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# An empirical comparison of default risk forecasts from alternative credit rating philosophies

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## Abstract

The New Basel Capital Accord will allow the determination of banks' regulatory capital requirements due to probabilities of default (PDs) which are estimated and forecasted from internal ratings. Broadly, two rating philosophies are distinguished: through the cycle versus point in time ratings. We employ a likelihood ratio backtesting of both types with respect to their probability of default forecasts and correlations derived from a nonlinear random effects panel model using data from Standard & Poor's. The implications for risk capital using these different philosophies are demonstrated. It is shown that Point in Time Ratings will exhibit much lower correlations and, thus, default probability forecasts should be more precise. As a consequence, Value-at-Risk quantiles of default distributions should be lower than those generated by Through the Cycle Ratings. Nevertheless, banks which use Point in Time Ratings may be punished in times of economic stress if the implied reduction of asset correlation is not taken into account.

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## 1. The problem

The planned Basel Accord for the revision of minimum requirements for banks' risk capital has raised a lot of discussions about how to measure credit risk and forecast probabilities of default (PDs). Within the new revisions, aimed to take effect by the end of 2006, banks are allowed to determine their capital charges due to the inherent credit risk of each borrower. This credit risk, or the probabilities of default, respectively, can be inferred to a bank from an

internal credit rating model. The planned approach is therefore called the "Internal Ratings Based" approach. A further driver for regulatory capital is the correlation between borrowers. However, this parameter is pre-specified by the supervising authorities. A bank's internal estimates of correlations are not expected to be used for capital charges.

Usually, one distinguishes two types of credit rating philosophies, see, e.g. [Basel Committee on Banking Supervision \(2000a,b\)](#): Through the Cycle versus Point in Time Ratings. The first group is mainly employed by external credit rating agencies such as Moody's and Standard & Poor's (S&P) while most banks internally follow the second philosophy, see [Treacy and Carey \(2000\)](#). Each philosophy has its own characteristics and purposes. Rating agencies

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focus on the long term over one or more business cycles. That is, they provide ratings which are forward-looking and do not try to offer a snapshot of the present situation or the near future, see [Standard and Poor's \(2002\)](#). A similar interpretation by Moody's can be found in [Catarineu-Rabell, Jackson, and Tsomocos \(2003\)](#). As such, an assigned rating is nearly constant over time ([Basel Committee on Banking Supervision, 2000a](#)) and is not conditioned on the point of the cycle ([Catarineu-Rabell et al., 2003](#)).

Borrowers are grouped into rating grades which are abbreviated with letters and/or ciphers. For example, S&P use grades from “AAA” (“Highest Rating; The obligor's capacity to meet its financial commitment on the obligation is extremely strong”) over “AA”, “A”, “BBB”, and so on, to “C” (“A bankruptcy petition has been filed or similar action has been taken but payments on this obligation are being continued”). Default probabilities are assigned to a grade by calculating the observed default rate of all borrowers within this grade in each year and averaging these figures over a historical horizon ([Standard & Poor's, 2001](#)).

A Point in Time Rating, on the other hand, reflects a borrower's situation and the most likely future condition over an exactly pre-specified horizon, e.g. 1 year ([Basel Committee on Banking Supervision, 2000a](#)). Therefore, the rating changes as soon as the borrower's condition changes within a business cycle and, thus, the ratings are more volatile than the Through the Cycle Ratings ([Catarineu-Rabell et al., 2003](#), see also [Carey & Hrycay, 2001](#)). A well-established paradigm of a Point in Time Rating is the proprietary Merton style model from KMV<sup>1</sup> which makes use of current equity price information, see [Crosbie \(1998\)](#) for an overview.

As such, a Point in Time Rating incorporates all relevant information which influences the 1-year creditworthiness of a borrower, i.e. the probability that the borrower will default within the next year. Point in Time Ratings and default probabilities are usually derived from market data (e.g. equity returns, credit spreads) as in the KMV model or from statis-

tical models, such as discriminant analysis or logistic regression. These types of ratings are often used to calculate economic capital.

Within the proposals of the new Basel Accord, there is no explicit guidance on which type of rating philosophy should be employed for the calculation of regulatory capital requirements although the philosophies, or the default probabilities which they generate, are essential for the new capital adequacy framework. Thus, researchers have begun to analyse rating philosophies empirically. [Carey and Hrycay \(2001\)](#) analyse the effects of calibrating external ratings to banks. [Crouhy, Galai, and Mark \(2001\)](#) argue that Point in Time Ratings are more appropriate for the purposes of capital allocation. [Catarineu-Rabell et al. \(2003\)](#) suggest that using Through the Cycle Ratings may mitigate the problem of procyclical capital requirements.

To summarize, the delineation above shows that an exact definition of a Point in Time Rating is possible—it reflects a borrower's 1-year probability of default—, while a definition of a Through the Cycle Rating is not as clear-cut. Regarding the information content, there is some evidence that Through the Cycle Ratings do not fully reflect all available information, see [Altman and Kao \(1992\)](#), [Lando and Skodeberg \(2002\)](#), and the comments in [Löffler \(2004\)](#).

In the context of the discussion on rating philosophies, the present paper tries to make several contributions. Firstly, we compare default probability estimates and estimates for asset correlation for Through the Cycle and Point in Time Ratings. Default data from S&P are used and we show that correlations implied by Through the Cycle ratings are merely substitutes for fluctuating underlying default probabilities of the rating grades over time. Using S&P's Through the Cycle Rating as a starting point, we generate a “mimicking” Point in Time Rating by adding information about the state of the business cycle. It is shown that asset correlations using this mimicking Point in Time Rating are much smaller than in the Through the Cycle case since 1-year default probabilities are reflected more adequately.

Secondly, we analyse which rating philosophy is better in forecasting defaults. We do this by employing the likelihood ratio test as it is suggested in [Berkowitz \(2001\)](#) in the context of market risk.

<sup>1</sup> KMV is a subsidiary of Moody's. The three letters are the initials of their founders, Steven Kealhofer, John McQuown, and Oldrich Vasicek.

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