Analysis and Application of Credit Default Models

Masterarbeit

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1 Introduction

From 1 January 2018 onward, credit institutes are obligated to address the accounting for financial instruments in accordance to the *International Financial Reporting Standards* (IFRS) 9 that have been published in July 2014. "During the financial crisis, the delayed recognition of credit losses on loans (and other financial instruments) was identified as a weakness in existing accounting standards" (IASB, 2014, p. 1). Following, a new impairment model that requires more timely recognition of expected credit losses has been introduced as part of IFRS 9. As credit institutes are allowed to apply their own credit risk models to determine expected credit losses, it now becomes necessary to analyze the existing models in order to check whether they already are applicable to IFRS 9 or if the internal models have to be adapted. In this respect, initially the requirements for a model's credit risk parameters under IFRS 9 are derived before determining potential dimensions of configuration. Hereby the focus is on the configuration of credit risk parameter *probability of default* and its relation to underlying rating philosophies, namely *Point-in-Time* and *Through-the-Cycle*, which are thoroughly analyzed in this context. In an artificial approach the impact of rating philosophies on internal credit risk models is simulated in order to derive key figures that quantify a potential need for adjustment with respect to the requirements of IFRS 9. Eventually, these key figures are applied to a bank's credit risk model and as benchmark to default study data sets provided by Standard & Poor's. The analysis is structured as follows: Section 2 outlines the Expected Credit Losses Model as the new impairment model and derives the necessary requirements for credit risk parameters under IFRS 9. Section 3 analyzes rating migration matrices as they incorporate convenient properties with respect to the analysis of credit default models. Section 4 contains the artificial approach to rating models and the quantification of the impact of underlying rating philosophies. Section 5 analyzes a bank's internal rating model and introduces a heuristic approach to the derivation of key figures that pragmatically classify the bank's need for adaption with respect to the requirements of IFRS 9, i.e. an underlying Point-in-Time orientation of the model. Section 6 contains concluding remarks and a general prospect to future research and potential application areas of the developed simulation scheme.

2 Requirements for Credit Risk Parameters under IFRS 9

Following the subprime crisis, the *International Accounting Standards Board* (IASB) issued a discussion paper with the program-defining title *Reducing Complexity in Reporting Financial Instruments* as they "have been urged by many to develop new standards of financial reporting for financial instruments that are principle-based and less complex than today's requirements" (IASB, 2008, p. 4). Accordingly, the discussion paper analyzes the main causes for complexity and states possible intermediate and long-term approaches to reduce this complexity and thus generally improve financial reporting that is regulated in *International Accounting Standard* (IAS) 39 *Financial Instruments: Recognition and Measurement*. Subsequently, the IASB has been extensively working on IFRS 9 *Financial Instruments*, which was published in November 2009 as the new financial instruments project containing requirements for financial assets that are planned to progressively replace the existing standards in IAS 39. The revision of IAS 39 by IFRS 9 as part of the replacement project is a major challenge for the IASB and for IFRS adopters. The process has been structured into three phases subject to respective adjustments of regulations:

1. Classification and Measurement (phase I),
2. Impairment Methodology (phase II),
3. Hedge Accounting (phase III).

find alternative approaches to a proper re-calibration of the key figures to counteract the latent distortion effects. Furthermore, despite that key figure σ can be interpreted as a robustness verification figure, there still is room for a validation test that originates from a completely different set-up.

At this point a single question remains to be answered: does the bank need to adapt its model or does it fulfill the requirements of IFRS 9? Let $\phi_{bank} = 81.23\%$ be the true degree of PIT orientation. In this context, the question to be answered changes to: how much PIT orientation does a credit risk model need in order to fulfill the requirements of IFRS 9? The answer to the question, that is the exact threshold for a sufficient PIT orientation, has yet to be made by the IASB.

6 Conclusion

In summary, the results show that the quantification of the degree of underlying rating philosophies is a challenging task due to various latent distortion effects that can hardly be allocated to the respective sources. On the bright side, the simulation scheme demonstrated that the derived key figures at least properly indicate the relative positioning of a model in comparison to another. This appears to be particularly useful in order to get a notion of existing credit default models with respect to the required Point-in-Time orientation under IFRS 9. That is, with relatively little effort the key figures can be applied to a models' corresponding rating migration matrices in order to indicate its behavior with respect to systematic information. Nevertheless, as stated, due to the fact that the key figures are of heuristic character, they have to be derived, applied and interpreted with caution and with respect to the individual portfolio data sets that underlie the credit risk models that are to be analyzed. Eventually, subject to the theory that the first and second dimension of migration matrices correspond to different manifestations of the business cycle, it appears appropriate to consider alternative approaches to the quantification of the degree of rating philosophies (e.g. Morone and Cornaglia (2009)), particularly in order to validate respective results in a proper robustness test.

As prospect, due to its flexibility, the simulation scheme might prove to be a practical toolkit for further studies on rating philosophies and credit default models in the framework of IFRS 9. For instance, in reference to the determinants in the three stages of the ECLM (see figures 1 and 2) the artificial approach could be used to derive lifetime expected credit losses as in expression (2) simply by specifically calibrating and running the simulation throughout a desired prognosticated business cycle without refilling entities. In addition, as the focus has been on the PD, the other credit risk parameters, namely LGD and EAD are still left for analysis. In conclusion, IFRS 9 and the ECLM thus provide plenty of room for exciting challenges and further research.