

## USE OF MACRO-ECONOMIC FACTORS IN CREDIT SCORING – APPLICATION TO POINT IN TIME RISK EVALUATION OF SMEs

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Credit scoring techniques have been widely used for creditworthiness assessment of consumers and companies and have been developed using statistical methods such as logistic regression. The focus of credit scores has been mostly ranking risk and little attention has been given to the reliability of the estimated probabilities of default throughout different economic conditions. The need for PD (probability of default) to calculate capital requirements for financial institutions in Basel II Accord brought the need of models that can produce reliable PDs estimation.

A typical credit scoring model supplies estimates for PD from a logistic formula or from historical mapping between scores and default performance. These estimates are conditional to the state of the economy current during the period of data used for the model development or the score-PD mapping process. Obtaining a PD that is conditional to the current or a forecasted economic scenario implies in including adjustments for changes in the economic conditions into credit scores.

We propose a way to include the effect of economic conditions into the traditional logistic regression models. The approach uses an ad-hoc econometric model to generate a correction factor that comprises the effect of macro-economic variables. The correction factor works like a positive or negative weight due to a favorable or unfavorable economic scenario. The advantage of using an ad-hoc approach is that an institution does not have to develop a new whole set of credit score models to take into consideration the effect of economic conditions. It only has to be able to back test its models over an historical period.

Time series of correction factors were obtained using the average predicted PD and the real default rate in each time period for different sectors. Dynamic econometric models were estimated for the time series of correction factors using a set of macro-economic variables as covariates. The econometric models are used to estimate a correction factor for a current or projected economic scenario.

Besides more accurate prediction of PD, the use of such an approach can lead to better results even if one is interested only in risk ranking due to the effects of different sensibilities to economic factors of different sectors. It is also useful in performing stress tests of PDs using projected stress scenarios to obtain the correction factor.

We applied the proposed methodology in the risk evaluation of Brazilian small and medium companies and we show that the precision of estimated PDs is substantially improved. We also show that there is a slightly improvement of the risk discrimination performance of the model.