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Chapter 15

Risk Management on the Romanian Capital Market

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Additional information is available at the end of the chapter

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1. Introduction

The Stock Exchange is a barometer of economic and financial life in any country, an indicator of world business and economic prospects. Its movement is reflected in the stock market indices that express the overall performance of the stock market or just a certain sector, and offers the investors the base of their investment decision on the markets. Therefore, the authors have proposed in this paper to summarize the results of research in order to highlight the most significant issues of the risk management on the Romanian capital market and to provide solutions to them.

The first part highlights the role of stock market indexes in describing the state of the capital market, as well as the difficulties arising on their representation in the current financial and economic crisis. In order to reduce the risk of erroneous information to investors, the authors propose a composite index that summarizes the information from other indexes on the capital market in Romania. Finally, using the Risk Grades method, the authors make a comparative analysis of the risks on the Romanian capital market with those in the Czech Republic, Poland and USA capital markets.

The second part outlines the main classes of risks that arise in the settlement of exchange transactions that dominate in the risk hierarchy of the stock operational management. After highlighting some international regulations on reducing the risk of stock trading settlement, the authors develop a broad range of solutions for reducing these risks on the Bucharest Stock Exchange.

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2. Risk assessment of stock market indexes

2.1. The role of stock market indexes

In the economic literature, the stock exchange is often characterized as being a true "engine" of the economic life, which stimulates business activity and allows the development of large-scale investment projects. Through its existence and operation, the stock markets provide liquidity for financial assets, enabling the sale of securities previously purchased, thus turning them to money. Economic and financial crisis that has monopolized economies worldwide in recent years has had a negative impact on the development of stock markets. Thus, stock prices of large companies listed on stock exchanges fell dramatically, the liquidity of stock markets fell heavily, and on this basis, the transaction volume decreased due to the reduction of interest shown by investors and speculators. Indexes saw an overall decrease and *a distortion of information provided to potential investors because of "interference" occurred in the structure of the companies participating in their training*. By their developments, stock market indices are able to provide clues on the economic outlook whereas in countries with developed financial markets, leading companies have almost without exception status of listed companies. Thus, the indices themselves may be true barometers of economic development or they may be included in the calculation of aggregate economic indicators, with a high degree of complexity.

Expressing the overall performance of stock markets or simply of a sector of the market, indices allow investors to perform analysis on yields of already performed transactions or on investment opportunities that may arise in the future. The existence of indices make the analysis of various stock markets much easier, even if the different methodologies used for calculating the indices affect to some extent the comparisons accuracy [1-3].

On any stock market, the indices are a reference for each investor when assessing the quality of the management portfolio. Due to the fact that in many cases individual performance fail to exceed indices' long-term growth rate, investors and fund managers especially were tempted to build their own portfolios using the precise structure and composition of the indices.

2.2. Critical elements in building and managing indexes

A first issue to be solved when considering the desirability of launching a stock index is if you choose to use a formula in the category of arithmetic or geometric average. Since the use of geometric replication creates difficulties when the stock index would be eligible as underlying for derivatives or as a benchmark for investment fund, managers will prefer to use a formula based on the arithmetic average.

Also, the option to use weights in the calculation of indices involves an analysis of market characteristics to be described by the respective stock market index. The decision to weight the prices which is part of an index is itself a controversial:

- the supporters of the unweighted variant believe that such an index only ensures equal treatment of each stock symbol which is part of an index;

- those who appreciate more weighted index say that the only way to avoid unwanted situation in which the relative change in price of shares issued by a company small in size will influence the stock index as much value as a change in the same type of the share price "Blue Chips".

Another issue that arises is the choice of the weighting factor. In theory there may be various options for the weighting factors, but in practice have won two:

- weighting by market capitalization (or the amount of the outstanding shares);
- weighting the liquidity of the shares that make up a stock index.

In the first case there is a risk that a relatively small number of companies - which have a market capitalization way above the market average - will decide the meaning and scope of developments in practice the whole index. It is a common situation in emerging markets. Therefore, it is often set a maximum level of the share capitalization of a single symbol that can play in the total capitalization of the symbols in the composition of a stock index.

In practice, the liquidity is the most common alternative criterion to using market capitalization as the weighting factor. Attractiveness of the weighted indices to the liquidity lies in the idea that virtually any listed price of a share is a fiction as long as it materializes through a stock transaction. Therefore, prices become relevant only insofar as they are the result of a large number of transactions, which require (at least at first) the use of liquidity as a weighting factor in calculating the indices. The disadvantage of using liquidity as a weighting factor consists, however, in the presence of many differences from one day to another in the number of shares made with a specific symbol, which significantly alter its influence in the evolution of the overall index [4-5].

In principle, a stock index is a tool for measuring aggregate price developments for the symbols which compose it, the sole result of supply-demand ratio of the market and the continuing process of reassessment of the price of each symbol individually [6-8]. Therefore is needed to incorporate the adjustment coefficients in the formula for calculating an index, allowing correction of artificial effects induced by certain events on the trading price of a symbol:

- events which directly affect the trading price of a symbol: the provision of dividends, granting of rights to subscribe.
- events that influence the number of shares taken into account: the change in share capital by increasing / reducing the number of the outstanding shares, split face value, strengthening the nominal value, granting free shares (bonus issues).
- changes in the composition of a stock index: the inclusion of a new symbol, a symbol of exclusion.

Payment of the dividends or issuing of preference rights involves reducing the value of traded shares of a company, unless the subscription rights have value “zero” or negative. When providing payment of dividends and share trading, price decrease is due to reducing the company's value by the amount allocated for dividends, while the rights issue of preference allocation occurs due to the decreased value of the company on a number of shares. These decreases in market value of a share are fully balanced by increasing the same

amount of portfolio investors as a result of amounts received as dividends or the sale of preference rights indices as a result of the above events has the advantage of simplicity, though in practice most indices are adjusted when there are such price changes.

- Assuming that the granting of a certain amount as dividend per share produces a decrease in the share price with the exact amount of the dividend, the adjustment procedure will require adding value to the price of the stock dividend is taken when calculating the indices. Otherwise, you can use an adjustment factor, multiplied by the share price is taken when calculating the index.

In the construction and management of indices there are other critical elements, which primarily aim to adapt to the concrete conditions of the stock market that they are going to describe. One such factor is the choice of a *data base*, which is preferably selected so that it does not belong to a period marked by turbulence or excessive volatility. As a general rule, the base date of an index must be chosen *"in order not to overlap with a minimum or maximum market history"*.

The base value of an index is also an important element in building a stock index. It should be chosen so that the reporting of the current nominal value of an index value based may allow easy calculation of percentage change in that timeframe. Therefore, the most commonly used figures based on an index value are 100 and 1,000 points.

In the case of adjusted indices, selecting a large number of shares to be part of an index basket involves assuming the possibility of relatively frequent cases of adjustment, thus reducing the transparency index. Also, a too extended composition raises serious problems for managers who use index funds as a "benchmark" or which suggest as investment strategy to make investments in securities index.

If an index is used as underlying assets for the development of financial derivatives, its composition becomes more important. It is desirable that the selected symbols, especially those with high weight in the index, have a sufficiently high level of liquidity in order not to influence the price with the idea of obtaining a more favourable settlement value of futures contracts or options. The issue of settlement value of derivatives that are underlying indexes has been addressed and in terms of prices that are taken in calculating its value at the close of trading session. Intuitively, the last price recorded in a day by a certain symbol should generate and last values of stock market index. To avoid forcing the closure of certain levels of price indexes, administrators have considered closing the option that its value is determined either as the average of past values of the index calculated based on average prices in a given period time for each symbol in its composition. This concern for the accuracy of the closing price of the shares and hence the value of stock index led some stocks to decide to introduce at the end of the trading session of the tender period in which prices are determined on a multilateral basis, through a fixing algorithm.

2.3. Improvement of the management of Bucharest Stock Exchange indexes

Through the changes that were made in time upon the methodology of calculation and management of indices, the Bucharest Stock Exchange (BSE) showed that it understands

their importance for the investors and the general public. However, according to the authors, there are still some aspects in the functioning of the indices in the future, as changes might occur, so that the indices calculated by the BSE to increase their representativeness and to become more attractive tools for use as benchmarks in management activity portfolio.

The first change is imposed by the profile described by the historical values of the indices. As it may be seen on Figure 1, joining the five indices calculated by BSE in the same graphic deprives us of any opportunity to make a comparison. This is obviously due to objective factors, as as BET, BET-C, BET-FI, BETXT and BETNG were launched from different basic data. Moreover, the BET and BET-C had worked in a period when inflation was very high and the national currency exchange rate at the time of their release was lower than the current one.

Therefore, it is required the denomination of all the BSE indices, so that on a specific reference date to have the same value for all indices. Bringing all indices at the same amount for a certain date, would open the way for a much easier tracking trends and comparison of their indices and market sectors they represent.

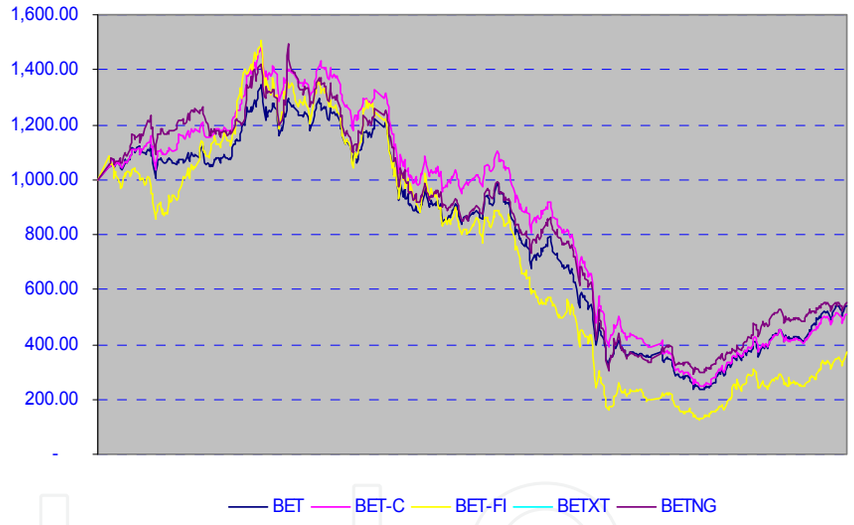


Figure 1. BSE indices (denominated) in January 2007-8 September 2009

To achieve this denomination, an important element consists in determining *the reference date,* which should be the first day of 2007, the day that marked the accession of Romania to the European Union, and thus integration of the regulated market operated by the Bucharest Stock Exchange in the unique European financial market.

Once the indexes are denominated, it appears the following problem consisting in identifying their new *base value*. Since 2 January 2007 had already established that the reference date for two of the indices BSE - BETNG and BETXT – which were then calculated for 1000 points, a value which seems to be the most appropriate and which will greatly ease the adjustment values of Historical BET index, BET-C and BET-FI. Adjusted historical series for these three indices of BSE will be as one that can be quite easily associated with the original series.

Another problem to be solved is to develop a synthetic stock index describing the overall market share in Romania, as the Bucharest Stock Exchange also calculates a number of indices for Rasdaq: RAQ-I, RAQ-II and RASDAQ-C (which is a composite index).

One of the main concerns of a stock market operator is to identify the most effective means by which information about the activities of the regulated market that he manages, reaches the participants, from potential investors or the general public. Indexes are highly effective tools in promoting or communication, and that is why special attention should always be given to their management. Regardless of the methodology used, the scope or the "brand" adopted, the indexes must reflect as closely as the stock market developments in a given period of time, and the investors and the general public should recognize this status. Therefore, we believe that the stock market in Romania would be even discussed whether to outsource the work associated with the major indexes by a specialized international company to calculate and disseminate indexes. Market indexes license is highly specialized, with a relatively small number of participants. Therefore, "rebranding" of BSE indices under the name of one of the leading players in this market (Dow Jones, FTSE or MSCI) it would significantly increase the international exposure of local indexes.

2.4. Construction of a synthetic index for the stock market in Romania

Currently, the shares of the Romanian companies are traded in two distinct market sectors (BSE - regulated market and Rasdaq), with the chance to add another market (alternative trading system). For historical, but also technical reasons, the two market sectors are currently covered by two families of indices:

- **"BET index family",** for the regulated market;
- **"Rasdaq index family"**, for the RASDAQ section.

Therefore, as stated, there is not a single synthetic indicator to describe the evolution of prices in the two market segments. Furthermore, in the "BET index family" there is a composite index, BET-C that does not include in its membership the five SIF symbols. So, even the most comprehensive index of the regulated market does not include the five most liquid stock market symbols, which normally accounts for almost half of the total transactions on the BSE [9].

That is why, it is necessary to create a more comprehensive stock index, which describes the overall evolution of the quotations for all shares traded on markets and market sections administered by the BSE. A possible name for this could be ALL-X, and that structure will be an "index of indices".

Once the objective is defined and the name is established, the next step is to clarify the composition of such an index, so there is no overlap, but at the same time to remain as few "areas" uncovered as well. From the analysis of the five indices of the "BET family" and all three of the "RASDAQ family" it is very clear that the optimal variant is that the composition of ALL-X to enter the next three BSE indices:

BET-C: reflects the price development of all companies listed on regulated market, Category I and Category II, except for the SIFs. BET-C is a price index weighted by market capitalization of companies in its composition. The maximum weight of a symbol in the BET-C composition is 20%

BET-FI: reflects the overall trend in the shares prices issued by the five financial investment companies (SIF) on the regulated market. The maximum weight of a symbol in the composition of the BET-FI is 25%

RASDAQ-C: includes all the shares traded on the "RASDAQ market" and follows the synthesized global trend in prices.

Regarding the topic, the fact that the Rasdaq-C index is calculated at the end of the trading session (and not in real time) also requires that the ALL-X index to be calculated with the same frequency.

Also, the type of formula chosen is relatively simple, since all three indices (I_i) use the arithmetic average. Therefore, the ALL-X index will use the same formula - weighted arithmetic average, as the relative importance of the three indices in the general stock market in Romania is very different, both in terms of market capitalization and liquidity of the shares in their composition. Therefore, it is necessary to use a weighted arithmetic average.

For the price index, the most frequent weighting factors (Pi,t) are either capitalization or liquidity. Since all of the three indexes found in the composition of ALL-X are capitalization-weighted price index, at least apparently the natural alternative is to use the same weighting criteria: capitalization. Moreover, the choice of the capitalization weighting factor ensures that the advantage of not requiring frequent rebalancing for an investor who decides to adopt a passive investment strategy in relation to the ALL-X index.

Through its coverage, the ALL-X index will create replication difficulties. Therefore, in its construction, the focus should be on its descriptive issues and less on the investment. Consequently, it becomes important to find a variant that takes into account the weighting of liquidity, which has the disadvantage that the index can cause daily changes without evidence of membership to undergo changes, or changes in scope than the other induced increases or decreases in the BET-C index, BET-FI and Rasdaq-C. Such a compromise version could be given to the establishment of fixed predetermined weighting factors, which remain unchanged for a defined period of two consecutive data adjustment index ALL-X (one quarter).

In calculating these predetermined weighting factors, both the capitalization and liquidity will be taken into account. The formula for calculating the determining factors will be:

$$Pi,t = \frac{Ui + Vi}{2} \tag{1}$$

where:

Ui is the weight that the capitalization of the symbols within I_i index holds in the total capitalization of the market, at the time of reference;

Vi is the weight that the value of transactions with the symbols of the I_i index holds in the total market turnover in the reference period (quarterly).

To ensure a unified form to display all BSE indices, will opt for the next version of the equivalent representation:

$$(\text{ALL-X})_T = (\text{ALL-X})_{T-1} x \frac{\sum_{i=1,N} p_{i,T} \times I_{i,T}}{\sum_{i=1,N} p_{i,T} \times I_{i,T-1}} \quad (2)$$

where:

Pt,i: weighting factor at time T, associated with each index in the composition of ALL-X;
Ii,t: ALL-X indices, at time T (BET-C, BET-FI, Rasdaq-C).

To ensure the possibility to compare the new ALL-X index with the main stock market index, BET, the start value will be 2901.10 points and the start date will be fixed for 31.12.2008. The calculation of the weighting factor, Pi,t, will be done quarterly, on the last trading day of the final month of the quarter, and will enter into force on the first trading session of the next quarter [10].

The main advantage of building the index ALL-X is that it can be obtained a simple and effective tool to provide an overview of the entire stock market development in Romania. The index is limited to the evolution of shares issued by the Romanian companies, while any direct influence induced by the prices movement of foreign securities admitted to trading on domestic capital market was being removed from the beginning.

In the presented form, ALL-X index is defined primarily as a descriptive index and less like an investment. This deficiency can be corrected later, to the extent that the BSE will decide to use the same calculation methodology for all its indices, regardless of the section or market segment that is addressed: regulated market, Rasdaq market or alternative trading system. Moreover, in order to emphasize the character of investment, it will be necessary to modify the weighting factor (which may become the capitalization of each index), as well as the dates when its new value is calculated and effective.

To calculate the ALL-X index values retrospectively, after the release date was determined (December 31, 2008) and the reference value at that time (2901.10 points), the first step is to determine the Ui and Vi factors for the first quarterly interval (January-March 2009). To this end it will determine:

- capitalization associated to the symbols in the composition of the BET-C index, BET-FI and Rasdaq-C on the last trading sessions of December 2008, March 2009, June 2009, September 2009 December 2009, March 2010, June 2010, September 2010 and December 2010 (RON);

Date	BET-C	BET-FI	Rasdaq-C
23-Dec-08	25,441,147,900	1,715,098,084	12,099,865,129
31-Mar-09	20,494,699,824	1,473,851,929	11,799,297,770
30-Jun-09	28,577,557,323	2,276,366,573	12,359,818,473
30-Sep-09	35,329,737,297	3,454,691,266	12,868,187,477
24-Dec-09	35,313,895,995	3,264,425,651	12,346,442,408
31-Mar-10	46,106,028,659	4,391,516,633	14,104,548,987
30-Jun-10	36,894,347,800	2,715,614,092	11,065,581,044
30-Sep-10	41,488,093,266	3,282,932,587	11,556,865,887
30-Dec-10	41,901,691,868	3,004,035,475	10,832,645,290

Table 1. Capitalization associated to the symbols in the composition of the BSE indices

- liquidity (total amount in RON) associated to the symbols in the composition of the BET-C index, BET-FI and Rasdaq-C in Quarter IV 2008, Quarter I 2009, Quarter II 2009, Quarter III 2009, Quarter IV 2009, Quarter I 2010, Quarter II 2010, Quarter III 2010 and Quarter IV 2010 (RON).

Period	BET-C	BET-FI	Rasdaq-C
Oct - Dec 2009	435,647,850.34	468,296,885.00	186,402,641.20
Ian - Mar 2009	423,175,985.74	203,780,032.70	86,885,606.44
Apr - Jun 2009	668,823,417.53	658,946,311.40	102,202,564.63
Jul - Sep 2009	600,539,594.05	728,518,117.60	94,069,608.81
Oct - Dec 2009	485,044,466.85	691,750,042.50	113,518,426.21
Jan - Mar 2010	691,952,816.70	735,425,007.50	148,602,226.21
Apr - Jun 2010	695,515,698.95	1,039,348,556.50	130,801,236.36
Jul - Sep 2010	331,670,219.85	407,212,194.50	57,407,872.87
Oct - Dec 2010	352,178,129.60	304,259,023.50	87,486,365.49

Table 2. Liquidity associated to the symbols in the composition of the BSE indices

Based on the data presented in the previous tables, we will calculate the following elements:

- weights associated with each index in the total capitalization for each final quarter;

Period	BET-C	BET-FI	Rasdaq-C
Jan - Mar 2009	64.81	hicag30.82	30.82
Apr - Jun 2009	60.69	4.36	34.94
Jul - Sep 2009	66.13	5.27	28.60
Oct - Dec 2009	68.40	6.69	24.91
Jan - Mar 2010	69.35	6.41	24.24
Apr - Jun 2010	71.37	6.80	21.83
Jul - Sep 2010	72.81	5.36	21.84
Oct - Dec 2010	73.65	5.83	20.52

Table 3. Weights associated to the BSE indices in total capitalization (%)

- weights associated with each index in the total liquidity for each quarter;

Period	BET-C	BET-FI	Rasdaq-C
Ian - Mar 2009	39.95	42.95	17.10
Apr - Jun 2009	59.28	28.55	12.17
Jul - Sep 2009	46.77	46.08	7.15
Oct - Dec 2009	42.20	51.19	6.61
Jan - Mar 2010	37.59	53.61	8.80
Apr - Jun 2010	37.28	55.71	7.01
Jul - Sep 2010	41.65	51.14	7.21
Oct - Dec 2010	47.34	40.90	11.76

Table 4. Weights associated to the BSE indices in total liquidity (%)

Once the weights are determined, it will be necessary to calculate the weighting factors in the composition of each ALL-X index for each quarter:

Period	BET-C			BET-FI			Rasdaq-C		
	Ui	Vi	**Pi**	Ui	Vi	**Pi**	Ui	Vi	**Pi**
Ian - Mar 2009	0.6481	0.3995	**0.5238**	0.0437	0.4295	**0.2366**	0.3082	0.1710	**0.2396**
Apr - Jun 2009	0.6069	0.5928	**0.5999**	0.0436	0.2855	**0.1646**	0.3494	0.1217	**0.2356**
Jul - Sep 2009	0.6613	0.4677	**0.5645**	0.0527	0.4608	**0.2567**	0.2860	0.0715	**0.1787**
Oct - Dec 2009	0.6840	0.4220	**0.5530**	0.0669	0.5119	**0.2894**	0.2491	0.0661	**0.1576**
Ian - Mar 2010	0.6935	0.3759	**0.5347**	0.0641	0.5361	**0.3001**	0.2424	0.0880	**0.1652**
Apr - Jun 2010	0.7137	0.4391	**0.5764**	0.0680	0.4666	**0.2673**	0.2183	0.0943	**0.1563**
Jul - Sep 2010	0.7281	0.3728	**0.5504**	0.0536	0.5571	**0.3053**	0.2184	0.0701	**0.1442**
Oct - Dec 2010	0.7365	0.4165	**0.5765**	0.0583	0.5114	**0.2848**	0.2052	0.0721	**0.1386**

Table 5. Weighting factors Pi,t



Figure 2. Evolution of the ALL-X index vs. Evolution of BET index (Jan. 2009 – Dec. 2010)

The biggest weight in the ALL-X index is given by the BET-C composite index. The values of Pi,t associated with the BET-C for the full period 2009-2010 ranged between 0.5 and 0.6 percent.

2.5. Risk assessment indices

Stock markets investors constantly face several risks, which is why researchers have focused their concerns on issues related to developing risk management improved models of assessment and management. Among the latest methods used in economic practice in assessing risk in financial markets the method *Value at Risc (VaR)* is required [11].

Risk Grades indicator provides a synthetic image of the risk associated with a certain financial security, a portfolio or an index. This new way of measuring volatility is based on exactly the same data and analysis as VaR, while making it possible to translate the Risk Grades estimates in terms of VaR. Furthermore, Risk Grades methodology is intended to be more intuitive and easier to use than VaR. The characteristics of the Risk Grades are:

- It is a dynamic method of measurement that adjusts to the market conditions
- Allows comparison between different investment classes, regions and different areas, is a standardized method of measuring volatility
- Allows comparison of different market indices.

The Risk Grades formula for the financial asset *i* is:

$$RiskGrades_{(i)} = \frac{\sigma_i}{\sigma_{base}} x100 \tag{3}$$

where: σ_i the volatility of the financial asset *"i"*
σbase the base volatility

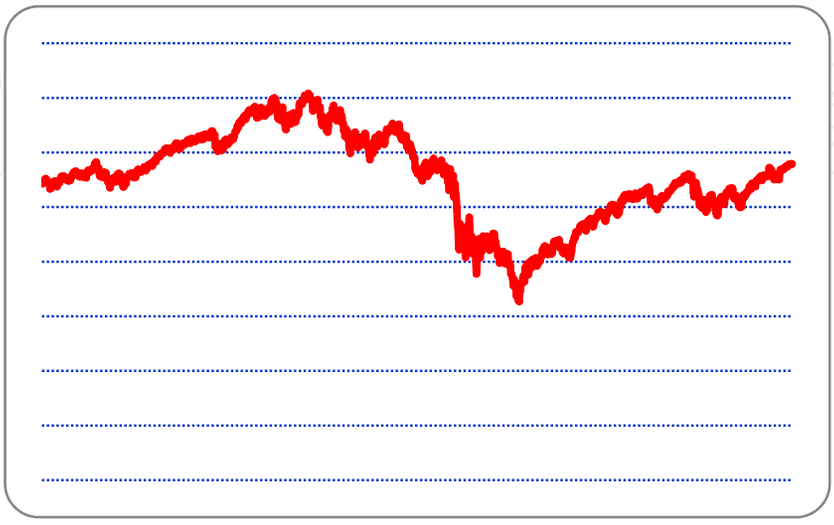


Figure 3. Evolution of DJIA between 1 Jan 2006 – 30 Dec. 2010

To determine the Risk Grades values associated to the main indices calculated by the BSE (BET, BET-FI, BET-C) it will be considered a decay factor $\lambda = 0.98$, which corresponds to a minimum number of records n = ln (0.1)/ln (λ) of 113. The series of values for indexes is 1 January 2008 to 30 December 2010 and the index used as reference for determining the Dow Jones Industrial Average (DJIA) is σ_{base}.

We can notice in the above chart the negative effects of the financial crisis that occurred on the DJIA mainly by early 2009, when the North American stock market indexes registered multi-minimum (on 9 March 2009, the DJIA was calculated for 6547 points). Choosing the interval 1 January 2009 to 30 Dec.2010 for the series of values Risk Grades indices used in the calculation took into account to cover both a pronounced downward trend of the DJIA index and an increasing trend after March 9 2009.

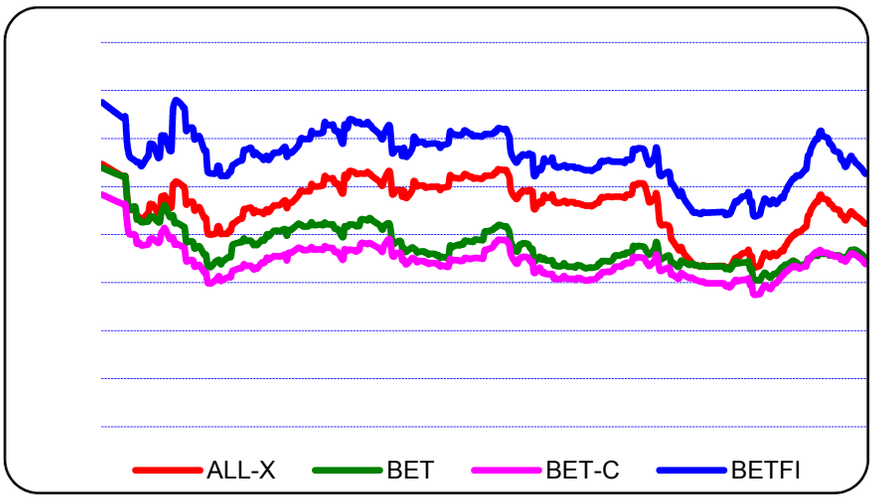


Figure 4. Risk Grades values for BSE indexes between 21 May 2009 - 30 Dec.2010

The Risk Grades values determined for the BSE indexes confirms that the Romanian capital market is riskier than the North American capital market. Besides that, as one can notice from the above chart, the Risk Grades values of the ALL-X index are consistently positioned below the BET-FI sector index and above the associated BET and BET-C.

If decay factor $\lambda = 0{,}96$ was chosen, the minimum number of records that we need is 228, sufficient for our purpose, consisting in comparing the risk associated with the capital market in Romania with those determined for other international stock markets or within the region.

In order to make a comparative analysis of the risks on the Romanian capital market and the main indexes of the Central and Eastern Europe we took into consideration the main indexes of Poland and the Czech Republic capital markets, meaning the WIG20 and the PX.

The **WIG20** index is the underlying instrument for futures transactions listed on the Warsaw Stock Exchange and represents a modified capitalization-weighted index of 20 Polish stocks which are listed on the main market. The base value was set to 1000 points in April 16th 1994. The WIG20 index may not include more than 5 companies from a single exchange sector

and limits the maximum weight of one symbol included in the WIG20 to 15%. Currently, the most important companies included in the WIG20 index are PKO BP, KGHM, DAM and Bank Pekao.

The **PX Index** is an index of major stocks that trade on the Prague Stock Exchange. The 5th of April 1994 was selected as the starting exchange day (a benchmark date) for the Index PX 50 and its opening value was fixed at 1,000 points. At this time the index included 50 companies traded on the Prague Stock Exchange, accordingly named PX 50. In 20 March 2006 the PX 50 index was merged with PX-D into the PX index, having now 14 symbols of the Prague stock market in its composition. The maximum weight for a stock symbol included in PX was set to 20% and from the companies included in the PX index the most important are CEZ, Comercni Banka, Erste Group Bank and Telefonika.



Figure 5. Risk Grades values for the main indexes in the region between 21 May 2009 - 30 Dec.2010

When comparing the Risk Grades values of WIG20 index of the Warsaw Stock Exchange and of PX index of the Prague Stock Exchange with those of the Romanian Stock Exchange (see figure 5), we reach a surprisingly conclusion, that the Risk Grades values calculated for the main indexes in the Central and Eastern Europe do not show major differences. Although constantly the Risk Grades values are above those associated with the WIG20 and PX index, the difference is very small [12].

3. Risk management in settlement of stock transactions

3.1. Clearing and settlement of stock market transactions

The risks managed by Institutions such as market operators, clearing houses and central depositories are not less important, but are maybe less visible to the public.

It is known that stock market transactions are followed by a mutual transfer of ownership from seller to buyer, and the amount of money equivalent, from buyer to seller. Clearing

and settlement take into account that transfers of financial instruments and financial funds between parties are to be performed safely and with little cost.

To prevent and to reduce the risks specific to the settlement of financial instruments transactions, direct access to clearing and settlement system is limited to those participants who meet a set of capitalization criteria, operational capacity and professional experience, which means that the settlement of an exchange transaction involves a given number of financial intermediaries. The more financial intermediaries are involved in the settlement of financial instruments transactions, the more complex is the settlement process.

3.1.1. Clearing and settlement stages

Clearing and settlement process begins immediately after a transaction with financial instruments is closed and goes through the following main steps:

- **Confirming** the terms in which the deal was closed between the buyer and seller. Confirmation of transactions can be conducted directly between parties or using a system that generates such an acknowledgment. In the latter case, the terms of the transaction can be transmitted to the central system or automatically by the trading system, or separately by each party. Although apparently it is just a formality, confirmation of transactions is a significant milestone in the process of completing a stock transaction, since it can identify in due time differences that may affect the proper functioning of the system.
- **Compensation** is an algorithm of obligations and / or rights accrued to the participant, after transactions were inserted in the system and confirmed. Usually, the calculation of obligations and rights of a participant can be made on a gross basis for the settlement of transactions, based on a bilateral net or multilateral net basis. Therefore, the calculation algorithm can result in one or more instructions to participants in the system that have to be respected. Only in the case of net multilateral compensation, the calculation algorithm results for each participant in only one instruction, that expresses (cash settlement level) either the obligation/ write to pay/ receive a certain amount.
- The settlement itself, which is composed of:
  - **obligation to deliver securities:** falls to the seller that is part of a transaction or to the participant in the settlement that is in the position of a net debtor for a particular security;
  - **obligation to pay an equivalent amount:** falls to the buyer that is part of transaction or to the participant in the settlement with a debtor net quality in respect to financial funds.

The last stages of the settlement imply the highest financial risk throughout the process of finalizing exchange transactions, one of the main criteria that measures the performance of a clearing system and securities settlement transactions refers to the method the connection between the mechanism of transfer of securities (obligation to deliver) and transfer mechanism of funds (payment required) is made. The systems within which the permanent transfer of securities are to take place, subject to an exchange transaction, only if the final and irrevocable payment of amounts is made, fulfilling one of the main conditions to measure performance:

delivery versus payment (Delivery Versus Payment - DVP). By using mechanisms that ensure DVP, one eliminates the most important component of all financial risks that accompany the settlement of transactions with financial instruments**: principal risk.**

3.2. Risks in clearing and settlement systems

As presented before, between the moment a transaction with financial instruments is closed and the ownership transfer certain stages are to be completed in a given time frame. The following risks are present and occur:

CREDIT RISK, implies the possibility that one side of a transaction might not honor its obligations, or after maturity, in whole or in part. Types of credit risk:

- **Principal risk**: is a consequence of time the difference between payment and delivery of securities as part of an exchange transaction. In case bankruptcy occurs between the two moments or insolvency of one parties involved in the settlement of that transaction, it is possible for one party to incur a loss equal to the transaction left unsettled. If such a risk occurs, the buyer might find itself in the position of having the financial securities acquired through market transactions paid, while the counterparty is no longer able to deliver those securities. The risk of the principal, from the perspective of the seller is described by the situation in which financial instruments have been delivered, but the buyer no longer has the opportunity to order the payment to the seller.
- **Replacement Cost Risk:** refers to a situation where before a final settlement between the parties involved in securities transaction may not be able to complete the initial negotiated market transaction settlement, thus requiring a replacement of that transaction. Thus, parties' involved in a transaction are equally exposed to loss due to the price change of the security that was object of the original transaction, the time interval between the time the original transaction (but not settled) and the transaction time for the replacing one. The buyer involved in a transaction takes over the risk associated with the replacement cost if the initial price of the transaction performed with a particular security is below the market price of that financial instrument once the transaction shall take place. Looking at the situation from the seller's point of view, the same type of risk occurs when the transaction replacement loss is concluded at a price lower than that of the original transaction. The size of the losses due to the risk associated with the replacement of a stock transaction is directly proportional to the volatility of the securities that were part of the original transaction and with the time between the date of completion of the transaction and the time of the final settlement. The shorter this time frame is, the lower the probability for the risk to materialize.

LIQUIDITY RISK refers to the situation where the seller of certain financial securities does not receive on the settlement date the amount from the buyer and thus he finds himself in a position to borrow or sell other financial assets to honor at its turn various other obligations assumed in view of collecting amounts from the original sale of securities. Liquidity risk arises in the case of the buyer as well if upon settlement it does not receive the securities purchased that were possibly involved in a transaction following the initial sale. The size of

the liquidity risk is inversely proportional to market liquidity: the more liquid the market is, the lower the liquidity risk costs are. Liquidity problems have a high potential to have negative influences on the entire settlement system, especially when occurring amid high volatility of shares market and any delay in completion of the settlement by a participant thus raising concerns about solvency.

SYSTEMIC RISK refers to cascade spreading of a situation when settlement is impossible, from one participant to the clearing - settlement system to other members in the system (or all participants in the system). Institutions that operate clearing and settlement of exchange transactions are required to provide mechanisms and procedures to prevent expansion of liquidity or solvency problems from one participant to the whole system. Investor confidence in post-transaction systems is essential for liquidity growth of the stock market and is a prerequisite to entering a virtuous circle: a more liquid market significantly reduces the impact of risks that may arise in clearing and settlement system, which is reflected in increased market liquidity.

OPERATIONAL RISK implies that defective processing of transactions by participants in a settlement system, failure of transactions, fraud, disruption of communications or any other operating problems turn into financial losses.

Depending on the structure of clearing - settlement systems and transaction type, there might also be other risk categories, such as bankruptcy risks of the settlement bank, legal risk or custody risk. The probability that one or other of the above risks could materialize depends substantially on the following two main factors:

- implementation of strict procedures to control risks in the clearing and settlement of securities transactions, procedures known collectively as "risk management";
- operation plan of the clearing and settlement system of transactions with financial instruments.

3.3. Recommendations on the clearing and settlement systems to reduce risks

Materialization of risks in clearing and settlement operations may have significant negative influences on a country's entire financial system [13].

Moreover, given the internationalization of financial flows, where some of the affected participants in a clearing and settlement system operate simultaneously in multiple markets or operational links exist between two or more national clearing and settlement systems, this may cause contamination and spread of local problems internationally. Thus a set of recommendations was elaborated by specialized international institutions.

3.3.1. G30 recommendations

"G30 Recommendations" consists of a set of nine recommendations that should be implemented by all settlement systems:

- Confirmation of all transactions must be achieved by all direct participants in the market (for example: brokers/ brokers/dealers and other members) in T+0. Details of all confirmed transactions must be transmitted to clearing – settlement system.
- Indirect market participants (e.g. institutional investors) should be informed on the implementation details of transactions in T +1.
- Every country should have an operational central securities depository, organized and managed so as to encourage activity of the direct and indirect market participants. The range of financial instruments eligible to be registered in the central depository must be broad. Preserving or dematerializing financial instruments should be as extensive as possible. If on the same market there are several depositors, they should operate on the basis of compatible rules and practices, in order to reduce settlement risk and to allow use of funds and make available any financial securities pledged as collateral in an efficient manner.
- Each market should be encouraged to reduce settlement risk by introducing "gross settlement in real time" mechanisms (Real Time Gross Settlement - RTGS) or by using compensation based on transactions that meet Lamfalussy recommendations.
- DVP system should be used as a method of settlement for all transactions. DVP is defined as "simultaneous dismissal, final, irrevocable and immediate securities and funds continuously throughout the day."
- Payments related to settlement of securities transactions and using a financial instrument portfolio should target all markets and financial instruments, the adoption of the "Same day fund" Convention.
- A single cycle of implementation of the settlement should be adopted for all markets. Final settlement for all transactions should be made no later than T +3.
- Loans of financial instruments should be encouraged as a method of developing financial instruments transactions settlement. Barriers and taxes that limit loan of financial instruments should be removed.

Each country should develop a standard for messages related to financial instruments based on ISO Standard 7775. In particular, each country should adopt the ISIN coding system for securities, as specified in ISO Standard 6166.

3.3.2. CPSS – IOSCO recommendations

CPSS (Committee on Payment and Settlement Systems) - IOSCO (International Organization of Securities Commissions) recommendations, completed in 2001, take and develop provisions of G30 recommendations, adapting them to the important changes occurring in the securities industry in recent years, but adding new ones.

1. The legal system: the settlement of transactions with financial instruments must have a solid legal framework, clear and transparent.
2. Confirming transactions: Confirming transactions between direct market participants should be completed as soon as possible after the time transactions are executed, but not later than the end of the trading day (T +0). When it is necessary to confirm the

transaction by indirect market participants (such as for institutional investors or global custodians), it must take place as soon as possible after execution of the transaction, preferably "T 0", but not later the "T +1".

3. The settlement cycle: settlement transactions mechanisms must adopt the system by which the value date is set after a specified number of days from trade date ("rolling settlement system"). Final settlement must be made no later than "T +3". Costs and benefits of a shorter settlement cycle than "T +3" should be carefully evaluated.
4. Central counterparty (CCP): costs and benefits of central counterparty mechanism should be evaluated. The introduction of this mechanism should always be accompanied by control of risk assumed by the institution which provides central counterparty services.
5. Loan instruments: lending of financial instruments (REPO contracts or other equivalent transactions) should be encouraged to streamline the process of settlement of transactions. Barriers that inhibit the use of loan activities for this purpose should be eliminated.
6. Central Depository (CSD): Preserving or dematerializing of securities and their transfer through electronic registration account must be used as widely as possible.
7. Delivery versus payment (DVP): CSDs should eliminate principal risk by linking the transfer of financial instruments and transfer of equivalent financial funds so as to achieve delivery against payment (DVP).
8. Complete Settlement: Completion settlement must take place no later than the end date of settlement. Successful settlement on the basis of a real-time settlement mechanism should be considered.
9. Risk control: CSD providing credit facilities to participants, including CSDs that operate net settlement systems, should establish control of risks, ensuring at least successful settlement if the participant with the largest payment obligation can settle the payment. The best way to control risks involves the adoption of a set of measures that combine the use of collateral to limit exposure.
10. Settlement money: Assets used for last payment obligation securities transactions should carry little risk or not be at all affected by credit risk or liquidity risk. If settlement scheme does not involve any use of central bank resources, measures should be taken to protect settlement system members of potential losses and liquidity constraints that may occur due to risk cash settlement agent used to complete transactions with financial instruments.
11. Operational Safety: Sources of operational risk arising in the clearing and settlement should be identified and minimized by adopting an appropriate architecture for the system, through control and adoption of specific procedures. Systems must be safe and have adequate capacity. Action plans and emergency back-up should allow recovery of data and timely completion of settlement.
12. Protect investors' portfolio: Entities that have custody of financial instruments must use specific procedures to ensure full protection of investors' portfolio. It is essential to have investors' portfolios protected from creditors' claims on the entity that retains custody of financial instruments.
13. Access: CSDs and CCPs should have objective and transparent criteria established for participants, allowing fair and open access to the system.

14. Efficiency: Without affecting operations safety, securities settlement systems should ensure efficiency in terms of costs incurred by participants.
15. Communication standards and procedures: settlement systems securities transactions must use or adopt procedures and standards to facilitate communication to facilitate efficient cross-border transactions. Providing conditions for all participants to communicate in a fast, safe and clear manner is of the outmost importance for the functioning of clearing and settlement systems. It is therefore recommended for all participants in the system to know and to use standard procedures in relation to the messages content, securities identification or other participants. In cross-border transactions is advisable to use international standards: ISO 6166 and ISO15022.
16. Transparency: CSDs and CCPs should provide participants enough information for them to identify and evaluate risks and costs of using services provided by the central depository and central counterparty.
17. Supervision: settlement systems securities transactions should be subject to transparent and effective supervision. Central banks and capital market supervisory authorities must work together or with other authorities with competence in the field.
18. Risks associated with trans-border connections between central securities depositories. The CSD that establish inter-connections with another CSD to make cross-border transactions must design and operate such connections so as to reduce specific risks of cross-border settlements. Cross-border transactions carry most of and the most complex risks that you may encounter when conducting capital market investments. Besides, the costs of performing such transactions are not reduced. To reduce risks and costs involved in carrying out cross-border transactions of financial instruments that otherwise would be borne solely by investors; institutions responsible for the successful settlement of the different countries were involved in establishing relationships to facilitate these operations. Achieving inter-connections between different systems operated by Central Depository make life easier for cross-border investors, but involves close monitoring of such risks if transferred from investors to administrators of clearing and settlement systems.

3.4. Risk management of settlement transactions at the Bucharest Stock Exchange

The services traditionally offered by stock exchanges refer to admission to the stock exchange of the issuing companies, establishing criteria for maintaining a particular security traded, disseminating for the public such stock exchange market information, especially for ensuring mechanisms to concentrate liquidity for a particular security. But continuously exchanges were directly interested in the whole building technical and institutional infrastructure to ensure safe completion and cost of transactions traded on the stock market. Therefore, some scholarships have created their own departments through which to work out the full range of post trading: clearing, settlement and registration. This was the case with the Bucharest Stock Exchange, which since the resumption of operations (in 1995) has provided all operators on the stock market clearing and settlement services [14].

For settlement of stock exchange transactions, BSE chose from the beginning a variant of Model 2 settlement, which requires multilateral clearing and final settlement of funds applied

to the net basis, followed by settlement of securities traded, settlement being applied to the gross. The modular structure of the electronic system of BSE that includes trading module, clearing and settlement module and registry module allowed real-time interaction between each of these components, which provided a minimum exposure of the system to operational risk. The settlement cycle used in the stock market in Romania is "T +3" and the final settlement of funds is performed in a separate section of the national payment system (ReGIS), BSE being authorized by the NBR as a inter-banking clearing house since June 9, 1997.

This brief presentation of the clearing and settlement of BSE is only an overview of its main features without revealing all relations established between participants on the stock market from the moment the transaction was closed on the exchange floor until settlement, meaning until the buyer settles all payment obligation according to the contract and the obligation to deliver the securities according to the contract stipulations, accrued to the buyer. To facilitate understanding of information flow that constitutes the transaction settlement system on the BSE it is useful to first review the following terms:

- **Trading Report:** is that statement issued by BSE with terms and conditions of sale contracts of financial instruments concluded on the Exchange floor at a certain date, called the trade date;
- **Compensation Report:** is that document issued by BSE reflecting financial obligations and rights of company's financial instruments or custodian agent resulting from the transaction;
- **Report of Settlement:** is that document issued by the Bucharest Stock Exchange outlining duties and the pay of brokers or custodian agent, resulting from clearing transactions;
- **Settlement Banking Report:** is that document issued by the Bucharest Stock Exchange based on the settlement report that outlines the duties and financial rights of each participating bank and brokers that have an open settlement bank account;
- **Balance for final settlement:** the document issued by the Bucharest Stock Exchange, upon which BSE is entitled to introduce in ReGIS the payment instructions for settlement to be applied to the net basis.

3.4.1. Participants in the clearing and settlement system

Bucharest Stock Exchange is at the heart of the whole system of securities transactions settlement concluded on the stock market, interacting with each of the participants in the system:

- **intermediaries**: are financial investment companies (SSIF) and credit institutions that have the right to trade on the BSE;
- **custodian agencies registered with BSE**;
- **clearing participants:** banks are authorized by the National Bank as credit institutions, that have a settlement contract with BSE, ReGIS participation contract and a set up and enforce securities agreement with NBR. Intermediaries have opened settlement accounts for exchange transactions at the level of the clearing participants.

- **National Bank of Romania**, which is the administrator of the Settlement Express Transfer (ReGIS) system within which the clearing participants hold settlement accounts and participate in the financial settlement transactions of securities concluded with BSE.

3.4.2. Settlement mechanism

Information flow and all the activities leading to successful settlement is achieved over three days (T +3). Presented sequentially, the process is done through the following steps:

1. After the trading session is closed, the Stock Exchange prepares the Compensation Report and the Settlement Report related to securities transactions executed by each intermediary. Intermediaries and custodians registered with BSE agents are required to confirm the next day, the contents of clearing and settlement reports.
2. BSE will issue and send by fax with delivery receipt or secured e-mail to the clearing participants (settlement banks) all bank settlement reports.
3. Participants in the clearing and settlement system managed by BSE are required to check the reports taken from BSE system. If participants in the clearing and settlement system managed by BSE object to the reports, they will communicate this in writing to BSE. After complaints are settled by BSE staff and reports are amended by BSE, documents and operations resume the circuit described above and the brokers modified reports, custodians and that participants will be forwarded by the BSE in the same day. If no objections are raised regarding the data presented in the reports provided by BSE, these are considered to be confirmed.
4. On transaction settlement date (T+3), debtor clearing participants will confirm BSE their consent to participate in the settlement, according to the amounts recorded in the Bank Settlement Report, by fax with delivery note or secured e-mail system. Also, participants will set up deposits equal to the net amount to be paid, in ReGIS in favour of BSE.
5. Based on the final Settlement Balance, BSE will initiate the payment instruction to settle all net positions.
6. National Bank will confirm to Bucharest Stock Exchange that final settlement was concluded by sending the document "Settlement report of net positions".
7. After payment confirmation is received, BSE will transfer financial instruments from the sellers' accounts to the buyers, according to the concluded transactions. This will be accompanied by sending a message confirming to all clearing participants that settlement transaction was closed.

Workflow described above is one in which all intermediaries and settlement system clearing participants honor their obligations that arise from the exchange transactions. Efficiency of clearing and settlement system is checked, but especially when during the settlement cycles a situation where one (or more) of the participants in the system cannot fulfil obligations. To prevent such situations and to solve them when they manifest, clearing and settlement system of the BSE has established a risk management mechanism.

3.4.3. Risk management

Risks that can disrupt the transactions settlement flow have been identified both at the level of the brokers and custodian (first layer) and the clearing participants (second floor). Consequently, risk management measures are structured on two levels:

- Risk management measures managed exclusively by BSE;
- Risk management measures managed together with NBR.

The main instruments to manage risk, available to BSE are the following:

1. In order to limit default exposure on brokers' obligations, BSE sets through procedures a trading limit for each broker.
2. To limit exposure in case of no payment, BSE ask from clearing participants and brokers to give priority to clearing and disbursement of amounts necessary to cover their debit positions.
3. If it is found that upon settlement date, the participant to the clearing and settlement system managed by BSE has limited solvability to cover payment obligations, the clearing participant with whom the broker holds an account may proceed to grant credit, under an agreement signed in advance.
4. If the clearing participant grants participants in the clearing and settlement system managed by BSE a loan needed to cover the debit position, the participant in the clearing and settlement system managed by BSE was in position debtor may proceed to establish a claim pledge of financial instruments existing own account, both those settled, and of the pending settlement in favor of the credit granted. Clearing participant is required to present BSE documents stating the guarantee institution.
5. If the participant does not grant credit or the loan does not fully cover the debit of participants in clearing and settlement system, than BSE shall be able to call the Guarantee Fund.

BSE applies risk management measures as presented above. However, it should be noted that enforcing trading limits to each participant and using the amounts from the Guarantee Fund are the measures with the greatest impact on the entire system thus helping BSE to control risks in the settlement system

3.4.4. Trading limit

The trading limit is the maximum amount limit within each of the participants on the market regulated by BSE can operate over a single trading session. This limit is calculated in real time by the electronic system of BSE, for each intermediate, being affected by each completed transaction and not by the orders entered into the system by the participant. The trading limit is determined by a calculation formula and is affected by exchange transactions concluded on their own by each participant, both on their own name and on behalf of clients.

The formula for calculating the trading limit is as follows:

$$3 \text{ x } \left(\text{CIFG } + \text{ CCFG } + \text{ VNC}\right) + \text{VGB } - \text{ / } + \text{ VMj} \quad (4)$$

where:

CIFG = participant's initial contribution to the Guarantee Fund;
CCFG = participant's current contribution to the Guarantee Fund;
NPV = participant's net equity amount, included in the "Minimum net capital and indebtedness indicators";
VGB = amount by which the trading limit may be increased as follows:

- *for purchases* - based on the amount deposited by the participant or his clients in the settlement account (or the accounts "clients") from the settlement bank or other banks, confirmed by presenting the statement of account or other bank documents (such as, for example, the payment order accepted by the bank);
- *for sales* - depending on the amount of sales declared by the participant in writing that he would perform during the trading session

VMj = value that has changed the total amount of loans to the participant and its customers and represents the more or less difference than the value previously reported by the participant. BSE will modify the participant's trading limit to this value.

During the trading session, each time a participant concludes a transaction, the Stock Exchange electronic system checks that the following formula is applied:

$$3\text{x}\left(\text{CIFG } + \text{ CCFG } + \text{ VNC}\right) + \text{VGB} - / + \text{VMj} >= 3\text{x}\left(\text{CNCP } - \text{ VNCP}\right) + \text{VNCl} + \text{CNCl} \quad (5)$$

where:

CNCP = are financial instruments purchased by the participant in his own name in that trading session, expressed as values;
VNCP = are financial instruments sold by the participant in his own name in that trading session, expressed as values
CNCl = are financial instruments purchased by the participant in that trading session, in his own name and on behalf of his clients, expressed as values;
VNCl = are financial instruments sold by the participant in that trading session, in his own name and on behalf of his clients, expressed as values

To determine the trading limit, participants are required to submit monthly to BSE's specialized department "Minimum net capital and indebtedness indicators statement" This statement will be sent to BSE within 10 working days from the end of the reporting month. If, during the time between two successive reports, the net capital varies more than + / - 15% compared to the last reports, the participant is required to communicate to BSE the new value immediately.

If during a day, the transactions concluded by a participant affect the relationship of inequality, the participant exceeding his trading limits, the Exchange system will not allow the introduction or modification of the exchange orders on behalf of that participant, as their execution would lead to increase his exposure, and orders that are already in the market will

be suspended automatically by electronic system of BSE. Basically, if a participant that has completed operations which no longer meet the inequality relationship described above, will not be allowed to the market access till increasing the trading limit. In order to increase the trading limit is however necessary that the participant expressly requests this by sending a form by fax to BSE in this respect, also assuming responsibility for carrying out the settlement. However, the participant shall submit an estimate of the value of transactions he intends to carry out during the day when the limit was exceeded.

In time, the usefulness of trading limits and especially the formula used to calculate it attracted much discussion at the level of the stock market participants. The main criticism concerns the fact that on the right side of the relationship of inequality the sales and purchases amounts made on behalf of clients are treated similarly and influence the limit in the same way. Even if by making a sale transaction the intermediary does not assume any risk regarding the cash settlement of transactions, however the value of sales transactions made on behalf of clients diminishes daily trading limit of the participant. In fact, you can even consider that sales transactions made by a participant does not induce any risk in the entire settlement system as long as before being accepted an order of sale by the Exchange's electronic system, in the account of the seller are performed verification of the securities, subject to trading order. Considered from the perspective of market participants and given the above considerations, the current formula for calculating the limit of transaction seems unduly restrictive. Intuitively, the limit of transaction reported only net amounts paid in settlement appears to be more reasonable and would create a much closer relationship of emerging risks into achieving financial settlement to the Guarantee fund.

3.4.5. Guarantee fund

As required by the regulations and procedures Bucharest Stock Exchange, "The Guarantee Fund", "the Fund ", has as main objective to ensure necessary resources for proper functioning of the mechanism of settlement of exchange transactions."

Sizing the Guarantee Fund and its constituent sources represent, for any settlement system, two central problems whose solutions can be found only by reference to at least the following elements:

- Settlement model used;
- Costs of setting up such a fund guarantee, costs supported mainly by direct participants in the settlement system;
- Financial strength of the participants in the system, which is closely related to the overall stock market development;
- The value of the transactions made on the stock market;
- The performance of the compensation system (the degree of compensation), which ultimately generates the size of the exposures to settlement;
- Other regulations of risk management;
- Accepting that, in fact, financial risks are minimized and in very few cases are complete eliminated.

As explained earlier, for settling the exchange transactions, Bucharest Stock Exchange is using a variant of Model 2 Settlement (BIS classification), which requires multilateral clearing and final settlement of the funds on a net basis, followed by gross settlement of securities. For such a system, in the literature were directed two ways of determining the optimal value of a Guarantee Fund:

1. For net settlement systems, there are six minimum requirements to be fulfilled. The fourth requirement of this report states that "*as a minimum requirement, compensation schemes and multilateral net settlement shall be able to provide for the daily settlement, when it is impossible to honour the payment obligations by the participant with the highest exposure*";
2. Another opinion is that the minimum requirement to be greater than or equal to the number of days of the settlement cycle (for BSE, three) plus one, multiplied by the greater of the net debtor position recorded in a recent period of time, e.g. last two weeks.

As these recommendations suggest, the total amount of the Guarantee Fund has no absolute meaning, but must be interpreted in light of the whole system of risk management, value of transactions made on the stock market and especially the amount of exposure to settlement . These considerations were taken into account when establishing criteria for setting up and functioning of guarantee fund for settlement of negotiated transactions to BSE.

Guarantee Fund of BSE was established based on initial contributions of all members of the Stock Exchange Association (later, with the transformation of BSE in a stock company, any intermediary agent, carrying out transactions at BSE became eligible to participate in the Guarantee Fund) as well as of all custodian agents authorized by the Stock Exchange.

For the Guarantee Fund to be effective and achieve the purpose for which it was created is necessary that the component assets to have a high degree of liquidity. Therefore, in managing resources in the Fund should be prioritized the safe and liquid investment criteria, the yield obtained in the administration of the Fund represents only a secondary criteria.

4. Conclusions

To increase the accuracy which describes the development of the stock exchange in our country, it is necessary to build a synthetic index. Regarding the risk on the capital market, Risk Grades values determined for BSE indices show that the domestic capital market is more risky than the North American market.

However, analyzing the Risk Grades values obtained for all indexes in the region we notice that they are very close and shows that the investors are not picking up the capital market in Romania as an excessively risky relative to other exchanges in the region. It confirms the hypothesis that the main problems of the capital market in Romania are not related to demand, but derive primarily from an inadequate supply.

The risks managed by Institutions such as market operators, clearing houses and central depositories are very important, even though there maybe be less visible to the public.

Clearing and settlement services ensure that transfers of financial instruments and financial funds between the parties of an exchange transaction to be performed safely and with low costs.

In order to prevent and to reduce the risks specific to the settlement of financial instruments transactions, direct access to clearing and settlement system is limited to those participants who meet a set of capitalization criteria, operational capacity and professional experience, which means that the settlement of an exchange transaction involves a given number of financial intermediaries.

Since the highest financial risk throughout the process of finalizing exchange transactions take place in the last stage of the settlement process, an essential role is associated to the way the connection is made between the securities transfer mechanism (obligation to deliver) and the funds transfer mechanism (payment required). By using mechanisms that ensure Delivery Versus Payment (DVP), one eliminates the most important component of all financial risks during the settlement of the financial instruments transactions that is the principal risk. In order to limit the exposure to the risk of default of the intermediaries' obligations, a trading limit is set for each intermediate part.

Furthermore, the BSE requires its participants to prioritize the amounts necessary to cover their redundancy payment positions. From the market participants' perspective, the current formula for calculating the transaction limit seems unduly restrictive. Intuitively, calculating the transaction limit based only on the net amounts paid in settlement appears to be a more reasonable assumption and could lead to a much closer relationship between the risks emerging in financial settlements and the guarantee fund. Meanwhile, for the Guarantee Fund to be effective and to achieve its purpose for which it was created it is necessary that the assets within it to have a high degree of liquidity. The transition process and the recent international financial crisis have significantly affected not only the evolution of stock markets in Central and Eastern Europe, but also significantly changed the outlook for their future development.

That is why the stock market management should not only consider short-term measures in order to mitigate the crisis impact, but also to try to ensure the prerequisites for further development. The improvement of stock management in general and of stock market risks in particular, requires a medium to long-term perspective, similar to the opinions and contributions formulated by the authors in this chapter.

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