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**Corporate borrowers default probability modeling**

Today the impact of credit risk is growing in the Russian economy. Concerning banks and other financial institutions this fact implies there is a necessity to take a deeper look at the estimation of the risks they undertake.

Under Basel II credit risk is measured with the use of its three major components – PD (Probability of Default), LGD (Loss Given Default) and EAD (Exposure at Default). The presentation focuses on PD, providing information about methods widely used to assess it and goes on to design a mathematical model able to predict corporate borrowers PD based on the figures of their financial statements.

The presentation starts with the interpretation of the terms of default and probability of default as it is put down in Basel Accords and as it is used in the practice of commercial banks. Then various methods of PD assessment are classified by their scientific principles. Artificial neural networks, external ratings approach, market data analysis and expert adjustments are mentioned, while the presentation focuses on mathematical analyses and econometric modeling as means to assess PD. Its core consists of Altman’s Z-scoring and binary choice models which are covered in the presentation.

There is also an overview and classification of the crucial financial, macroeconomic and qualitative factors which are most frequently used in those models and researches.

Then combining Altman’s Z-score and logistic regression a model estimating PD of corporate borrowers is designed. The model made by the author evaluates Russian industrial companies default probabilities on the basis of their financial statements figures such as capital adequacy, debt, profitability ratios etc. by discriminatory and regression analysis. The presentation describes the most important stages of the model’s development, such as selecting input data, designing the sample, transformation of financial indicators, calculating correlation of financial indicators values with default probabilities, excluding nonfactors and crosscovariance, designing Z-scoring function, calculating logistic regression calibration coefficients and finally assessing the predictive power of the developed model.

The input data is collected from RUSLANA database and contains a number of observations each containing a block of financial indicators values. For each observation it is checked whether the company was liquidated within a year or not. After each financial indicator is transformed into a coefficient over the 0 to 1 range, the author analyses Spearman rank correlation between the transformed values of the financial indicators and default markers (0 – for companies not liquidated within a year, 1 – for liquidated companies). Factors that showed not significant correlation as well as those factors that had high crosscovarience ratios with more significant factors, were excluded from the model and disregarded in the following calculations. After the list of indicators used in model was formed, each indicator was assigned a weight coefficient in Z-scoring function. The weight coefficients were found with the use of ordinary least squares technique. After each observation had its Z-score, calibration coefficient of logistic regression were calculated once again using ordinary least squares.

The designed model has a notably good predictive power and demonstrates the efficiency of applying PD assessment with widely used financial indicators. As a downside the model operates with liquidation of the company as the default criteria, which could both degrade the predictive power of the model (the company may get liquidated not due to financial problems) and boost it (liquidation generally comes way later than payment arrears or restructuring and is a consequence of disastrous financial condition of the borrower). Provided the model is improved by introducing internal data concerning each borrower and extra economic factors described in the first part of the presentation, it can be used in the practice of a Russian commercial bank.