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A credit scoring approach for the commercial banking sector

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Abstract

For managing credit risk, commercial banks use various scoring methodologies to evaluate the financial performance of client firms. This paper upgrades the quantitative analysis used in the financial performance modules of state-of-the-art credit scoring methodologies. This innovation should help lending officers in branch levels filter out the poor risk applicants. The Data Envelopment Analysis-based methodology was applied to current data for 82 industrial/manufacturing firms comprising the credit portfolio of one of Turkey's largest commercial banks. Using financial ratios, the DEA synthesizes a firm's overall performance into a single financial efficiency score—the "credibility score". Results were validated by various supporting (regression and discriminant) analyses and, most importantly, by expert judgments based on data or on current knowledge of the firms.
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1. Introduction

The economic and, therefore, the social well-being of developing countries with fairly privatized economies is highly dependent on the behavior of a country's commercial banking sector. Banks provide credit to sustain manufacturing, agricultural, commercial and service enterprises. These, in turn, provide jobs thus enhancing purchasing power, consumption, and savings. Bank failures, especially in such settings, send shockwaves affecting the social fabric of the country as a whole and, as experienced recently, (Latin America and Asia) have the potential of a quick global impact. Thus, it is imperative that lending/credit decisions are made as prudently as possible while keeping the decision making process both efficient and effective.

Commercial banks provide financial products and services to clients while managing a set of multi-dimensional risks associated with liquidity, capital adequacy, credit, interest and foreign

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exchange rates, operating and sovereign risks, etc. In this sense, banks may be considered to be "risk machines". They take risks, and transform or embed such risks to provide products and services [1].

Banks are also "profit-seeking" organizations basically formed to make money for shareholders. In their typical decision-making processes (i.e. pricing, lending, funding, hedging, etc.), they try to optimize their "risk-return" trade-off. Management of risk and of profitability are very closely related. Risk taking is the basic requirement for future profitability. In other words, today's risks may turn up as tomorrow's realities. Therefore, banks may not live without managing these risks.

Among the different banking risks, credit risk has a potential "social" impact because of the number and diversity of stakeholders affected. Business failures affect shareholders, managers, lenders (banks), suppliers, clients, the financial community, government, competitors, and regulatory bodies, among others. In the age of telecommunications, the ripple effect of a bank failure is virtually instantaneous and such ripples hold the potential of global impact. In order to effectively manage the credit risk exposure of a modern bank, there is thus a strong need for sophisticated decision support systems backed by analytical tools to measure, monitor, manage, and control, financial and operational risks and inefficiencies.

Conscious risk-taking decisions call for quantitative risk-management systems, which, in turn, provide the bank early warnings for predicting potential business failures. Thus, an effective risk-monitoring unit supports managers' judgments and, hence, the profitability of the bank. A potential client's credit risk level is often evaluated by the bank's internal credit scoring models. These aim to determine whether an applicant has the capacity to repay by evaluating the credit risk of his loan application. This is normally done using historical data and statistical techniques. Such models offer banks a means for evaluating the risk of their credit portfolio, in a timely manner, by centralizing global-exposures data and by analyzing marginal as well as absolute contributions to risk components. These models can offer useful insight and do provide an important body of information to help a bank formulate its risk management strategies. Models that are conceptually sound, empirically validated, backed by good historical data, understood and implemented by management, augment the business success of credit quality.

Over the past decade, several financial crises observed in some emerging markets enjoying a recent financial liberalization experience, showed that debt financing built on capital inflow may result in large and sudden capital outflows, thereby causing a domestic "credit crunch". A glance into the causes of these financial crises indicates that credit expansion funded mainly by capital inflows leads to over investment and renders banks and the corporate sector vulnerable to shocks. Experience with these recent crises forced banking authorities, i.e. the Bank of International Settlements (BIS), the World Bank, the IMF, as well as the Federal Reserve, to draw a number of lessons. Hence, they all encourage commercial banks to develop internal models to better quantify financial risks. The Basel Committee on Banking Supervision [2], English and Nelson [3], the Federal Reserve System Task Force on Internal Credit Risk Models [4], Lopez and Saidenberg [5] and Treacy and Carey [6] represent some recent documents addressing these issues.

Credit scoring has both financial and non-financial aspects. The scope of the current paper, however, is limited to the evaluation of a bank client's financial performance. Studies attempting to measure firm performance on the basis of qualitative data are exemplified by Bertels et al. [7].