



## Motivation

Economic and financial downturns are usually accompanied by a reduction in lending activities by commercial banks. This occurs due to two factors: reduced loan supply, and lower customer demand. The reduction in demand for loans can be explained by several factors including overall lower industrial activity, reduced opportunities for profitable investments, and increases in unemployment as well as an increase of the risk of becoming unemployed (due to a reduced confidence in economic conditions). On the other hand, the reduction in loan supply is primarily caused by a general increase in uncertainty within the economy as well as by a corresponding increase in bank-client information asymmetry which in the end raises the risk of making unsound lending decisions or errors in the evaluation and selection of clients during the loan application process. These factors give rise to a phenomenon in which (potentially worse, rather than the "better quality") clients more actively seek funding, which in itself increases the probability of approving loans to higher risk clients, i.e. to clients who show higher levels of potential default risk.

As a reaction to these two factors, banks frequently implement stricter loan approval standards (without the necessary segmentation), primarily by approving loans at interest rates that reflect the deteriorated average loan quality of clients and potential clients on the market, resulting in the high-quality clients being forced to pay too high a price for much needed funding while lower-quality clients pay too low a price which does not reflect the risk of the customer. As a result high-quality clients, who do not have problems with short-term liquidity, can and often do completely abandon the idea of the needed investment (i.e. required financing) in such circumstances, meaning lost business for the bank.

Other banks, aware that in an environment of rising interest rates the predominantly riskier clients and loan applicants are willing to borrow money, give up the idea of increasing interest rates and introduce stricter loan approval standards in order to reduce the total increase in their exposures to segments of (non-government-controlled) companies and private individuals, reflected in the reduction of credit limits at the level of particular industries, groups of related persons, and individual clients.

Such a strategy consequently leads to an increase in lending to governments, which (driven by the availability of slightly cheaper liquidity due to regulatory exceptions in capital requirements related to this type of bank exposure) start to borrow beyond economically rational limits, gradually increasing the overall potential for a default risk of the central government (i.e. Sovereign Risk). This strategy of limiting the loan supply has some limitations of its own since in terms of the total increase in default risk it indirectly (by insufficient lending to clients exposed to relatively minor problems in the short term) further increases the rate of transformation of good clients (those who more-or-less orderly fulfil their credit obligations) into worse performing clients thus increasing the subsequent demand for restructuring down the road.

The described commercial bank lending strategies are the result of the aforementioned increase in information asymmetry due to it becoming harder than before to distinguish between (potentially) good and bad clients. Consequently, the commercial banks' senior management finds it more difficult to anticipate the expected significant changes in behaviour and credit performance of debtors, which is why they cannot adequately integrate them into the process of loan decisioning.

Therefore the banks have gradually turned to various attempts to control and limit these information asymmetries (and the associated risk of erroneous selection of clients) by improving

the process of ex-ante assessment of the credit quality of loan applicants. This improvement can be achieved by simultaneously using two approaches:

- More frequent direct contacts with clients and borrowers ("relationship banking"), and
- Using (i.e. introducing or upgrading and improving the existing) quantitative tools, such as credit scoring models<sup>1</sup>.

Since the increase in the discriminatory power and predictability of scoring and rating models reduces the effects of the risk of erroneous selection, it is necessary to find methods to contribute to this. One of those methods is more frequent verification of accuracy (validation) of existing models and, consequently, more frequent re-development (and calibration) of those models based on more recent historical data (without using those from the period before the crisis), combined with the introduction of the so-called behavioural component of the models in all segments of the loan portfolio. This introduction of more frequent "back-testing", validation, re-development and calibration of quantitative models for credit quality – in accordance with the available human and technical resources of commercial banks – allows for better optimisation of loan approval standards (set by the bank's risk control function) and sales targets (i.e. mostly profitability-based targets these days) at the level of the institution, in the environment of increased competition and stricter supervisory practices within the financial sector.

As a result of these challenges, SAS, the leader in business analytics software and services, in cooperation with Mr. Stjepan Anić, a regionally renowned expert in field of risk management in financial institutions, decided to design this cutting-edge two-day seminar to provide much needed insight – for all relevant managers, key employees and other specialists – in all of these knowledge areas ((relating to data analytics, business, and financial analytics), and guidance in best-practice methods related to the development, calibration, testing, validation and implementation of credit quality models (scoring and rating models) in the post-crisis period.

The content of the seminar is well balanced so it provides participants with a grounding in all relevant aspects of the knowledge areas relating to the development, testing and implementation of these models. Also, the overall objectification of the credit quality assessment of clients and loan applicants necessary to manage the loan decisioning process in the current business and regulatory context is brought closer to the broader set of users of these models in commercial banks. In this way the seminar provides a kind of a much needed link between the theoretical and practical as well as between the technical and business dimension of modern risk and portfolio managers.

SAS is a global and regional leader in the field of business and predictive analytics and an organisation which is aware of the fact that, in conditions of increased uncertainty, a careful approach to the development and use of analytical tools and quantitative models for assessing credit risks presents an absolutely necessary tool to commercial banks for the management of credit portfolios.

Mr. Stjepan Anić is a renowned expert in using quantitative methods when it comes to risk management in financial institutions.

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<sup>1</sup> Note: Bearing in mind that in terms of the onset of the financial and economic crisis, and increase in the overall uncertainty in the market, the aforementioned models quickly become unreliable; a decline occurs primarily in their accuracy, but also in the discriminatory power

# Detailed agenda

## Day one: Credit scoring models in the Retail segment

### Model development

- Two types of models («application scoring» and «behavioural scoring»)
- Types of variables (statistical and business classification of candidate variables)
- Preparation of data (from cleaning and filtering data to the preparation, the so-called "modelling sample")
- Theoretically available and practically tested methods of making models (from decision trees, neural networks, to logistic regression and the development of "scorecards")
- Selection of variables (different measures of predictability of candidate variables)
- Statistical measures of performance (from the discriminatory power to the overall accuracy of the model)

### Model calibration

- "Product-" and "client-based" models
- Determination of "cut-off score" (from the statistical background to the search for balance between protection and result)
- Combining application and behavioural components (how to get the overall credit score)
- Credit rating in Retail?

### Initial model validation

- Data validation
- Quantitative validation
- Qualitative validation

### Implementing the model in the loan approval process

- "Work-flow" of loan approval (key elements)
- "Credit scoring" models and loan application processing system (APS)
- Technical and user testing of the system

### Follow-up model validation and model performance management

- Out-of-time validation and the champion-challenger method
- "Life cycle" model of credit quality in the Retail segment

### A practical example of the described phases in SAS software

## Day two: Credit rating models in SME/Corporate segment

### Model development and calibration

- Typical model components in SME/Corporate segment (financial "scorecard", "soft facts" correction, behavioural model correction)
- Types of variables (classification according to the creation method and financial classification of candidate variables)
- Preparation of data (calculation of financial indicators and initial exploratory analysis, creation of "modelling sample")
- Development of models (selection of variables - the balance between statistical measures and economic significance)
- Calibration of rating models (from financial score to final rating)

### Initial model validation

- Specifics of all types of validation in SME/Corporate segment

### Implementing the model in the loan approval process

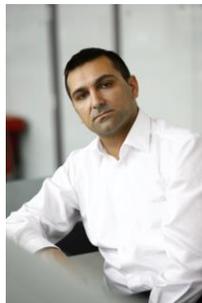
- Key elements of loan approval "work-flow" – Specifics in SME/Corporate segment
- Limits of standardization of loan approval processes in the domain of legal entities
- Internal measures of credit worthiness of clients and the system for loan application by business entities
- Technical and user testing of the loan approval system

### Follow-up model validation and model performance management

- Out-of-time validation and the champion-challenger method
- Guidelines for model management in SME/Corporate segment

### A practical example of the described phases in SAS software

## Lecturers



### Stjepan Anić

Stjepan Anić, CEO at Op2M Company, is one of the leading experts in C/SEE in fields of risk control and management, financial regulation and business process optimization in financial institutions. He has gained practical experience during a long career in commercial banking in positions ranging from project manager to management board member, as well as through numerous consulting engagements related to the regulatory compliance, risk management, optimization of key business processes and corporate governance in financial institutions. He is a Regional innovator in the field of risk education and assessment, with extensive experience in the country and abroad. Stjepan has MS degree in Engineering Physics from Zagreb's University.



### Aleksander Pivk

Aleksander Pivk, Practice Leader in SAS Adriatic region, deals with solving different business problems using advanced techniques of data mining, primarily in banking, telecommunications and retail industries. His main fields of work are analytical CRM (Customer Relationship Management), credit risk modelling, analysis of social networks, collection optimization, fraud detection, and text analytics. He has gained practical experience through many client implementations, where he is responsible for creating a vision (of the project), project management, business and technical consulting, coaching and knowledge transfer – always with the aim of creating value and improving measurable results. Dr. Pivk joined SAS in 2006, immediately after the completion of his doctoral studies with an emphasis on the discovery and extraction of knowledge from text.

He is also a researcher at the Department of Intelligent Systems, Jožef Stefan Institute, Ljubljana, and a member of the ECCA (European Coordinating Committee for Artificial Intelligence) and SLAIS (Slovenian Artificial Intelligence Society).

## Who should attend seminar

- Higher and middle management of commercial banks and leasing companies;
- Quantitative analysts;
- Risk managers and experts specialising in credit risk management;
- Collection officers;
- Credit analysts;
- Accounting analysts of banks and other financial institutions;
- Specialists in retail sector (those in corporate banking, as well as those in business with private individuals);
- Portfolio management specialists;
- Specialists in the sector of internal control and audit.

## Programme

09.00 – 09.15	Participants' arrival and handover of materials
09.15 – 10.45	Work part of the seminar
10.45 – 10.55	Coffee Break
10.55 – 12.25	Work part of the seminar
12.25 – 13.10	Lunch Break
13.10 – 14.35	Work part of the seminar
14.35 – 14.45	Coffee Break
14.45 – 16.15	Work part of the seminar / Discussion