

# **DOES SOVEREIGN RISK HAVE AN EFFECT ON CORPORATE RATING? CASE-STUDY FOR EMERGING VERSUS DEVELOPED COUNTRIES**

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***Abstract.** This paper focuses on analyzing the correlation between corporate and country rating. Is there an impact from the part of the sovereign risk towards the company financial and economical performance? Can this impact be differentiated according to emerging and developed countries? If yes, can it be quantified? Does the sovereign ceiling continue to be an outstanding theory? These are the main questions this article proposes to offer an answer to. A case study using the financials of 150 companies activating in various fields has been performed in order to highlight out the correlation between the two variables.*

**Key words:** rating, sovereign risk, idiosyncratic risk, globalization, sovereign ceiling.

## **1. Introduction**

The correlation between country and corporate rating has been an interesting research topic for the last years. There have been conducted many studies regarding the essential steps that have to be followed up in order to deliver a viable corporate rating, especially concerning the most significant financial indicators which should be analyzed. Meanwhile it has been underlined that corporate rating is impacted also by sovereign risk. Basel criteria introduced the concept of sovereign ceiling (Basel Committee on Banking Supervision, 2001).

Thus corporate rating became multi-dimensional approached, not only at the level of the internal environment of the company, but also at the macroeconomic level. East Asian financial crises as well as the current subprime mortgage financial crises point out the importance of the corporate rating assignment process. Moreover, globalization determined consistent inflows directed towards the emerging countries because of the higher return perspectives. In this context, both idiosyncratic and systemic risk have to be reflected into the corporate rating.

During the last financial crises, rating agencies have been accused of not being able to predict the rating downgrade and to avoid the collapse. In fact, they proved to be pro-cyclical since a rating downgrade during such a period determined automatically similar phenomena. Thus corporate rating has lost its predictive power, tending to become rather obedient to the than being able to anticipate it.

It has been acknowledged also that an accurate rating can be delivered only applying the appropriate model which should take into account the specific features of every country the corporation is located into (Dwyer, 2005). Even the most successful commercial application belonging to Moody's – RiskCalc Model – implies a multidimensional approach in terms of credit scoring model adapted to the specific of every developed country.

Unfortunately, emerging countries do not benefit from such powerful predictive tools; based on similarities between the accounting systems of emerging and developed countries, proxy models are valorized for developing ones (Bharath, Shumway, 2004).

The most recent theories relative to the relationship corporate-country rating subscribes to the idea of such a deep correlation in the case of the emerging countries (Peter, 2005); as for the developed ones, it has been pointed out that idiosyncratic risk is determinant when delivering the corporate rating, the country risk not having the same importance.

This article aims at identifying the way country rating affects the corporate financial performance. The case-study is performed at the level of 150 companies located in both emerging and developing countries and contains a comparative analysis in terms of financial indicators. Two statistical tests – one including a regression, the other one a causality test- are also performed.

The paper is structured as follows: section 2 contains the general framework regarding the correlation between corporate and country rating, including particularities implied by the credit rating within the emerging countries, section 3 includes the case-study and section 4 embraces the final conclusions.

## 2. The general framework

The general framework of the relationship between country and corporate rating has built up all over a chain of modern concepts and ideas.

Financial globalization determined huge capital inflows to be directed towards emerging countries. Indeed, developing countries imply higher profitability potential, but risks are also directly correlated with. From this perspective, new models capable of predicting and managing at a more powerful level the credit risk are needed.

Rating agencies have adapted to the financial globalization phenomena and implemented models capable of integrating also the country risk dimension, but unfortunately the emerging countries are not covered from this point of view.

KMV model belonging to Moody's or RiskMetrics belonging to Standard and Poor's are not especially adapted to companies located into emerging countries, this representing an actual research challenge for all the financial laboratories.

The correlation between country and corporate rating can be approached also in the context of Basel 2 implementation.

From the perspective of new Basel II, especially in terms of internal rating approach, every credit institution will have to elaborate the own credit risk assessment model. Moreover, Basel II focused on the sovereign ceiling policy (Basel Committee on Banking Supervision, 2001). A private entity will not be able to receive an upper rating than the country it is located into, which creates real asymmetry effects. A private entity will be always downgraded in case country rating will be downgraded, but as for the case of a potential country rating upward, the corporate rating will not be correlated accordingly.

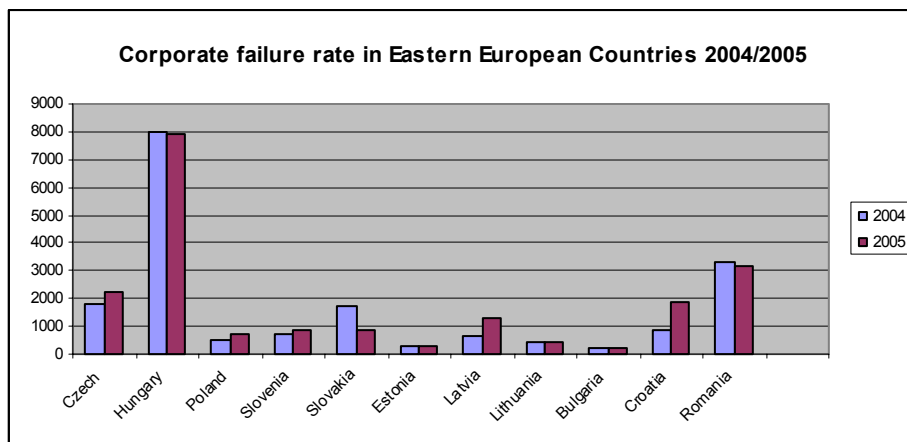
## Does sovereign risk have an effect on corporate rating?

Thus the relationship between the two variables becomes more and more challenging, especially in the context of actual financial crises when rating agencies have not been capable of acting anti-cyclically. It is obvious that globalization determined them becoming more general in their assessment process. The global view tends to make them ignore the particularities implied by the emerging countries.

From the global perspective, companies located into emerging countries are more sensitive to the macroeconomic environment and a keen interest of the rating agencies regarding the correlation between corporate and country rating might result in a higher risk premium reflected into tougher financing conditions.

But as for the financial system safety, at a global level, a profound analytical approach of the correlation would have positive effects and it would strengthen the anti-cyclical behaviour. Rating assignment process becomes this way a very important mechanism which supports sustainable growth theories. Corporate segment represents a key-resource which contributes to a high extent to economical growth. As long as a solid and viable rating will be delivered, corporate failure procedure can be avoided which would ensure a more performing financial management.

The particularities implied by the emerging countries in terms of corporate rating assignment derive from the features of their macroeconomic environment. Since it tends to be more unstable because of the economical and political conditions, the corporate default rate is higher in comparison with the developed countries.



Source: [www.coface.ro](http://www.coface.ro)

Graph 1

Damodaran (2004) pertains that it is necessary to determine an exposure of every multinational corporation to country risk by the integration of the risk premium into the equity cost. This risk premium is correlated with the country rating delivered by the rating agencies in accordance with the macroeconomic stability.

Unlike developed countries where credit-rating transparency is legally founded at the level of international accounting standards, but also at the level of the corporate failure legislation, corporate segment within the emerging countries is not supposed to obey to the same regulations. According to the report published by BIS in 2005, the degree of informal economy within the emerging countries is higher than 35% which complies with the asymmetric information theory.

### **3. Case study**

#### ***3.1. Database and methodology description***

The most recent theories regarding the correlation between corporate and country rating assume an impact from the part of the first variable towards the second one. In terms of interdependencies between the cash-flow of the company and the macroeconomic conditions, it has been pointed out that the correlation is more pregnant for the emerging countries.

This study focuses on revealing if this correlation can be validated at the level of a sample of 150 companies located in both emerging and developed countries. The innovative element consists of highlighting out the correlation at the general level which excludes a potential influence of the industry category. The sample includes companies activating in various fields (IT, retail, car manufacturing, mobile phone equipments, electronic).

Companies activating in the financial services field have been eliminated from the database because of the specific features implied by their activity in terms of capital structure.

The motivation for excluding the potential influence of the industry characteristics on the correlation country-corporate rating derives from the global perspective. In fact, country rating has an impact on the corporate sector at the global level, no matter to which sector of activity the company belongs to.

The topic of this case-study is related to the one of Cavallo and Valenzuela (2007) and also to the one of Huang and Kong (2003) or Peter and Grandes (2005) which studied the relationship between corporate and sovereign spreads having as point of reference the corporate default premia limited to the case of publicly traded firms. This study is closer to the work of Borensztein et al. (2006) who analyzed this correlation at the level of the credit-rating, but we propose to be more analytical in terms of rationale which lays out behind the financial indicators which contributed to the assignment of the final corporate rating; afterwards the corporate rating will be deeply correlated with the country rating. The in-depth analysis will be performed in terms of principles which governed the selection of certain financial indicators which should be integrated in a final score function by which a credit-rating will be assigned to the companies.

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The corresponding corporate rating will be delivered by a scoring function which will be elaborated using the statistical method of Principal Components Analysis. The countries where the companies are located into are both emerging (Poland, Hungary, Romania, Slovenia, Slovakia) and developed (France, USA, Germany, Italy, Austria) ones.

The sources the information was obtained from were the following:

- Hewlett-Packard Division containing information relative to the Financial Statements of various companies located both in emerging and developed countries;
- Bloomberg agency site which contained information regarding the country rating where the companies are located into.

The assembly of financial indicators that will be analyzed is the following: Current Liquidity ratio ( $I_1$ ), Quick Liquidity ratio ( $I_2$ ), Short Term Debt Cash-Flow Coverage ( $I_3$ ), Return on Tangible Net Worth ( $I_4$ ), Earnings before Taxes/Total Assets ( $I_5$ ), Operating Expenses/Net sales ( $I_6$ ), Debt/Tangible Net Worth ( $I_7$ ), Interest Coverage ( $I_8$ ), Short Term Debt/Total Debt ( $I_9$ ), Leverage multiplier ( $I_{10}$ ), AR turnover ( $I_{11}$ ), AP turnover ( $I_{12}$ ), Working Capital Turnover ( $I_{13}$ ), Total Assets Turnover ( $I_{14}$ ), Altman Z-score ( $I_{15}$ ).

The initial point of the analysis will be focused on a comparative analysis of financial indicators in terms of descriptive statistics characterizing companies located into emerging and developed countries.

First, the companies will be analyzed at the global level which includes the whole sample of companies and excludes a potential influence of the country rating.

Second, the sample of companies will be divided into two sub-samples: one including companies located into emerging countries and the other one including companies located into developed countries.

**3.2. Descriptive statistics analysis of the financial indicators**

*Table 1*

**Descriptive statistics of the corporate rating at the global level, for companies located both in emerging and developed countries**

Descriptive Statistics (conf fin 2007.sta)						
	Mean	Confid.	Confid.	Sum	Minimum	Maximum
		-95.000%	95.000			
VAR1	1.299178	1.209908	1.388449	94.84	0.34	2.4
VAR2	0.789589	0.689772	0.889407	57.64	0	2.35
VAR3	1.35589	-1.3653	4.077084	98.98	-1.01	99.62
VAR4	33.71695	24.799	42.63489	2461.337	-95.77	151.24
VAR5	29.34014	-0.23625	58.91653	2141.83	-4.91	822

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Descriptive Statistics (conf fin 2007.sta)						
	Mean	Confid.	Confid.	Sum	Minimum	Maximum
		-95.000%	95.000			
VAR6	16.44288	12.01771	20.86805	1200.33	-1.05	112.47
VAR7	10.179	6.025144	14.33286	743.067	-7.24	122.69
VAR8	4.104658	1.122891	7.086424	299.64	-5.44	100
VAR9	79.52274	73.31821	85.72727	5805.16	20.46	100
VAR10	6.590521	4.986759	8.194283	481.108	-6.24	43.21
NEWVAR11	19.75863	-4.66472	44.18198	1442.38	0	900.66
NEWVAR12	11.42027	3.284602	19.55595	833.68	0	293.3
NEWVAR13	21.28822	-0.77627	43.35271	1554.04	-634.8	361.5
NEWVAR14	8.927973	-3.74234	21.59828	660.67	0	472.82
NEWVAR15	10.11288	-3.3742	23.59995	738.24	0.03	497

Variance	Std.Dev.	Standard	Skewness	Std.Err.	Kurtosis	Std.Err.
		Error		Skewness		Kurtosis
0.146394	0.382614	0.044781625	0.673728392	0.281029217	0.872270874	0.555223
0.183029	0.427819	0.050072413	0.933459295	0.281029217	2.496810998	0.555223
136.027	11.66306	1.365058315	8.538644903	0.281029217	72.9378062	0.555223
1460.951	38.22239	4.473592446	-0.385924797	0.281029217	3.4949552	0.555223
16069.29	126.7647	14.83668538	5.904859859	0.281029217	34.10880151	0.555223
359.7216	18.96633	2.219840704	2.203393629	0.281029217	7.729327325	0.555223
316.9634	17.80346	2.083737919	4.196338566	0.281029217	22.5910837	0.555223
163.3253	12.77988	1.495771807	6.410445831	0.281029217	45.8994027	0.555223
707.1696	26.59266	3.112435596	-0.986375014	0.281029217	-0.663367015	0.555223
47.24829	6.873739	0.804510291	3.373907423	0.281029217	15.47853654	0.555223
10957.63	104.6787	12.25171678	8.508045973	0.281029217	72.57912324	0.555223
1215.887	34.86957	4.081174348	7.608696657	0.281029217	61.44324586	0.555223
8943.225	94.56862	11.0684203	-3.94085058	0.281029217	34.60490479	0.555223
2990.839	54.68856	6.357416068	8.590933039	0.279196952	73.86764696	0.551684
3341.502	57.80572	6.76564811	8.531049327	0.281029217	72.85045725	0.555223

Proceeding with the comparative analysis, it is obvious that the descriptive statistics of the companies grouped at the general level are less performant than the descriptive statistics of the companies belonging to developed countries. The median corresponding to the Current Liquidity Ratio is 1.3 for the global level while for the case of developed countries is 1.45 and 1.23 for the developing countries.

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The minimum level corresponding to the interest coverage ratio is -5.44 at the global level which is similar to the one of the emerging countries; the minimum level for developed countries is -1.56.

*Table 2*

**Descriptive statistics of the corporate rating for companies located in developed countries**

Descriptive Statistics (developped.sta)						
	Mean	Confid. -95.000%	Confid. 95.000	Sum	Minimum	Maximum
VAR1	1.454091	1.225482	1.6827	31.99	0.34	2.4
VAR2	0.690455	0.40856	0.97235	15.19	0	2.35
VAR3	0.060455	-0.0922	0.213112	1.33	-0.04	1.6
VAR4	30.06591	6.513331	53.61849	661.45	-95.77	151.24
VAR5	4.224091	1.178827	7.269355	92.93	-4.91	23.88
VAR6	34.2	24.65164	43.74836	752.4	-0.78	112.47
VAR7	22.6	10.97924	34.22076	497.2	0.49	122.69
VAR8	5.851818	-3.51913	15.22277	128.74	-1.56	100
VAR9	45.61182	36.50074	54.7229	1003.46	20.46	98.81
VAR10	8.919091	7.060018	10.77816	196.22	1.38	17.18
NEWVAR11	6.393636	4.217333	8.569939	140.66	0	13.67
NEWVAR12	4.315455	3.163251	5.467658	94.94	0	8.86
NEWVAR13	11.03955	0.746264	21.33283	242.87	0	96.71
NEWVAR14	0.541364	0.400874	0.681853	11.91	0	1.26
NEWVAR15	1.174545	0.853302	1.495789	25.84	0.03	3.46

Variance	Std.Dev.	Standard		Std.Err.		Std.Err.
		Error	Skewness	Skewness	Kurtosis	Kurtosis
0.265854	0.51561	0.109928468	-0.205446643	0.490962	-0.1667	0.95278
0.404233	0.635793	0.135551586	1.129806483	0.490962	0.907865	0.95278
0.118547	0.344307	0.073406528	4.670339348	0.490962	21.86963	0.95278
2821.852	53.1211	11.3254573	-0.785737469	0.490962	2.421724	0.95278
47.17449	6.868369	1.46434118	1.924955359	0.490962	4.386805	0.95278
463.7833	21.53563	4.591411661	2.170240968	0.490962	8.194769	0.95278
686.9522	26.20977	5.587942337	2.985149054	0.490962	10.41599	0.95278
446.7089	21.13549	4.506101666	4.613679914	0.490962	21.48972	0.95278
422.2766	20.54937	4.381140398	1.254384776	0.490962	1.11457	0.95278
17.58127	4.193002	0.893951031	0.090867569	0.490962	0.421537	0.95278
24.09328	4.908491	1.046493743	0.267268425	0.490962	-1.63168	0.95278
6.753293	2.59871	0.554046792	0.391972805	0.490962	-0.78212	0.95278

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Variance	Std.Dev.	Standard		Std.Err.		Std.Err.
		Error	Skewness	Skewness	Kurtosis	Kurtosis
538.9705	23.21574	4.949611882	3.13627588	0.490962	9.774787	0.95278
0.100403	0.316864	0.067555638	0.373834006	0.490962	-0.49918	0.95278
0.524959	0.724541	0.154472608	2.026778856	0.490962	4.982444	0.95278

The maximum level for the weight of the short term debt into the total debt ( $I_9$ ) is 100 for the global and developed countries level and 41.61 for the case of the emerging countries.

It is obvious that most of the companies located into emerging countries had adopted financing structures based on long term debt since a higher weight of the short term debt into the total debt will make them being perceived as riskier. The financial effort implied by the long term debt is considered to be softer than the one implied by the short term debt.

The standard deviations corresponding to the financial indicators of the companies located in emerging countries are to a high extent superior to the standard deviations of the financial indicators corresponding to companies located in developed countries.

*Table 3*

**Descriptive statistics of the corporate rating for companies located in emerging countries**

Descriptive Statistics (emerging.sta)						
	Mean	Confid.	Confid.	Sum	Minimum	Maximum
		-95.000%	95.000			
<b>VAR1</b>	1.232353	1.150821	1.313884916	62.85	0.71	2.25
<b>VAR2</b>	0.832353	0.749112	0.915593998	42.45	0.11	1.95
<b>VAR3</b>	1.914706	-2.01051	5.839917453	97.65	-1.01	99.62
<b>VAR4</b>	35.2919	26.8066	43.77720084	1799.887	-13.22	131.92
<b>VAR5</b>	40.17451	-2.22191	82.57093339	2048.9	-4.65	822
<b>VAR6</b>	8.782941	5.643163	11.92271901	447.93	-1.05	49.6
<b>VAR7</b>	4.820922	2.455366	7.186477441	245.867	-7.24	45.58
<b>VAR8</b>	3.35098	1.450728	5.251233033	170.9	-5.44	41.61
<b>VAR9</b>	94.15098	91.11233	97.18963215	4801.7	49.2	100
<b>VAR10</b>	5.586039	3.458177	7.713901303	284.888	-6.24	43.21
<b>NEWVAR11</b>	25.52392	-9.66817	60.71601801	1301.72	2.02	900.66
<b>NEWVAR12</b>	14.4851	2.833387	26.1368088	738.74	1.43	293.3
<b>NEWVAR13</b>	25.70922	-5.84364	57.26206901	1311.17	-634.8	361.5
<b>NEWVAR14</b>	12.64373	-5.84446	31.13191102	644.83	1.2	472.82
<b>NEWVAR15</b>	13.96863	-5.43839	33.37564754	712.4	1.94	497



**Does sovereign risk have an effect on corporate rating?**

Variance	Std.Dev.	Standard		Std.Err.		Std.Err.
		Error	Skewness	Skewness	Kurtosis	Kurtosis
0.084034353	0.289887	0.040592	1.163369	0.333464	2.408033	0.65592
0.087594353	0.295963	0.041443	1.248806	0.333464	4.31809	0.65592
194.7722494	13.95608	1.954242	7.139862	0.333464	50.98487	0.65592
910.1966381	30.16947	4.22457	0.890227	0.333464	0.882396	0.65592
22722.67121	150.7404	21.10788	4.89671	0.333464	23.07088	0.65592
124.6231652	11.16347	1.563199	2.438823	0.333464	5.648299	0.65592
70.74037531	8.41073	1.177738	4.099043	0.333464	18.18413	0.65592
45.64819702	6.756345	0.946078	4.1371	0.333464	21.07631	0.65592
116.724709	10.80392	1.512852	-2.68184	0.333464	7.316524	0.65592
57.23845368	7.56561	1.059397	3.962093	0.333464	17.68527	0.65592
15656.37509	125.1254	17.52107	7.118525	0.333464	50.77356	0.65592
1716.249129	41.42764	5.80103	6.385535	0.333464	43.14059	0.65592
12585.72437	112.1861	15.7092	-3.56969	0.333464	25.86702	0.65592
4321.052276	65.73471	9.204701	7.13858	0.333464	50.97237	0.65592
4761.224396	69.00163	9.66216	7.137892	0.333464	50.96566	0.65592

The instability conferred by the macroeconomic environment is dominant in the case of the emerging countries.

The variance corresponding to the leverage multiplier is 57.23 for the emerging countries, 4.19 for the developed ones and 47.24 for the general level.

The Altman Z-score has the highest variance -3.341,502 at the global level while at the level of the emerging countries has a value of 4.761,22; for the level of the developed countries the variable reaches the point of 0.52.

The minimum values for all the financial indicators are reached in the case of emerging countries while the maximum values are reached in the case of the developed ones.

From this perspective, we can assume that macroeconomic environment had a strong impact on the corporate rating. The macroeconomic volatility implied by the emerging countries environment affects the evolution of the financial variables.

### **3.3. Scoring functions elaboration**

The next step of the analysis focuses on elaborating a scoring function in accordance with which there will be delivered a rating to every company included in the sample.

There will be elaborated two scoring functions using the Principal Components Method adapted for companies located in both developed and emerging countries.

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In order to elaborate the two scoring functions there will be analyzed the correlation matrices of the financial indicators characteristic to the companies located in both emerging and developed countries.

For the financial indicators characteristic to the companies located in emerging countries there is a high positive correlation between the variables  $I_1-I_2$ ,  $I_5-I_{11}$ ,  $I_{12}$ ,  $I_{14}$ ,  $I_{15}$ ,  $I_7-I_{10}$ ,  $I_{11}-I_{12}$ ,  $I_{11}-I_{14}$ ,  $I_{11}-I_{15}$  and a negative correlation between the variables  $I_2-I_9$  (see annexes no.1).

The earnings before taxes (EBT) indicator is highly correlated with the company activity indicators (AR turnover, AP turnover, Total Assets turnover).

As for the financial indicators characteristic to the companies located in developed countries there is a high positive correlation between the variables  $I_4-I_{15}$ ,  $I_4-I_1$ ,  $I_2-I_3$ ,  $I_5-I_8$ ,  $I_5-I_{11}$ ,  $I_5-I_{13}$ ,  $I_5-I_{15}$ ,  $I_7-I_{10}$ ,  $I_8-I_{10}$ ,  $I_8-I_{15}$ ,  $I_9-I_8$ ,  $I_{12}-I_{14}$ ,  $I_5-I_{13}$ ,  $I_{14}$ ,  $I_{15}-I_{13}$ ,  $I_{12}$ ,  $I_{13}-I_{14}$ ,  $I_{14}-I_{15}$ ,  $I_5-I_{15}$ ,  $I_6-I_{15}$ ,  $I_8-I_{15}$ ,  $I_{12}-I_{15}$ ,  $I_{13}-I_{15}$  and a negative correlation between variables  $I_2-I_5$ ,  $I_2-I_{11}$ ,  $I_9-I_4$ ,  $I_6-I_2$ ,  $I_6-I_{12}$ ,  $I_6-I_{14}$ ,  $I_6-I_{15}$ ,  $I_{10}-I_{15}$ ,  $I_{14}-I_{30}$ .

It is obvious that the degree of correlation between the variables is a higher one for companies located in developed countries than for the ones located in emerging countries. This phenomenon can be explained by a higher degree of interdependency between the financial indicators due to the lack of dominant influences from the part of external factors which could distort the mechanisms of internal environment of the enterprise.

Table 4

### Eigenvalues of the financial indicators characteristic to companies located into emerging countries

Eigenvalues (emerging.sta)				
Extraction: Principal components				
	Eigenval	% total	Cumul.	Cumul.
		Variance	Eigenval	%
1	4.860551	32.40367	4.860551	32.40367332
2	2.42721	16.1814	7.287761	48.58507254
3	2.13325	14.22167	9.421011	62.80673902
4	1.327779	8.851857	10.74879	71.65859587
5	1.061166	7.074439	11.80996	78.73303513

In order to get a deeper insight regarding the most important financial indicators which should be integrated into a final scoring function, the Eigenvalues will be computed.

As for the companies located into both emerging and developed countries, the final scoring function should contain 5 main financial indicators. If we had limited to only 3 variables, we would be able to reflect only 58% of the initial information. Extending the analysis to 4 axes, we would reach 67.01% while 5 axes will permit an information recovery of 74.19% of the initial space.

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*Table 5*

**Eigenvalues of the financial indicators characteristic to companies located into developed countries**

<b>Eigenvalues (developped 2007.sta)</b>				
<b>Extraction: Principal components</b>				
	<b>Eigenval</b>	<b>% total</b>	<b>Cumul.</b>	<b>Cumul.</b>
		<b>Variance</b>	<b>Eigenval</b>	<b>%</b>
1	4.585171	30.56781	4.585171	30.56781
2	2.300322	15.33548	6.885493	45.90329
3	1.782827	11.88552	8.668321	57.7888
4	1.397383	9.315884	10.0657	67.10469
5	1.063543	7.090288	11.12925	74.19498

*Table 6*

**Factor loading procedure applied to the case of companies located into emerging countries**

<b>Factor Loadings (Varimax normalized) (emerging.sta)</b>					
<b>Extraction: Principal components</b>					
<b>(Marked loadings are &gt; .700000)</b>					
	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
VAR1	-0.05682543	-0.13546	-0.87879069	0.189186	0.146971
VAR2	-0.01689646	0.057082	-0.93099764	0.034834	0.074337
VAR3	0.007694462	-0.07853	-0.02471589	0.373825	0.04907
VAR4	-0.07623822	0.37189	-0.08876734	-0.27633	0.728893
VAR5	0.779857989	-0.0273	0.03583305	-0.00501	0.0826
VAR6	0.473625254	0.069669	0.005170129	-0.42014	-0.61299
VAR7	0.00461981	0.933517	0.02052204	0.019621	0.19775
VAR8	-0.04776552	-0.16801	0.010911783	-0.85097	0.147053
VAR9	0.060333561	-0.07116	0.70360751	0.284162	0.434472
VAR10	0.01160606	0.948104	0.022475681	0.019759	0.188291
NEWVAR11	0.974392077	0.046438	0.037869299	-0.00247	-0.1262
NEWVAR12	0.978689721	0.024889	0.021896903	0.07265	-0.06043
NEWVAR13	0.105807189	0.602143	-0.013097049	-0.07165	-0.34889
NEWVAR14	0.975640929	0.049155	0.029965347	0.004396	-0.12172
NEWVAR15	0.976207091	0.04752	0.025833253	0.001456	-0.12044
<b>Expl.Var</b>	<b>4.671287343</b>	<b>2.345349</b>	<b>2.148590226</b>	<b>1.245763</b>	<b>1.398966</b>
<b>Prp.Totl</b>	<b>0.311419156</b>	<b>0.156357</b>	<b>0.143239348</b>	<b>0.083051</b>	<b>0.093264</b>

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In order to identify which are the most important factors that will be integrated into a final scoring function, we will proceed to a factor loading procedure for both cases.

Thus, the first axis is highly positively correlated with the same financial indicators for both cases of companies located in emerging as well as for companies located in developed countries. It represents a synthesis of variables no. 5, 11, 12, 14, 15, meaning the activity and profitability indicators.

Table 7

### Factor loading procedure applied to the case of companies located into developed countries

Factor Loadings (Varimax normalized) (developped 2007.sta)					
Extraction: Principal components					
(Marked loadings are > .700000)					
	Factor	Factor	Factor	Factor	Factor
	1	2	3	4	5
VAR1	-0.05586	0.24077	-0.83926710	-0.12226254	-0.108475
VAR2	0.0215046	-0.18532	-0.76437141	0.04381431	0.2903029
VAR3	0.0029756	-0.14462	-0.07974859	-0.12639902	0.5324963
VAR4	-0.068453	-0.09819	-0.54415254	0.36978645	-0.249502
VAR5	0.7711261	-0.07302	0.005976976	-0.00480120	-0.048995
VAR6	0.1577448	0.844536	0.332092509	0.003781518	-0.040428
VAR7	-0.078216	0.340323	-0.14763976	0.740407368	0.0478886
VAR8	-0.014420	-0.16349	-0.10665025	-0.18827425	-0.787663
VAR9	0.1118456	-0.88555	0.284482008	-0.15243316	0.0022389
VAR10	-0.023451	0.100796	-0.09204839	0.89223255	0.0271387
NEWVAR11	0.9816334	0.056396	0.05324519	0.029491733	0.0038475
NEWVAR12	0.9806119	-0.02732	0.007871061	0.018453087	0.065828
NEWVAR13	0.1759165	-0.16481	0.148276367	0.524649519	-0.031218
NEWVAR14	0.9833211	0.037537	0.045923452	0.031821526	0.0191175
NEWVAR15	0.9838006	0.036869	0.042225904	0.028904078	0.0151107
<b>Expl.Var</b>	4.5381166	1.812214	1.852765495	1.850904414	1.0752454
<b>Prp.Totl</b>	0.3025411	0.120814	0.1235177	0.123393628	0.071683

The second axis represents a synthesis of variables no. 7, 10, 13 (solvency ratios) for the case of emerging countries and of variable no. 6 (operating expenses reported to net sales) for the case of developed countries.

The third axis represents a synthesis of variables no. 2 and 9 (liquidity and solvency ratios) for the case of emerging countries and of variables no. 1, 2 and 4 for the case of developed countries (liquidity and profitability ratios).

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The fourth axis represents a synthesis of variable no. 8 (interest coverage) for the case of emerging countries and of variables no. 7, 10 13 for the case of developed countries (solvency and activity dynamics indicators).

The fifth second axis represents a synthesis of variable no. 4 (profitability) for the case of emerging countries and of variable no. 3, 8 (solvency indicators) for the case of developed countries.

It is obvious that the most important financial indicators characteristic to the emerging countries focus on the solvency and liquidity ratios while the most important financial indicators specific to the developed countries are based on profitability.

*Table 8*

**Factor score coefficients procedure applied to the case of companies located into developed countries**

<b>Factor Score Coefficients (developped 2007.sta)</b>					
<b>Rotation: Varimax normalized</b>					
<b>Extraction: Principal components</b>					
	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>	<b>Factor</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
VAR1	0,028108	0,158033387	-0,47699067	-0,16175	-0,0829
VAR2	0,032351	-0,10209908	-0,42665502	-0,02462	0,275963
VAR3	-0,00309	-0,06076668	-0,06015703	-0,08041	0,500489
VAR4	0,006705	-0,09914599	-0,26761162	0,190575	-0,23907
VAR5	0,173555	-0,04149843	-0,02954401	-0,0043	-0,05983
VAR6	0,022271	0,482981542	0,172967483	-0,07144	-0,03338
VAR7	-0,02338	0,110736952	-0,02274822	0,374806	0,027273
VAR8	0,017749	-0,08166680	-0,06337233	-0,07107	-0,72974
VAR9	0,014269	-0,49418067	0,148668605	0,037135	-0,00982
VAR10	-0,01579	-0,04570330	0,020245606	0,494813	-0,00202
NEWVAR11	0,217375	0,029526125	-0,01119303	-0,00105	-0,0141
NEWVAR12	0,218166	-0,01622239	-0,03749276	-0,00332	0,043597
NEWVAR13	0,025044	-0,15795037	0,119043008	0,332146	-0,05389
NEWVAR14	0,217758	0,01865176	-0,01520904	0,001375	-0,00012
NEWVAR15	0,218141	0,018585372	-0,01747767	-0,0004	-0,00373

Table 9

**Factor score coefficients procedure applied to the case of companies located into emerging countries**

Factor Score Coefficients (emerging.sta)					
Rotation: Varimax raw					
Extraction: Principal components					
	Factor	Factor	Factor	Factor	Factor
	1	2	3	4	5
VAR1	0.032898	-0.04542256	-0.43579	0.067558	0.142933
VAR2	0.027902	0.030680563	-0.44458	-0.01306	0.032118
VAR3	0.014824	-0.03106414	-0.03471	0.271662	0.116824
VAR4	0.048303	0.191208866	-0.09125	-0.43365	0.419236
VAR5	0.191166	-0.01870064	-0.02607	-0.07785	0.167986
VAR6	0.037089	-0.00669371	0.061757	-0.13922	-0.48222
VAR7	-0.00696	0.395443175	0.006227	0.046224	-0.01062
VAR8	-0.00084	-0.05956541	0.027123	-0.74529	-0.017
VAR9	0.047737	-0.01248532	0.271293	0.080303	0.408061
VAR10	-0.00686	0.400908778	0.008032	0.050859	-0.01925
NEWVAR11	0.211797	-0.00114827	-0.01187	-0.00558	0.02504
NEWVAR12	0.221936	-0.00706896	-0.02976	0.028433	0.091437
NEWVAR13	-0.03223	0.230815454	0.037817	0.122959	-0.36466
NEWVAR14	0.212787	0.000185215	-0.01633	-0.00163	0.029139
NEWVAR15	0.213184	-0.00041499	-0.01833	-0.00472	0.029858

Analyzing the factor score coefficients procedure (see tables no. 9 and 10) applied to both cases, we could build up the final scoring function.

For the companies located into emerging countries, the scoring function in accordance with which there will be assign a rating is:

$$Rtg_{CEC} = 0.2 * Var 5 + 0.4 * Var 7 - 0.44 * Var 2 + 0.27 * Var 9 - 0.75 * Var 8 + 0.42 * Var 4$$

Where  $Rtg_{CEC}$  = corporate rating assigned to companies located into emerging countries

For the companies located into developed countries, the scoring function in accordance with which there will be assign a rating is:

$$Rtg_{CDC} = 0.2 * Var 5 + 0.48 * Var 6 + 0.16 * Var 1 + 0.38 * Var 7 - 0.73 * Var 3$$

Where  $Rtg_{CDC}$  = corporate rating assigned to companies located into developed countries.

The two scoring functions contain two common indicators – Var 2 and Var 7 (liquidity and solvency ratios) while the other ones are different.

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The scoring function relative to emerging countries located companies focuses on solvency and liquidity ratios while the second one relative to developed countries located companies is keener on profitability and activity dynamics indicators.

### 3.4. Statistical perspective on the relation between corporate and country rating

In order to get a deeper insight regarding the potential impact of the country rating on the final corporate rating, there have been performed a regression and a Granger test. The regression conceived the corporate rating as dependent variable and all the other variables as independent ones, including the country rating.

This regression is performed just in order to see the statistics associated to the country rating in terms of country rating impact on the final corporate rating.

*Table 10*

#### Output of the corporate rating regression

Dependent Variable: SCORING				
Method: Least Squares				
Date: 10/28/07 Time: 21:58				
Sample(adjusted): 1 73				
Included observations: 72				
Excluded observations: 1 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VAR1	1.84E-13	1.24E-13	1.486227	0.1427
VAR2	-0.440000	1.28E-13	-3.43E+12	0.0000
VAR3	-5.39E-17	3.34E-15	-0.016112	0.9872
VAR4	0.420000	1.11E-15	3.77E+14	0.0000
VAR5	0.200000	4.53E-16	4.42E+14	0.0000
VAR6	6.85E-16	2.57E-15	0.265977	0.7912
VAR7	0.400000	3.06E-15	1.31E+14	0.0000
VAR8	-0.750000	6.58E-15	-1.14E+14	0.0000
VAR9	0.270000	1.03E-15	2.62E+14	0.0000
VAR10	-1.00E-14	7.93E-15	-1.266072	0.2106
NEWVAR11	-6.15E-14	8.56E-15	-7.183595	0.0000
NEWVAR12	-6.59E-15	4.86E-15	-1.357861	0.1799
NEWVAR13	3.74E-16	4.23E-16	0.884990	0.3799
NEWVAR15	1.15E-13	1.58E-14	7.305208	0.0000
COUNTRAT	2.96E-15	1.80E-15	1.645720	0.1053
R-squared	1.000000	Mean dependent var		43.17501
Adjusted R-squared	1.000000	S.D. dependent var		31.55549
S.E. of regression	3.09E-13	Sum squared resid		5.44E-24
Durbin-Watson stat	1.803138			

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The standard error associated with the country rating as dependent variable is a very low one (2.96E-15) in comparison with the standard error associated to the operating expenses reported to net sales as dependent variable (6.85E-16).

The probability associated to the Null Hypothesis is also one of the lowest (0.1053).

We could conclude that country rating has a strong impact on the corporate rating.

In order to refine the analysis of the relationship between the two variables, a Granger causality test will be performed.

The Probability associated to the Null Hypothesis slightly exceeds the value of 0.5 which does not permit drawing a clear conclusion – rejecting or accepting the null hypothesis-, but based on the previous analysis, the relationship between the two variables is validated.

*Table 11*

### **Output Granger Causality Test performed between corporate and country rating**

<b>Pairwise Granger Causality Tests</b>			
<b>Date: 10/28/07 Time: 22:03</b>			
<b>Sample: 1 74</b>			
<b>Lags: 2</b>			
Null Hypothesis:	Obs	F-Statistic	Probability
COUNTRAT does not Granger Cause SCORING	150	0.63524	0.53301
SCORING does not Granger Cause COUNTRAT		0.05028	0.95100

## **Conclusions**

This paper focused on the global perspective on corporate rating which conceives it as a variable determined not only by the internal environment of the company, but also by an external macroeconomic synthetic variable – the country rating.

Deep comparative analysis of the descriptive statistics have been performed as well as statistic tests – Regression built between corporate rating as dependent variable and a series of financial ratios as independent ones, Granger Causality test- .

The overall conclusion subscribes to the influence resulting from country rating towards corporate rating. The most important financial indicators specific to the companies based in emerging countries were characterized by a higher volatility and low values in comparison with companies located in developed countries.

Moreover, the characteristic financial indicators to companies based in emerging countries were the ones focused on liquidity and solvency while profitability and activity dynamic indicators were specific to companies located in developed countries.



## Does sovereign risk have an effect on corporate rating?

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The impact of the country rating on the corporate one is to be considered as an important element for the financial leverage management performed at the level of the companies located into emerging countries which will have to implement more active strategies, adapted not only to the challenges implied by the internal environment of the company reflected into the idiosyncratic risk, but also to the macroeconomic one. Thus, their financial management will have to be a multidimensional one, in the way that systemic risk is likely to be integrated too.

The future research papers will be focused on refining the particularities of credit risk/corporate rating implied by the emerging countries.

**Note:** *This paper has been presented within the Financial Risk International Forum, Structured Products and Credit Derivatives, Europlace Institute of Finance, March 2008, Paris*

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