Chapter 1

Bayesian Networks as a Decision Support Tool in Credit Scoring Domain

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ABSTRACT

The main purpose of this article is to discuss applicability of Bayesian belief networks (BBN) within the procedures of working-capital credit scoring conducted in commercial banks. A brief description of Bayesian formulation of causal dependence and its strength is given. Inferential and diagnostic features of BBN are illustrated using sample structure. As an example we present and compare results of estimating a credit risk using two techniques: traditional credit-scoring system and BBN structure.

INTRODUCTION

The history of the credit scoring ideas started in the early ’40s, but the prosperity of the scoring techniques became widespread in the ’50s, when William Fair and Earl Isaac set up Fair, Isaac and Company in San Francisco (Janc & Kraska, 2001). The first credit scoring system was called a numerical scoring system. Credit scoring in a bank is a supportive procedure of granting individual and/or business credits.

In the system, the rules of gathering information are formalized so they give the basis for credit approval. This information is substantial for assessment of the risk level of a credit. Risk management reduces risk of granted credits, minimizes
the number of irregular credits and consequently reduces the costs of capital reserves. Thus, the quality of the system directly influences return of assets of the bank.

The quality measures of the system are:
- reliability of evaluation of economic and financial position of a customer
- correctness of risk estimation assigned to a specific class of economic and financial position

Taking bank security into consideration, it is recommended to take rigorous measures in the crediting strategy. However, following them too strictly can unnecessarily limit accessibility to credits, degrade market share and influence profitability of the bank.

Apart from the risk reduction, the quality of service is very important as well. Quality level can be measured using the following criteria:
- credit accessibility
- time required by a bank to process a single credit application
- credit cost

From the point of view of the bank, an additional criterion is consistence of risk classification—for customers of similar profiles, the decisions should be consistent when comparing different agencies of the same bank.

The tool that improves quality of service and minimizes risk of credit can substantially increase competitiveness of the bank.

Solutions presented in this article can be applied to working-capital credits for enterprises that are obliged to perform all standard financial statements such as:
- balance sheet
- income statement
- cash flow

CREDIT SCORING SYSTEM

One of the important functions realized by a credit scoring system is information processing. Every information processing system includes:
- input information
- module of processing information
- output information

In the case of credit scoring system input, information consists of:
- registry information
- financial information (financial statements)
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