-Bera	Kolmogorov-Smirnov
Gold Price	102	56.98	24.56	1.14	3.66	23.81	1.77
BET-C Index	102	3107.51	1784.60	0.47	2.16	6.67	1.12
Exchange Rate	102	3.69	0.37	-0.22	2.49	1.92	1.12
Interest Rate (%)	102	13.64	7.60	1.19	3.51	25	2.93
Inflation (%)	102	0.70	0.55	1.02	3.98	21.74	1.26
Price Index of Industrial Production	102	107.00	25.83	-0.14	1.84	6.02	1.17
Average Net Earnings	102	882.02	364.65	0.21	1.65	8.53	1.20
Unemployment Rate (%)	102	6.41	2.03	1.20	5.05	42.26	1.10

The factors have both positive and negative skewness. As for the kurtosis, the values show a relatively normal distribution. Bera-Jarque test shows that no factor is normally distributed. Thus, we test normality also with Kolmogorov-Smirnov test that indicates that no factor is normally distributed.

We have also studied the correlations between the macroeconomic factors. Most of the correlations are relatively weak and not significant. This correlation matrix can be found in the next table.

Table no. 3. The Pearson correlation between the macroeconomic factors

	Gold Price	BET-C Index	Exchange Rate	Interest Rate	Inflation	Price Index of Industrial Production	Average Net Earnings	Unemployment Rate
Gold Price	1.000	-	-	-	-	-	-	-
BET-C Index	0.192	1.000	-	-	-	-	-	-
Exchange Rate	0.634	-0.196	1.000	-	-	-	-	-
Interest Rate	-0.609	-0.729	-0.330	1.000	-	-	-	-
Inflation	-0.414	-0.379	-0.264	0.513	1.000	-	-	-
Price Index of Industrial Production	0.881	0.518	0.507	-0.815	-0.523	1.000	-	-
Average Net Earnings	0.903	0.449	0.470	-0.756	-0.477	0.981	1.000	-
Unemployment Rate	-0.255	-0.724	-0.198	0.785	0.394	-0.625	-0.533	1.000

It can also be seen in table no. 4 which are the correlations between the 30 titles and the macroeconomic factors. The data shows that the correlations are relatively weak and not significant. The main correlations are with the market factor, namely BET-C.

Table no.4. The Pearson correlation between the macroeconomic factors and the 30 titles

	Gold Price	BET-C Index	Exchange Rate	Interest Rate	Inflation	Price Index of Industrial Production	Average Net Earnings	Unemployment Rate
ALR	0.031	0.867	-0.457	-0.269	-0.192	0.356	0.297	-0.623
AMO	-0.079	0.779	-0.525	-0.226	-0.232	0.248	0.144	-0.573
ARM	-0.427	0.542	-0.196	-0.163	-0.110	-0.136	-0.273	-0.430
ARS	-0.193	0.740	-0.291	-0.426	-0.050	0.043	0.016	-0.435
ART	0.030	0.806	-0.416	-0.348	-0.099	0.295	0.283	-0.548
ATB	0.173	0.971	-0.688	-0.257	-0.369	0.489	0.433	-0.694
AZO	0.200	0.000	-0.054	0.294	-0.161	0.255	0.198	-0.124
BRD	0.341	0.919	-0.703	-0.171	-0.368	0.592	0.561	-0.625
BRM	-0.413	0.551	-0.196	-0.203	-0.019	-0.155	-0.250	-0.389
CBC	0.153	0.879	-0.561	-0.239	-0.263	0.498	0.459	-0.729
CMP	-0.186	0.795	-0.511	-0.280	-0.204	0.145	0.050	-0.560

ELJ	-0.149	0.729	-0.484	-0.165	-0.292	0.199	0.101	-0.628
EPT	0.047	0.756	-0.404	-0.259	-0.128	0.319	0.292	-0.550
IMP	-0.010	0.529	-0.307	-0.065	-0.121	0.050	0.017	-0.151
MEF	-0.765	-0.282	0.663	-0.277	0.416	-0.763	-0.807	0.356
MPN	0.170	0.409	-0.336	0.119	-0.242	0.351	0.304	-0.418
OIL	0.187	0.827	-0.541	-0.166	-0.169	0.476	0.442	-0.633
OLT	0.164	0.872	-0.578	-0.213	-0.223	0.473	0.433	-0.663
PEI	-0.318	0.548	-0.309	-0.245	-0.203	-0.068	-0.182	-0.354
PPL	-0.378	-0.110	0.113	0.116	0.068	-0.277	-0.356	-0.023
PTR	0.234	0.785	-0.506	-0.179	-0.247	0.473	0.466	-0.577
SCD	0.016	0.443	-0.250	-0.166	-0.082	0.163	0.138	-0.282
SNO	0.170	0.727	-0.501	-0.055	-0.232	0.427	0.392	-0.599
SNP	0.124	0.929	-0.722	-0.167	-0.432	0.442	0.347	-0.682
SRT	-0.349	-0.176	0.353	0.070	0.161	-0.364	-0.393	0.144
STZ	0.288	0.919	-0.682	-0.126	-0.388	0.588	0.529	-0.724
TBM	-0.462	-0.078	0.118	-0.010	0.105	-0.397	-0.478	0.077
TLV	0.624	0.398	-0.607	0.418	-0.401	0.571	0.550	-0.139
UAM	0.076	0.246	-0.145	-0.011	-0.090	0.185	0.162	-0.220
ZIM	-0.186	0.617	-0.264	-0.484	-0.097	0.107	0.062	-0.378

4. Conclusions

Individual asset prices are influenced by a wide range of contingencies and some events have a more significant impact on asset prices than others.

Test assets are represented by the 30 companies listed on Bucharest Stock Exchange on the 1st and 2nd category. The macroeconomic factors that are used are the following: inflation, interest rate, unemployment rate, gold price, price index of industrial production, average net earnings and the exchange rate. We will also use the market as a factor.

It can be observed that every equity has a positive mean excess return, and the riskiness title, in our case, is Petrolimportexport (PEI), with a 51.52 standard deviation and a price fluctuation between 3.3500-198 RON. Almost every equity has a positive skewness, and distribution's tail is long to right. Also, it can be observed a very high degree of kurtosis.

Bera-Jarque test shows that no equity is normally distributed, and Kolmogorov-Smirnov test showed that the amount of normally distributed equities grows to 2.

Regarding the macroeconomic factors, they have a positive mean return, and the standard deviation is relatively closed to the mean. The factors have both positive and negative skewness. As for the kurtosis, the values show a relatively normal distribution. Both Bera-Jarque test and Kolmogorov-Smirnov test shows that no factor is normally distributed.

Finally the correlation between the macroeconomic factors was analyzed, but also the correlation between the factors and the 30 titles that are listed on Bucharest Stock Exchange and it could have been observed that in both cases the correlations are relatively weak and not significant.

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