



Modelling the economic value of credit rating systems

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Abstract

In this paper we develop a model of the economic value of credit rating systems. Increasing international competition and changes in the regulatory framework driven by the Basel Committee on Banking Supervision (Basel II) called forth incentives for banks to improve their credit rating systems. An improvement of the statistical power of a rating system decreases the potential effects of adverse selection, and, combined with meeting several qualitative standards, decreases the amount of regulatory capital requirements. As a consequence, many banks have to make investment decisions where they have to consider the costs and the potential benefits of improving their rating systems. In our model the quality of a rating system depends on several parameters such as the accuracy of forecasting individual default probabilities and the rating class structure. We measure effects of adverse selection in a competitive one-period framework by parameterizing customer elasticity. Capital requirements are obtained by applying the current framework released by the Basel Committee on Banking Supervision. Results of a numerical analysis indicate that improving a rating system with low accuracy to medium accuracy can increase the annual rate of return on a portfolio by 30–40 bp. This effect is even stronger for banks operating in markets with high customer elasticity and high loss rates. Compared to the estimated implementation costs banks could have a strong incentive to invest in their rating systems. The potential of reduced capital requirements on the portfolio return is rather weak compared to the effect of adverse selection.

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1. Introduction

Increasing international competition and changes in the regulatory framework driven by the Basel Committee on Banking Supervision (Basel II) called forth incentives for banks to improve their credit rating systems. In a competitive framework a poor statistical power of a bank's internal rating system will deteriorate the economic performance due to adverse selection, i.e. customers with a better credit quality than assessed by the bank will potentially walk away and leave the bank with a portfolio of customers with a credit quality lower than estimated. Obviously, improving the statistical power of a rating system will have a positive impact on economic performance. The size of this effect depends mainly on the degree of competitiveness of the market environment. The counterweight of these potential benefits are the costs of investing into the power of a rating system such as organizational costs, costs of information technology, and costs of collecting and managing the required data. In addition, a bank's internal rating system with sufficient statistical power might be used for calculating the regulatory capital requirements set by the Basel II Internal Ratings Based Approaches which are expected to be lower than in the Modified Standardized Approach. In addition it can be shown that due to the concave relation between regulatory capital requirements and default probabilities even for banks having already qualified for the Internal Ratings Based Approach a more accurate rating system which enables a finer grained rating class structure leads to lower capital requirements.

It is the main objective of this paper to model the decision whether to invest into the quality of a rating system in a rather general framework. Our model is aimed to quantify the benefits of such an investment. We use an adverse selection framework and actual default data to simulate the benefits of improving the accuracy of a rating system on pricing and regulatory capital in a zero-profit competitive market setting. The results demonstrate the significant potential economic value of better rating systems to a lender because these ratings allow the banks to price loans more effectively. The benefits are evident across wide ranges of possible parameter choices, and thus a wide range of market conditions. The results specially suggest that the potential benefits to the bank in terms of earnings would be much larger than potential regulatory capital benefits of the new Basel II framework which itself relies heavily on such strong rating systems.

The first part of our analysis is focused on the economic value of increasing the statistical power of a bank's internal rating system. In line with the work by [Jordão and Stein \(2003\)](#) we compare the profitability of prototypical banks with different statistical power of their rating systems in different market environments. In our model the statistical power of a rating system depends on several parameters such as its accuracy and the rating class structure. We measure the accuracy of forecasting individual default probabilities as the variance of the deviations of the forecasted from the actual default probabilities. In this setup this measure is more closely related to the economic impact than the area-under-the-curve measures traditionally used by other researchers.

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