

## A process model to develop an internal rating system: Sovereign credit ratings

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### Abstract

The Basel II capital accord encourages financial institutions to develop rating systems for assessing the risk of default of their credit portfolios in order to better calculate the minimum regulatory capital needed to cover unexpected losses. In the internal ratings based approach, financial institutions are allowed to build their own models based on collected data. In this paper, a generic process model to develop an advanced internal rating system is presented in the context of country risk analysis of developed and developing countries. In the modelling step, a new, gradual approach is suggested to augment the well-known ordinal logistic regression model with a kernel based learning capability, hereby yielding models which are at the same time both accurate and readable. The estimated models are extensively evaluated and validated taking into account several criteria. Furthermore, it is shown how these models can be transformed into user-friendly and easy to understand scorecards.

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### 1. Introduction

The recently put forward Basel II capital accord provides guidelines for the calculation of the minimum required regulatory capital needed to be set aside to

recover from defaulted loans or obligations [4]. One of the key recommendations encourages financial institutions to build rating based risk systems that quantify the default and/or recovery risk of their credit assets. In contrast to the standardized approach, where banks can rely on external ratings, the internal ratings based (IRB) approach catalyzes the development of customized ratings based on collected data and advanced statistical modelling. In this paper, we will present a process model to develop rating models and apply it to design a model for country risk.

The aim of country risk analysis is to identify those countries that will be unable to meet their commitments

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on external debt, i.e. debt owed to non-residents. This is typically tackled by assigning ratings to countries reflecting a country’s ability and willingness to service

and repay its external financial obligations [8,15]. A strong credit risk rating creates a financially favorable climate whereas a low credit rating usually leads to a

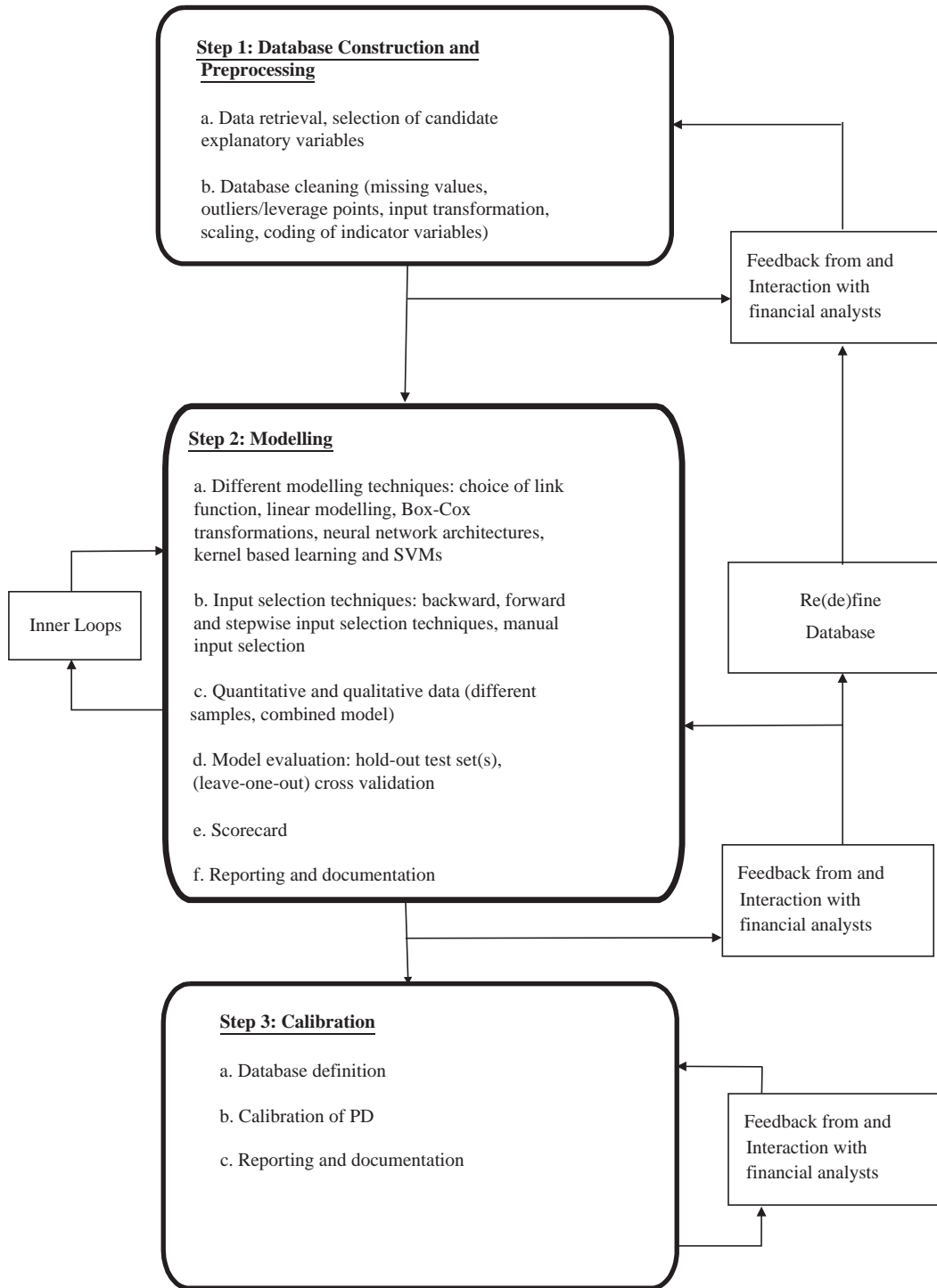


Fig. 1. A process model for developing an internal rating system for mapping to external ratings (or default data) and calibrating it for the internal rating based (advanced) approach. See text for details.

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