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The credit risk in SME loans portfolios: Modeling issues, pricing, and capital requirements

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Abstract

This paper is devoted to the credit risk modeling issues of small commercial loans portfolios. We propose specific solutions dealing with the most important peculiarities of these portfolios: their large size and the limited information about the financial situation of borrowers. We then compute the probability density function of futures losses and VaR measures in a portfolio of 220.000 French SMEs. We also compute marginal risk contributions in order to discuss the loan pricing issue of small commercial loans and to compare the capital requirements derived from our model with those derived from the New Ratings-Based Basel Capital Accord. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

During recent years, financial institutions have devoted important resources to build statistical models to measure the potential losses in their loans

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portfolios. Supervisors have recognized such efforts. The New Basel Capital Accord allows banks to compute the minimum capital requirements using an internal ratings based (IRB) approach which is founded on the most sophisticated credit risk internal models. However, most of the current models have considered the credit risk in wholesale commercial loans portfolios. Few attempts have been devoted to small commercial loans credit risk, despite the relatively high share of SME exposures in the banks loans portfolios, especially in Europe. The first objective of this paper is to present a Value at Risk model of the SME credit risk dealing with the specific methodological problems which arise in the modeling of small commercial loans portfolios.

Several factors distinguish credit risk in small and wholesale commercial loans portfolios. First, the primary credit risk of small business loans is that they will not be repaid. The SME credits are not traded in organized financial markets and their value does not change until maturity, except if the borrower defaults. This restricts the modeling choice to the default mode paradigm (Jones, 1998), while wholesale commercial loans credit risk models are "multi-state" or "Marked-To-Market" models which incorporate transition probabilities between non-default rating classes. Second, the size of a small commercial loans portfolio is larger than that of a large corporate loans portfolio. While the latter contains hundreds of loans, the former contains thousands of loans. Consequently, it is very difficult to adopt the methodological choices which are used in the models dealing with large corporate exposures, like CreditMetrics, CreditRisk+ or KMV. In particular, it would consume too much time to simulate directly potential losses at the individual level, as it is the case in the CreditMetrics model (Bathia et al., 1997), for example. Methodological choices are restricted by time constraints. Consequently, a retail credit risk model should proceed in two separate steps: the first step should be devoted to the simulation of the number of defaults into each risk class, the second step to the simulation of the amount of individual losses given default (LGD). Third, data limitations also restrict the modeling choices. The wholesale commercial loans models use a rich information concerning companies financial health which comes from rating agencies and financial markets prices. In general, this information is available in the form of time series. It allows to assess the long run stability of the main building blocks of any credit risk model (default probabilities (PDs), loans losses given default, and correlations). It also allows to derive analytically the probability distribution of potential losses or to proceed to historical simulations. In the small business case, the relevant information is reduced to default scores. This is the reason why the credit risk model should build the loss density function by using the information given by the volatility of scores.

The final objective of any credit risk model is to build the probability density function (PDF) of future losses in a loans portfolio. In the case of small commercial loans portfolios, this implies to find specific solutions to the two