



ELSEVIER

Journal of Banking & Finance 26 (2002) 445–474

Journal of  
BANKING &  
FINANCE

www.elsevier.com/locate/econbase

## Ratings migration and the business cycle, with application to credit portfolio stress testing

Anil Bangia <sup>a,1</sup>, Francis X. Diebold <sup>b,c</sup>, André Kronimus <sup>d</sup>,  
Christian Schagen <sup>d,2</sup>, Til Schuermann <sup>e,\*</sup>

<sup>a</sup> *Oliver, Wyman & Company, New York, USA*

<sup>b</sup> *University of Pennsylvania, Philadelphia, PA, USA*

<sup>c</sup> *NBER, Cambridge, MA, USA*

<sup>d</sup> *WHU Otto Beisheim Graduate School of Management, Koblenz, Germany*

<sup>e</sup> *Federal Reserve Bank of New York, New York, USA*

---

### Abstract

The turmoil in the capital markets in 1997 and 1998 has highlighted the need for systematic stress testing of banks' portfolios, including both their trading and lending books. We propose that underlying macroeconomic volatility is a key part of a useful conceptual framework for stress testing credit portfolios, and that credit migration matrices provide the specific linkages between underlying macroeconomic conditions and asset quality. Credit migration matrices, which characterize the expected changes in credit quality of obligors, are cardinal inputs to many applications, including portfolio

---

\* Corresponding author. Federal Reserve Bank of New York, 33 Liberty Street, New York, NY 10045, USA. Fax: +1-212-720-8363. The views are the author's and do not necessarily reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System. Much of the work was conducted while at Oliver, Wyman & Company, and this author would like to thank them for their hospitality and inspiration.

*E-mail addresses:* bangia\_anil@jpmorgan.com (A. Bangia), fdiebold@sas.upenn.edu (F.X. Diebold), kronimus@whu.edu (A. Kronimus), christian.schagen@project49.de (C. Schagen), til.schuermann@ny.frb.org (T. Schuermann).

<sup>1</sup> Now at JP Morgan Chase, USA.

<sup>2</sup> Now at project 49, AG, Germany.

risk assessment, modeling the term structure of credit risk premia, and pricing of credit derivatives. They are also an integral part of many of the credit portfolio models used by financial institutions. By separating the economy into two states or regimes, expansion and contraction, and conditioning the migration matrix on these states, we show that the loss distribution of credit portfolios can differ greatly, as can the concomitant level of economic capital to be assigned. © 2002 Elsevier Science B.V. All rights reserved.

*JEL classification:* G11; G21; G28

*Keywords:* Credit risk; Stress testing; Ratings migration; Credit portfolio management

---

## 1. Introduction

The evolution of modern risk management can be traced back to Markowitz and his portfolio theory for investments. His fundamental concept of diversification, of considering the joint distribution of portfolio returns, has gradually migrated to risk management. Market risk measurement techniques were the first to mature, mainly due to the richness of available data. Risk managers now routinely measure portfolio change-in-value distributions and compute statistics such as value-at-risk (VaR), which are used to determine trading limits and assess risk capital. Moreover, the regulatory community has broadly accepted such a model-based approach to assessing market risk capital. On the credit risk side, however, even with the new BIS accords of June 1999 (BIS publication no. 50, 1999), formal credit portfolio models (CPMs) are not permitted for use in the determination of bank credit risk capital. Nevertheless CPMs are becoming more widespread in their use among financial institutions for economic capital attribution, and as the use of new risk transfer instruments such as credit derivatives increases, so by necessity will the use of CPMs.<sup>3</sup>

Recent turmoil in the capital markets has highlighted the need for systematic stress testing of banks' portfolios, including both their trading and lending books. This is clearly easier said than done. Although we have a wealth of data at our disposal in market risk, even there it is not obvious how best to implement stress testing. A short decision horizon, one on the order of hours or days, forces the thinking towards specific scenarios or the "tweaking" of volatilities and correlations between dominant risk factors. Particularly the latter is important when designing a strategy for stress testing, as the LTCM debacle so poignantly demonstrated (Jorion, 1999). It appears, for example, that correlations increase during times of high volatility (Andersen et al., 2000).

---

<sup>3</sup> For insightful comparisons of various CPMs, see Koyluoglu and Hickman (1998), Saunders (1999) and Gordy (2000).

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات