Rating model opportunities for emerging markets

Alexander Karminsky *

Ratings are in high demand in market-driven economies. The Basel II Accords have sparked increased interest in the development of approaches based on internal ratings systems. They have initiated the elaboration of models for remote ratings forecast based on external ones as part of Risk Management Systems and Early Warning Systems.

This article evaluates peculiarities of current ratings systems and specific issues of development of econometrical rating models (order probit) for emerging market companies. Financial indicators, market-value appraisals and macroeconomic indicators of different countries are used as explanatory variables. Standard & Poor's and Moody's ratings are considered as modeling ratings. The sample was based on data from an information agency as well as the rating agencies, and related to companies from almost 40 countries.

Keywords: financial risk, corporate ratings, econometric model

1. Introduction

Ratings are in high demand in market-driven economies. As a business, the rating process has a moral component, since the agency does not bear legal responsibility for its conclusions. Its reputational capital serves as a regulatory element however (Partnoy 2002). In addition to independent appraisals of investment risk in the form of the rating agency's opinion, ratings also function as licensing of a sort.

The Basel II Accords (Basel 2004) have sparked increased interest in ratings and their models. The development of approaches based on internal ratings systems holds a practical interest, especially for developing markets. The topic has received increased attention in connection with the global recession that began in 2007.

In this work, an analysis is made of the possibilities for rating modeling as applied to industrial companies and banks of developing countries (according JP Morgan classification). Emphasis is placed on the elaboration of econometric models. As explanatory variables, financial indicators, which characterize the activities of a company, are incorporated. Market indicators are used to reflect the

* Dr. Alexander Karminsky, Professor, State University – Higher School of Economics, Faculty of Economics (Moscow)

Acknowledgement: I would like to thank Anatoly Peresetsky for his helpful comments.

dynamics of stock quotations, and macroeconomic variables and dummies of industrial and country affiliations are also used.

Ratings of Moody's Investors Service and Standard & Poor's agencies are considered as modeling ratings, which also allows an evaluation of the specific approaches of each of those agencies to be made. Samples were made up of data from those agencies and the Bloomberg information agency.

Analysis of the predictive power of the derived econometric models allows an appraisal of their remote use in risk management systems to be made. Particular attention is given to variables in ratings of companies in accordance with their affiliations with developing countries or with particular industries.

It is demonstrated that the ratings companies and banks from developing countries with the same financial indicators have significantly lower ratings than those in developed countries ("advanced economy" by new IMF understanding). It is also shown that industry affiliation influences ratings.

The work consists of six sections. The second section addresses the particularities of ratings as a measurement of risk in Russia and the countries of Central and Eastern Europe. Section 3 includes an overview of different approaches to rating modeling. In Section 4, there is an examination of the types of models used and the formation and statistical characteristics of the samples.

Models of corporate ratings and bank ratings relating to developing markets and a comparison of the ratings of Moody's and S&P are systematized in Sections 5. Conclusions are presented in the final section.

2. Development of ratings services in developing countries

As an example of the ratings system using, we may consider the ratings in Russia where they are rather particular. We may observe several waves of interest in these possibilities.

At the initial stage of the establishment of market relations, ratings in Russia were predominantly used for banks. The entry of the international rating agencies and the ratings they made in Russia (beginning in 1996) had little impact before the 1998 financial crisis and immediately after it.

The opportunities for foreign borrowings, including by industrial companies and corporations, beginning in 2003, gave impetus to their development. The number of ratable entities in Russia has more than tripled since then, reaching more than 300 at the beginning of 2009. (About half of them are banks and more than a third are companies.) The process was encouraged when Russia received investment-level ratings in 2005-2006.

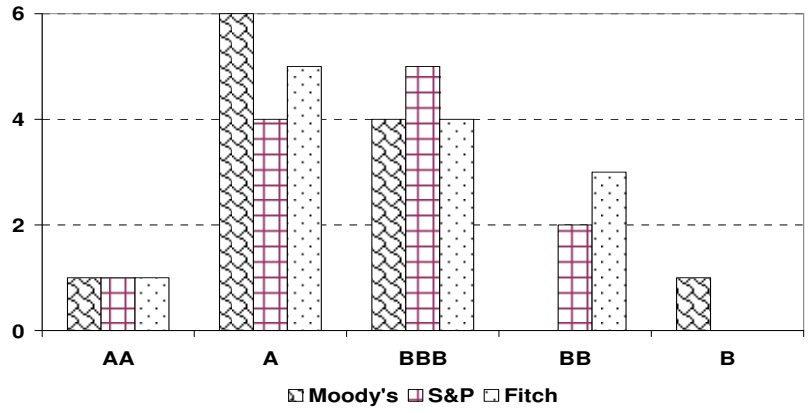
The recession of 2008-2009 has had an effect on the rating process. In particular, a number of ratings were withdrawn. Russia's sovereign ratings were lowered by Standard & Poor's and Fitch Ratings by one grade, although ratings

remained on the investment level at BBB. The insignificant lowering of the sovereign ratings did not dampen interest in them from economically active entities, as happened in 1998.

A large portion of the bank ratings was assigned by Moody's Investors Service (hereinafter, "Moody's"), the Standard & Poor's agency (hereinafter "S&P") leads in ratings of industrial companies and their financial instruments. The distribution of international agencies' corporate ratings by grades shows that the level of ratings of Russian companies is comparatively low. Less than 20 companies have investment-level ratings. The average level of ratings is between BB- and BB for all three agencies, while the average level for S&P is almost BB- and for Moody's, it is Ba2, which is equivalent to BB. For the Fitch Ratings agency, the average level is between these grades.

The ratings of banks and industrial companies in Central and Eastern Europe (CEE) have much in common as they concern developing countries. The level of development of these countries lags considerably behind that of the original members of the European Community. However, these countries were oriented toward membership in the EU, and many of them have become members of EU.
Data analysis shows (Fig.1) that the sovereign ratings of the countries of the CEE are in the lower part of the investment range (A and lower), with the exception of the higher ratings of Slovakia, the Czech Republic (A+) and especially Slovenia (AA). Serbia, Macedonia and Bosnia and Herzegovina have noninvestment ratings.

Figure 1. Distribution of CEE countries ratings

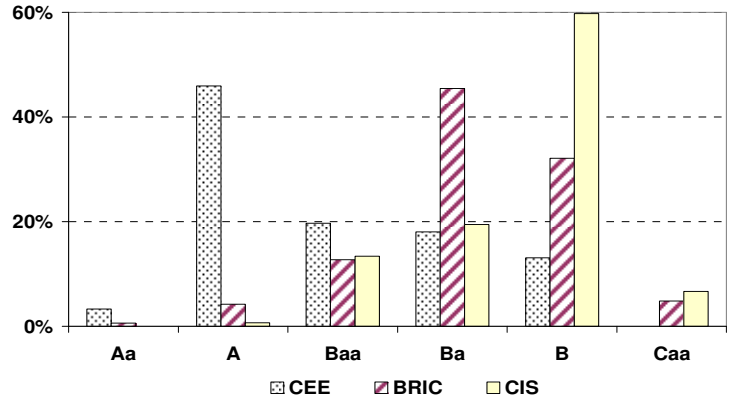


Source: own creation

At the same time, companies and banks mainly have ratings on the speculative level, and the number of rated entities is not high (Fig. 2). This is largely explained by European Union support for these countries, although that support has been limited since the recession began. On the other hand, there are few large companies in these

countries and the existing ones happen to be subsidiaries of transnational companies. This may potentially lower the level of the ratings, since their market capitalization (or volume of assets) is one of the main explanatory variables for them.
Thus, in spite of higher sovereign ratings, company ratings in these countries are on the level of Russian companies, being predominantly in the upper range of uninvestment ratings.

Figure 2. Distribution of banks developing countries ratings



Source: own creation

In spite of the comparative growth in the number of ratings, there are still clearly too few of them in developing countries. In addition, rating methods are largely inexplicit, and expertise plays a significant role in them which hinders the use of ratings for risk evaluation and decision making even on the state level. This is the reason for interest in the creation of internal ratings and model ratings that can be used as preliminary evaluations in making management decisions.

3. Overview of the literature and particulars of the methodology

Changes in ratings play an important role in transactions with interest-rate risks. In spite of a certain decrease in the normative significance of ratings, their presence and popularity have grown since the mid-1970s (Partnoy 2002). That is due largely to the regulatory significance of ratings, in addition to their market significance (Karminsky-Peresetsky 2009).

Although the initial application of ratings was to debt obligations, corporate ratings are now steadily gaining significance (Altman and Suggitt, 2000) for the organization of syndicated credits, the rating of corporate bonds and other purposes (Altman-Saunders 1998; Servigny-Renault 2004; Partnoy 2002).

The recession has exacerbated the problem of ratings. A number of researchers have shown (Altman-Rijken 2004; Pederzoli-Torricelli 2005; Curry et al. 2008) that ratings are pro-cyclical. There is a certain lag between the recording of financial results and the changing of a rating. While this creates stability in the rating process and averts reactions to comparatively insignificant events, it does not always provide for a timely reaction by ratings agencies to significant events. The widely-discussed collapse of several major companies is an example of this (Servigny-Renault 2004).

At the same time as (Amato-Furfine 2004) demonstrated based on the activities of U.S. firms and the data of the S&P rating agency between 1980 and 2000, credit ratings rise less during times of recession. However, ratings do not display excessive sensitivity to business cycles. Without discounting this factor, especially for new financial instruments (at present predominantly structured transactions), it should be noted that degradation can be connected with the dynamics of the market as a whole. With regards to banks, the absence of such degradation during the transition to ordinal scales was shown in (Karminsky-Peresetsky 2007).

The reason for the relative volatility of ratings is the specifics of the assignment of country ratings, especially for developing countries, considering the specifics of their reexamination and the modification of the rating agencies' methodology (Moody's 2007). In (Kaminsky-Schmucler 2002; Reinhart 2002), it is shown that there are three possible channels of instability that arise from changes to a country rating during a recession:

- directly through the value of debt obligations and stock on the market,
- through contagion and generated global unstability,
- due to markets in countries with lower ratings because of their greater liability to fluctuations.

In (Reinhart 2002), it is also shown that changes in sovereign ratings influence the spread and income of bonds, complicate access to resources of developing markets, hastens the transition from currency crisis to banking crisis and can act on recession. Some of the specifics of the rating process during crisis, including its effects on developing countries, are also examined in (Joo and Pruitt, 2006). Significant attention has been given to an analysis of indicators of financial and banking crises, especially with regards to developing countries (Kaminsky-Schmucler 2002; Rojas-Suarez 2002).

Evaluating sufficiency of capital as a measurement of risk based on internal ratings, as is foreseen by the IRB approach put forward as part of Basel II (Basel 2004), can use probability of default as a model as well as ratings. It can also use an evaluation of transition matrices and the mechanism of Markov chains (Frydman-Schuermann 2008) or econometric models, including scoring (Altman-Saunders 1998; Altman 2005; Feng et al. 2008).

A number of articles have been devoted to the elaboration of internal ratings and early warning systems. An overview of methodological specifics of elaborating models is made in (Altman-Saunders 1998; Karminsky et al. 2005).

In (Carey-Hrycay 2001), specifics are examined of the joint use of several methods for the evaluation of the probability of default on debt instruments according to an internal rating scale. Mapping to a standardized scale and scoring models are used. The presence of a data series of long duration is critical. A number of the specifics of the elaboration of internal ratings systems are also examined in (Jacobson et al. 2006; Servigny-Renault 2004; Hanson-Schuermann 2006). In the last of these articles, the confidence interval technique is used to refine rating gradation.

Selection of the explanatory variables is methodologically important for the elaboration of corporate ratings models. The indicators that are employed by the rating agencies can be also used (Moody's 2009; S&P 2008) by other researchers (Rojas-Suarez 2002; Servigny-Renault 2004; Guttler-Wahrenburg 2007; Curry et al. 2008). Typical indicators are the size of the company, its profitability, stability, liquidity and structure of the business, as it is expressed through companies' balance-sheet figures. In recent years, the use of such factors as state support for companies, and support from the parent company or group of companies, has become more prominent (Moody's, 2007; S&P, 2009).

The use of macroeconomic indicators has also become more typical recently (Carling et al. 2007; Curry et al. 2008; Peresetsky-Karminsky 2008). Among the most common indicators are inflation index, real GDP growth, industrial production growth and, for export-oriented countries, oil prices and changes in the cross-rate of currencies. Separate mention should be made of market indicators (Curry et al. 2008), which is especially important for publicly held companies (market value of companies, volatility of stock prices, systemic parameters, etc.).

It should also be noted that alternate indicators can also be used for developing countries (Altman 2005; Rojas-Suarez 2002; Karminsky et al. 2005) that are characteristic of developing markets and predominantly uninvestment ratings. These include value of resources, percent margin, pace of asset growth and growth of interbank debt, including on an international level.

Variation over time, both of the dimensions of the risk and the approaches of the rating agencies points to the use of a time factor in models including that of panel data. Some of the specifics of these approaches are found in (Elton et al. 2004; Frydman-Schuermann 2008).

The particular significance of industry affiliation and possible differences among ratings of companies of varied profiles and regions can be noted for corporate ratings (Niemann et al. 2008). This is connected with the specifics of business in various segments of production activity. Industry-specific models and the use of fictitious variables depending on the industry and the location of companies are possible.

A number of articles have noted differences in the ratings of various agencies (Packer 2002; Bae-Klein 1997; Kish et al. 1999). Corresponding factors of national and international agencies were analyzed in these works. In practically all the research, the two main rating agencies, Moody's and S&P, were considered.

The global financial recession exposed a number of problems of the ratings business and the entire financial management system. The financial system grew markedly in the first decade of the 2nd millenium (IMF 2009). New financial instruments were created, designed for higher profit without adequate quality of risk management. However, the inability of both regulatory organs and rating agencies to evaluate the global outlook and the threat from the asset price bubble.

Faith in light regulation based on the discipline of the financial market and hope for the successful distribution of risk through financial innovation does not preclude their concentration. An IMF analysis shows problems on three levels:

- Financial regulatory and monitoring organs proved to be incapable of exposing the higher concentration of risk brought on by the rapid growth in financial innovation.
- No account was taken of growing macroeconomic imbalances that contributed to the growth of systemic risk in the financial system and real estate market, as well as in the shadow financial system.
- International financial organizations and the monitoring and control system that was in place were unable to cooperate reliably on the international level to identify vulnerable areas in transnational relations.

Heightened possibilities of infection during the liquidity deficit are noted in (Karas et al. 2008) in regard to the Russian banking stystem and developing markets. It is shown there that regulating the liquidity of individual banks is not sufficient to avoid a systemic crisis. Rather, resource management by the lender of the last resort is necessary to restore the coordination of the interbank market.

The crisis emphasized the need for clearer signals in economic policy and the development of international cooperation on a number of economic and financial questions, including ratings. Among the steps suggested was taking leadership in responsive measures to systemic global risk. Establishing an early warning system should be included as one of these preventive steps.

Development and regulation of early warning systems require improved independent evaluation. Rating agencies should also be employed for this purpose. Policy has to be coordinated in various areas. Some of the elements included in these should be: supervision of the rating agencies, bookkeeping practice and auditing. Those initiatives should be coordinated both within a country and on the international level (IMF 2009).

Among the problems that arise in connection with the financial crisis, rating agencies' lag in the methodology of assigning ratings can be pointed out, along with calculation of the systemic risks of the global financial system and a lag in the

evaluation of complex financial instruments. A more active role of agencies in developing methodology, including areas emphasized by the Basel committee, can be noted (Basel 2009).

4. Data and models

4.1. Models and rating scales

Multiple choice probit models are used for follow-up studies. Earlier, they had been used for the elaboration of bank rating models. Further, three numerical scales are used. They correspond to the classes of ratings and gradations of ratings and a mixed scale that is tied to the limitations on the volume of the sample. The mapping of these scales to the numerical scales has 8, 18 and 12 levels, respectively. A higher rating corresponds to a lower number.

4.2. The Sample: financial and market variables, macrovariables and ratings

To elaborate ratings models for industrial enterprises, a sample was made on the principle of affiliation with companies in a number of industries (oil and gas, metals, retail trade, energy, telecommunications and heavy industry) that are potential competitors of Russian production companies of the same profile.

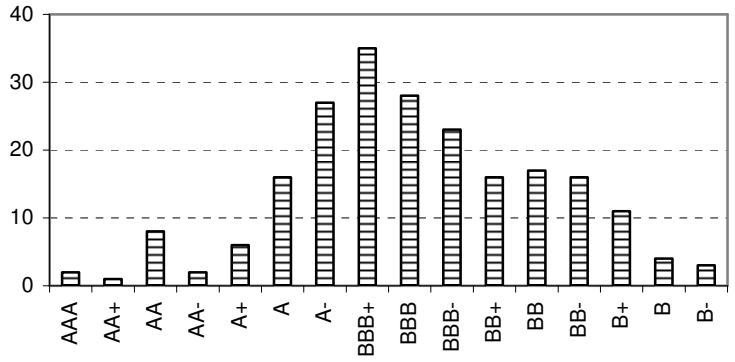
Conditions for selection in the sample were: the presence of an S&P rating at the time the sample was made, affiliation with a selected industry, accessibility of financial data and market indicators, and tradability as indicated by a liquid market for the company's stock. In the sample, there were 215 companies from 39 countries with S&P ratings as of spring, 2008.

The sovereign and corporate credit ratings of companies were taken from the websites of the S&P and Moody's agencies as they were presented as of February, 2009. Financial and market indicators were taken from the Bloomberg information system. A minimum of one financial indicator is assumed in each of the following groups: market valuation, size, profitability, market risks, balance-sheet and cash flow.

Distribution of the companies represented in the sample by rating gradation as of spring, 2008 is presented in Fig. 3. The small number of companies with ratings in categories AAA, AA and B justify the use of the mixed scale with differentiation of gradation in classes' A to B.

More than half the companies were represented by five countries: U.S. (74), Russia (31), Canada (15), Great Britain (13) and Japan (10). Division of the countries into developed or developing economies was done according to the methodology of the International Monetary Fund (IMF). The sample contains a greater number of companies from developed countries (152) than from developing ones (63).

Figure 3. Distribution of companies in the sample by gradation of rating



Source: own creation

The time lag between financial indicators and ratings was determined to be 1.5 years (financial indicators were taken from autumn, 2007 and ratings from the beginning of 2009). This agrees with the conclusions reached in (Karminsky-Peresetsky 2007) for bank ratings, and with a number of other articles, such as (Altman-Rijken 2004). Financial and market data for only one accounting period can be considered a flaw in the sample.

The sample of banks included (Peresetsky-Karminsky 2008) about 1000 observations in 2002-2005 of 380 banks in 42 developing and developed countries. The distribution of the sample by gradation and region, and the statistical distinctions of the sample may be found in the work indicated. The sample included 37 banks from CEE.

4.3. Explanatory variables and descriptive statistics

The lists of the main financial and market indicators used for the elaboration of the rating models, as well as a description of them and their expected influence on the ratings of industrial companies and banks are partly presented in Tables 1. Supplemental indicators have been used in a number of models as described in the text. According to the Bloomberg, market risks correspond to the Beta coefficient and Volatility.

Country distinctions will be calculated with macrovariables: annual rate of inflation, real GDP growth, CPI (Corruption Perception Index), and sovereign rating, which can be seen as a proxy for the institutional environment in which a company works. The first two indicators were taken from World Bank 2007 data, the corruption index comes from Transparency International, and sovereign ratings were taken from rating agencies data. The expected influence of inflation and the

level of corruption are negative. The remaining indicators are positive. Higher CPI corresponds to lower corruption. This indicator with other macrovariables may be used as explonatory variables instead of sovereign rating.
A number of dummies will also be used in the models. The relationship of a company to a country with a developed economy (1- developed, 0- developing) and Russia were introduced for the analysis of the influence of affiliation to the groups on the level of the rating. Companies' liability to risk in dependence of their affiliation with various industries will be traced through the introduction of dummies affiliated with the following sectors: telecommunication, oil and gas, metal and mining, consumer, utilities, and manufacturing and chemicals.
The variables used in the models will be commented on in the analysis of the resulting tables.

5. Econometric rating models

5.1. Models of corporate ratings

The models examined in this work depend exclusively on open information. Accordingly, we will examine the possibilities derived from the use of indicators based on company financial accounts prepared to international standards and supplemental possibilities provided by macroeconomic variables and market elements.

Among the questions that we face in elaborating rating models, we emphasized the following:

- Do the ratings of enterprises depend on their affiliation with a group of countries (developing countries, Russia)?
- Do ratings depend on affiliation with an industry?
- Is it possible to incorporate a high enough level of information in sovereign ratings using macrovariables?

In the elaboration of the base rating model for the Standard & Poor's agency, indicators were chosen from each group of financial indicators. The indicator of size of the company was included in all models. Below (in logarithmic scale), capitalization of the company is taken as the same. As criteria for comparison at the first stage, statistical characteristics of the quality of the models (Pseudo-R^2, t-statistics) were used, to which predictive characteristics were added at the next stage.

Coefficient signs match prior expectations. As one of the areas for the improvement of the quality of the model, transition to a scale of gradations or a mixed scale may be considered. This will ensure the models are more accurate. Relevant models are presented in Table 1.

Table 1. Models of ratings on scales of gradations and a mixed scale

	S&P		S&P, market		Moody's
Scale	**Grades**	**Mixed**	**Grades**	**Mixed**	**Mixed**
Volatility of value			0.022***	0.068***	
			(0.0060)	(0.011)	
Share value/			-0.015**	-0.26***	
Cash flow			(0.0075)	(0.0078)	
Capitalization	-0.517***	-0.509***	-0.528***	-0.588***	-0.502***
(logarithm)	(0.151)	(0.153)	(0.154)	(0.158)	(0.158)
EBITDA/Interest	-0.0062*	-0.0062*	-0.0089***	-0.0086***	-0.017**
expenses	(0.0034)	(0.0035)	(0.0033)	(0.0033)	(0.0070)
Return on assets	-0.035***	-0.033**	-0.042***	-0.041***	-0.032**
	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)
Long-term debt/	-0.012*	-0.012**			0.0095*
Capital	(0.0045)	(0.0047)			(0.0049)
Inflation level	0.379***	0.391***	0.443***	0.561***	0.345***
	(0.063)	(0.065)	(0.070)	(0.077)	(0.069)
GDP growth	-0.186***	-0.184***	-0.185***	-0.252***	-0.96
	(0.060)	(0.060)	(0.185)	(0.053)	(0.076)
Metal and mining			-0.456*	-0.835***	
			(0.258)	(0.270)	
Oil and gas	-0.619***	-0.625***	-0.866***	-0.954***	-0.413*
	(0.197)	(0.198)	(0.212)	(0.215)	(0.228)
Utilities	-1.217***	-1.223***	-1.127***	-0.973***	-1.403***
	(0.0224)	(0.0225)	(0.234)	(0.238)	(0.243)
Developed countries	-0.636**	-0.611**			0.086
	(0.308)	(0.310)			(0.355)
Pseudo-R^2	0.159	0.169	0.166	0.219	0.148
Accuracy of forecast	34	31	35	39	33
Error up to 1 grades	52	57	51	50	57
Error up to 2 grades	14	12	13	10	9

*, **, *** signify 10%-, 5%- and 1%-level of significance, respectively.
Source: own creation

For models using market indicators, as before, volatility of a company's share value exerted a negative influence. The influence of the ratio of share value to cash flow is positive. Among the balance indicators, size of the company (capitalization) retains its positive influence, as do probability of loan repayment with earnings and return on assets. The influence of the long-term debt as ratio to capital is also positive, but the sign in the model was due to the rather high negative correlation of this variable with the three previous ones.

The inclusion of macroeconomic indicators and consideration of the factors of industry and country affiliation raise the quality of the base model. The influence of macroeconomic factors on the rating is expected: negative for inflation and positive for the GDP growth indicator, which determines the level of stability of the external business environment. Developing countries dummy is among the explanatory variables and have positive influence.

Affiliation with developed countries in our research was not obviously a positive factor, which, of course, is connected with the correlation present between this element and the macroenvironment indicator. Russian companies are not significantly distinguishable from companies in other developing countries.
Among industries, the positive influence on the rating of affiliation with the oil and gas or utilities industries can be noted. Moreover, an analysis of average deviations shows that that tendency was stable.

The use of a stock market indicator (the S&P market model) is raising of the quality of the models for publicly-traded companies, that is, those with market quotations. In particular, there were in our distribution indicators of value volatility, level of systemic risk, ratio of share value to cash flow and a number of others, as well as an indicator of market discipline in the country where the company is located.

Systemic risk was insignificant in practically all the models examined. Volatility of value negatively influenced the level of the rating. Growth of share value in relation to cash flow has a positive influence on the rating. The positive influence of capitalization, the ratio of gross earnings to interest expenses and return on assets is preserved, as is the influence of macroeconomic indicators.

An analysis of the predictive power of the models was conducted by making a comparison of the true ratings of enterprises with their model values. The accuracy of the forecasts was approximately equal for the models examined. Accuracy of forecasts with an error of 1 gradation was about 90% and the accuracy of forecast was 39% and 33%, respectively. The accuracy of forecast with an error of no more than 2 gradations was higher than 99%, which is better than for models in the scale of classes.

5.2. Rating models for banks

Modeling ratings of financial stability for banks (bank financial strength rating, BFSR) depends on the same scheme. Selection of explanatory variables is made by both statistical and predictive criteria. The results of the appraisal of various models for choosing a bank profitability indicator are presented in (Peresetsky-Karminsky 2008). Unlike models for rating bank deposits, BFSR is not grouped in classes, but presented in grades.

A logarithm of assets is used as a variable to characterize the size of the bank. The debt-to-equety ratio characterizes the adequacy of the capital. The share of

overdue credits was chosen as a proxy for quality of assets. That variable has practically no correlation with other indicators except the provision for impairment of loans.

The following conclusions can be drawn from an analysis of the signs of the coefficients:

- Banks located in developing countries have a lower BFSR than banks in developed countries, and Russian banks are undervalued even in relation to banks in developing countries.
- The volume of assets influences the BFSR positively.
- Parameters reflecting efficiency (ratio of personnel expenses to operating income), the quality of assets (ratio of overdue debt to all debt) and ratio of client funds to own capital are significant; growth of personnel expenses and the portion of bad debts or financial leveraging have a negative influence on BFSR.
- The ratio of interest expenses to interest income and return on assets yielding interest income are indicators of profitability; net interest margin has the expected signs that reflect the fact that growth of profitability indicators encourages stability.

It should especially be noted that the coefficient before the value of interest liabilities is positive, which means that banks that pay more to obtain funds have a lower BFSR indicator. This conclusion coincides with a previous analysis (Karminsky-Peresetsky 2007). It is the value of resources that to a large extent determines the level of stability and efficiency of banks' activities.

The forecast of ratings based on the financial results of Russian banks in 2005, which were not used for the elaboration of the model, gave an exact forecast on the level of 56% and over 90% with 1 grade error scope.

The significance of the developing markets dummy should also be brought to attention, as well as differences in evaluations of Russian banks in comparison with banks of developing markets. This indicates the potential for Russian banks' ratings growth because of both the rise of the level of evaluation of business in Russia as a whole and the rise of the quality of the operating and regulatory environments, which have been a substantial hindrance to the rice of the evaluation of Russian banks and industrial companies. Such improvements were partially implemented in 2005-2008.

5.3. Comparative analysis of the corporate ratings of the two agencies

We also made a statistical comparison of the ratings of the S&P and Moody's agencies. We used a subsample containing observations of companies that have ratings from both agencies simultaneously. That sample amounted to 178 companies.

Three measures of difference were used for the comparison:

Δ - the difference between S&P and Moody's ratings,

FDS = $|\Delta|$ - the difference module,

SPLIT - a binary function that takes the value of 0 when the ratings coincide and 1 otherwise.

For each measure, we elaborated econometric models to determine the factors that significantly influence agencies' opinions. The results of the comparison are presented in Table 2.

Table 2. Comparison of the ratings of the S&P and Moody's agencies

	Model number				
	Difference Δ		**Difference module**		**SPLIT**
	1d	2d	1a	2a	1s
Return on assets	0.028**	0.022*			
	(0.011)	(0.011)			
Instant liquidity	-0.462***	-0.507***			
	(0.140)	(0.150)			
Fixed assets/Assets		-0.924**			
		(0.383)			
Share value/		-0.0098			
Cash flow		(0.0073)			
Value volatility			-0.007*	-0.006	-0.0038*
			(0.0036)	(0.0036)	(0.0023)
Inflation level	-0.221***	-0.156***			
	(0.056)	(0.060)			
Corruption index	-0.303***	-0.305***	-0.81		
	(0.060)	(0.058)	(0.053)		
Consumer sector	-0.857***	-1.084***	-0.169		
	(0.284)	(0.288)	(0.216)		
Developed countries			-0.572**	-0.838***	-0.309***
			(0.237)	(0.163)	(0.086)
Russia			-0.649***	-0.098	
			(0.243)	(0.341)	
Other insignificant				+	
Pseudo-R^2	0.182	0.217	0.127	0.140	0.061

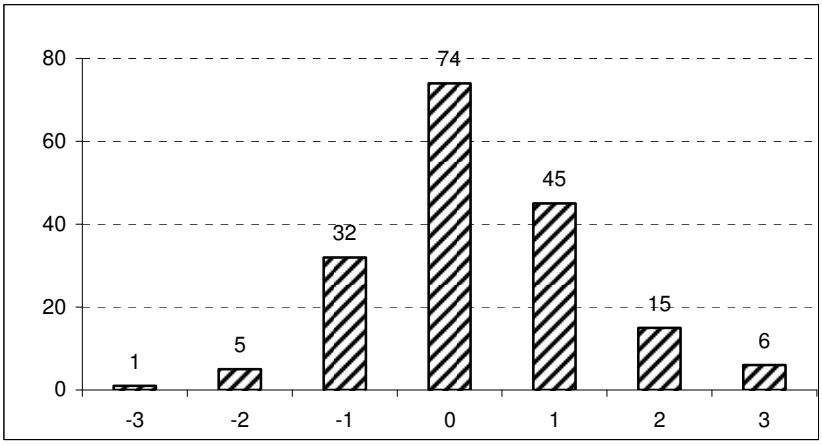
*, **, *** signify 10%-, 5%- and 1%-level of significance, respectively.

Source: own creation

The following conclusions can be drawn from this analysis of the table:

1. The most substantial differences are in the rating of companies from developing countries, which is expressed either directly through the dummy or indirectly as the influence of corruption.
2. Among the most significant and positive factors influencing the ratings of the Moody's agency, return on assets can be pointed out. For the S&P, factors such as instant liquidity, share of fixed assets in assets, level of inflation and corruption were more significant.
3. No substantial difference in the ratings of Russian companies was uncovered except indication of the large differences in the ratings on both the positive and negative sides (model 1a).
4. Growth of the volatility of companies' share value creates multidirectional differences, although not at a very high level of significance – 10% (models 1a and 1s). That indirectly confirms the previous conclusion.
5. The S&P agency takes a more critical stance toward companies from the consumer sector (models 1d and 2d). On average, the divergence between the agencies' ratings, expressed as their difference of the ratings, was 0.26 grades for our sample and is characterized by the bar chart in Fig. 4.

Fig. 4. Sample distribution of the difference between the ratings of the S&P and Moody's agencies



Source: own creation

6. Conclusion

Probability evaluations based on econometric models should be an integral part of internal rating systems, which determines the potential practical significance of such models, especially in developing countries. In this article, rating models of corporate ratings were elaborated based on multiple choice models. Financial indicators of corporations, dummies of regional and industry affiliation, market and macroeconomic indicators were used as explanatory variables.
It was shown that:

- A set of explanatory financial indicators is sufficient and are interpreted well to rating models.
- When other conditions are equal, industrial companies in developing countries receive lower ratings in comparison with companies in developed countries.
- The predictive power of corporate ratings models is somewhat better than bank deposit rating models.
- The degree of influence of country affiliation, return on assets, instant liquidity and inflation level are prominent factors that differentiate the approaches of the two agencies.

References

Altman E., 2005: An emerging market credit scoring system for corporate bonds. *Emerging Markets Review*, 6, 311-323. p.

Altman, E. - Rijken, H. 2004: How rating agencies achieve rating stability. *Journal of Banking & Finance*, 28, 2679-2714.p.

Altman, E. - Saunders, A. 1998: Credit risk measurement: Developments over the last 20 years. *Journal of Banking & Finance*, 21, 1721-1742. p.

Altman, E. - Suggitt, H. 2000: Default rates in the syndicated bank loan market: A mortality analysis. *Journal of Banking & Finance*, 24, 229-253. p.

Amato, J. - Furfine, C. 2004: Are credit ratings procyclical? *Journal of Banking & Finance*, 28, 2641-2677. p.

Bae, S.C. - Klein, D. P. 1997: Further evidence on corporate bonds with event-risk covenants: Inferences from Standard and Poor's and Moody's bond ratings. *The Quarterly Review of Economics and Finance*, 37, 709-724. p.

Basel, 2004: *International convergence of capital measurement and capital standards*. A revised framework. Basel, Bank for International Settlements, Basel Committee on Banking Supervision.

Basel, 2009: *Revisions to the Basel II market risk framework* - final version. Basel, Bank for International Settlements, Basel Committee on Banking Supervision.

Carey, M. - Hrycay, M. 2001: Parameterizing credit risk models with rating Data. *Journal of Banking & Finance*, 25, 197-270. p.

Carling, K. - Jacobson, T. - Linde, J. - Roszbach, K. 2007: Corporate credit risk modeling and the macroeconomy. *Journal of Banking and Finance*, 31, 845-868. p.

Curry, T. - Fissel, G. - Hanweck, G. 2008: Is there cyclical bias in bank holding company risk ratings? *Journal of Banking & Finance*, 32, 1297-1309. p.

Elton, E. - Gruber, M. - Agrawal, D. - Mann, C. 2004: Factors affecting the valuation of corporate bonds. *Journal of Banking & Finance*, 28, 2747-2767. p.

Feng, D. - Gourieroux, C. - Jasiak, J. 2008: The ordered qualitative model for credit rating transitions. *Journal of Empirical Finance*, 15, 111-130. p.

Frydman, H. - Schuermann, T. 2008: Credit rating dynamics and Markov mixture models. *Journal of Banking & Finance*, 32, 1062-1075. p.

Guttler, A. - Wahrenburg, M. 2007: The adjustment of credit ratings in advance of defaults. *Journal of Banking & Finance*, 31, 751-767. p.

Hanson, S. - Schuermann, T. 2006: Confidence intervals for probabilities of default. *Journal of Banking & Finance*, 30, 2281-2301. p.

Jacobson, T. - Linder, J. - Roszbach, K. 2006: Internal ratings systems, implied credit risk and the consistency of banks' risk classification policies. *Journal of Banking & Finance*, 30, 1899-1926. p.

Joo, S. - Pruitt, S. 2006: Corporate bond ratings changes and economic instability: Evidence from the Korean financial crisis. *Economics Letters*, 90, 12-20. p.

IMF 2009. *Global Financial Stability Report. Navigating the Financial Challenges Ahead* / October 2009, International Monetary Fund.

Kaminsky, C. - Schmucler, S. 2002: Rating agencies and financial markets. In *Ratings, rating agencies and the global financial system*. Editors R. Levich, G. Majononi and C. Reinhart. Boston, Kluwer Academic Publishers. 227-250. p.

Karas, A. - Schoors, K. - Lanine, G. 2008: Liquidity matters: Evidence from the Russian interbank market // *BOFIT Discussion papers*, No. 2008/19.

Karminsky, A. - Perestsky, A. 2007: International agencies rating models. *Prikladnaya ekonometrica* (Applied econometrics), 1, 5, 1-17. p.

Karminsky, A. - Perestsky, A. 2009: Ratings as financial risks measure. Evolution, purposes, applications. *Journal of New economic association*, No. 1-2.

Karminsky, A. - Perestsky, A. - Petrov, A. 2005*: Ratings in economy: methodology and practice*. Financi i Statistika (Finance and Statistics Publishing House), 240. p.

Kish, R. - Hogan, K. - Olson, G. 1999: Does market perceive a difference in rating agencies? *The Quarterly Review of Economics and Finance*, 39, 363-377. p.

Moody's 2007: *Incorporation of joint-default analysis approach into Moody's bank ratings: a refined methodology*. Moody's Investors Service, www.moodys.com.

Moody's 2009: *Moody's Financial Metrics. Key Ratios by Rating and Industry for Global Non-Financial Corporations*. Moody's Investors Service, www.moodys.com.

Niemann, M. - Schmidt, J. - Neukirchen, M. 2008: Improving performance of corporate rating prediction models by reducing financial ratio heterogeneity. *Journal of Banking & Finance*, 32, 434-446. p.

Packer, F. 2002: Credit ratings and the Japanese corporate bond market. In Levich, R. – Majononi, G. – Reinhart, C. (eds): *Ratings, rating agencies and the global financial system*. Kluwer Academic Publishers, Boston, 177-201. p.

Partnoy, F. 2002: The Paradox of Credit Ratings. In Levich, R. – Majononi, G. – Reinhart, C. (eds): *Ratings, rating agencies and the global financial system*. Kluwer Academic Publishers, Boston, 65-84. p.

Pederzoli, Ch. - Torricelli, C. 2005: Capital requirements and business cycle regimes: Forward-looking modeling of default probabilities. *Journal of Banking & Finance*, 29, 3121-3140. p.

Peresetsky, A. - Karminsky, A. 2008: Models for Moody's bank ratings. *BOFIT Discussion Papers,* 2008/17.

Reinhart, C., 2002: Sovereign ratings before and after financial crisis. In Levich, R. – Majononi, G. – Reinhart, C. (eds): *Ratings, rating agencies and the global financial system*. Kluwer Academic Publishers, Boston, 251-268. p.

Rojas-Suarez, L., 2002: Rating banks in emerging markets: What credit rating agencies should learn from financial indicators? In Levich, R. – Majononi, G. – Reinhart, C. (eds): *Ratings, rating agencies and the global financial system*. Kluwer Academic Publishers, Boston, 177-201. p.

Servigny, A. – Renault, O. 2004: *Measuring and managing credit risk*. McGraw-Hill, N.Y. etc., 467 p.

S&P 2008. *Global economic decline increases Russia's country risk*. Standard & Poor's. www.standardandpoors.ru.

S&P 2009. *Improved methodology for assigning ratings to organizations linked to the state.* Standard & Poor's. www.standardandpoors.ru.