Msc thesis proposal:

An integrated benchmark model for SA-CCR (Standardized Approach for Counterparty Credit Risk)

Fang Fang[[1]](#footnote-2)

**Background**

The Capital Requirements Regulation (EU) No. 575/2013, CRR in short, is an EU law that reflects Basel III rules on capital measurement and capital standards and aims to decrease the likelihood that banks go insolvent. In 2019 fundamental amendments were made to CRR and the new regulations are referred to as CRR2 [1].

The regulations in both CRR and CRR2 are laid out per type. The counterparty credit risk type is the subject of this thesis project.

Counterparty credit risk is the risk that a bank suffers from Mark-to-market losses due to a counterparty it has in the derivative and/or repo trade(s) going into default.

CRR quantifies the counterparty credit risk using the “loan-equivalent” approach, i.e. an OTC derivative is treated the same way as a loan from the banking book, only that the Exposure-at-Default (EAD) is not known upfront and thus needs to be quantified.

For calculating the EADs of derivative transactions under the counterparty credit risk framework, CRR gives banks the choice between three different standardized approaches: the Standardised Method (SM), the Mark-to-Market Method (MtMM) and the Original Exposure Method (OEM). Those standardised approaches however do not recognise appropriately the risk-reducing nature of collateral in the exposures. Their calibrations are outdated and they do not reflect the high level of volatility observed during the financial crisis. Neither do they recognise appropriately netting benefits.

To address those shortcomings, the Basel Committee decided to replace the SM and the MtMM with a new standardised approach for computing the exposure value of derivative exposures, the so-called Standardised Approach for Counterparty Credit Risk (SA-CCR). CRR2 incorporated those standards.

The SA-CCR is more risk sensitive than the SM and the MtMM and should therefore lead to own funds requirements that better reflect the risks related to institutions' derivative transactions.

**Challenge**

CRR2 is, however, still based on the loan-equivalent approach. More precisely, the capital requirements for counterparty credit risk are calculated as alpha\*EAD\*LGD\*PD\*Maturity\_adjustments.

The outcome of the SA-CCR calculations is the EADs. Usually LGD (Loss-at-default) and PD (probability of default) are exported from the credit risk models designed for loans in the banking book.

One can see that there is no interconnection between EAD and LGD or PD in the “loan-equivalent” approach. In practice, however, there can be a positive correlation between EAD and LGD or between EAD and PD, which is referred to as “wrong-way risk”. The factor “alpha” is designed to compensate for the wrong-way-risk somehow.

It is thus questionable whether the loan-equivalent approach would properly capture the wrong-way-risk.

**Topic of this thesis**

The topic of this thesis project is to build an integrated benchmark model for SA-CCR. This model is named “integrated” because we will directly simulate the default events of all counterparties while simulating the MtM values of the derivatives, instead of separating the two as does the loan-equivalent approach.

Under the guidance of a senior Quant, the student is expected to

* Build a simple simulation model for interest rate (IR) and FX rate;
* Insert the simulation of defaults of one counterparty, taking into account the correlation between the default events of the counterparty and the movements of IR and FX rates via a virtual global factor;
* Link the simulation engine with the pricers we already have to yield MtM scenarios per trade;
* Aggregate the scenarios to yield a total loss distribution;
* Compare the results from this integrated approach with those from the loan-equivalent approach using SA-CCR EADs.

**Contact**

If you are interested to enter the field of quantitative risk analysis, this is a very good starting point. Please feel free to contact me directly if this topic is of your interest, or if you would like to learn more details: [fang.fang@ffquant.nl](mailto:fang.fang@ffquant.nl) or [f.fang@tudelft.nl](mailto:f.fang@tudelft.nl)

**About FF Quant Advisory B.V.**

KvK nr.: 70817979

<http://fsquaredquant.nl/>

We provide quantitative consulting services to banks, insurance companies and other financial institutions. Our expertise include the development, validation and audit of regulatory and non-regulatory risk models and of pricing models for financial instruments.

We are also specialized in researching, developing and testing quantitative toolkits. Other services include, but are not limited to, backtesting of trading strategies, applying machine learning techniques to replace traditional quantitative models, etc.

1. Part-time Assistant professor at the Applied Mathematics Department of TU Delft; Director of FF Quant Advisory B.V. https://fsquaredquant.nl/ [↑](#footnote-ref-2)