Internship or Msc thesis proposal:

An integrated benchmark model for SA-CCR

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Background

The banking authority obliges banks to hold sufficient capital, such that losses (occurred especially from the stressed period) can be easily absorbed.

The Capital Requirements Regulation (EU) No. 575/2013 is an EU law that aims to decrease the likelihood that banks go insolvent. With the Credit Institutions Directive 2013 the Capital Requirements Regulation 2013 (CRR 2013) reflects Basel III rules on capital measurement and capital standards. The regulations in CRR are laid out per risk type. The counterparty credit risk is one of the risk types addressed thereof and is also the subject of this internship.

Counterparty credit risk is the risk that a counterparty of the bank goes into default and fails to pay out the outstanding amounts in the derivative trades it has with the bank.

In 2019, fundamental amendments were made to CRR, and the new regulations are referred to as CRR2 **Error! Reference source not found.**. It includes amendments to the capital requirements for counterparty credit risk:

- For calculating the exposure value of derivative transactions under the counterparty credit risk framework, CRR gives institutions 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 Their calibrations are outdated and they do not reflect the high level of volatility observed during the financial crisis.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).
- Given that the revised international standards introduced a new standardised approach that is better suited to the central clearing environment, 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.

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Challenge

The capital requirements for counterparty credit risk are calculated as alpha*EAD*LGD*PD*Maturity_adjustments. In other words, the derivatives are treated the same way as loans in the banking book of the bank.

The outcome of SA-CCR calculations provides the EADs – exposure at default. Usually LGD (Loss-at-default) and PD (probability of default) are exported from the credit risk models.

The factor alpha is designed to cover the so-called wrong-way-risk, i.e. the probability that the PD and EAD might be positively correlated with EAD of the derivatives under consideration.

In practice, however, it is questionable whether this loan-equivalent approach would accurately capture the counterparty credit risk in general, and the wrong-way-risk in particular.

Topic of this internship/thesis

The topic of this internship/thesis project is to build an integrated benchmark model for SA-CCR. This model is named “integrated” because we directly simulate the default events of all counterparties and return the portfolio loss distribution directly, instead of using 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;
- Include the simulation of defaults of all counterparties;
- Include the correlation between default probabilities of all counterparties with IR and FX rates via a virtual global factor;
- Link the simulation engine with the pricers we already have;
- Generate the default losses per scenario and in turn the total portfolio loss distribution;
- Compare the results with 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 or f.fang@tudelft.nl

About FF Quant Advisory B.V.

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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.