Master thesis proposal:

Calculation of FRTB-SA and FRTB-CVA sensitivities

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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.

Mainly according to the purpose of a trade, it is classified to be either in the banking book or in the trading book. The trading book mainly contains trades that a bank holds for trading purpose.


Challenge

There are two approaches under FRTB, from which banks can choose one approach to calculate and hold regulatory capital: standardized method (SA) and internal model approach (IMA).

Our focus is in the SA approach. More precisely, the main technical challenge in the calculation of the FRTB-SA lies in the fact that the conventional sensitivity definitions (such as ISDA definitions) are what banks implemented in the P&L calculation system, but they are not always aligned with FRTB sensitivity definitions.

One such example is in FX products. ISDA sensitivities are directly measured on the two currencies involved in the FX pair under consideration, whereas FRTB sensitivities are defined on a base or reporting currency.

Another example is in the index products, such as equity funds or index CDSs. FRTB regulation sometimes requires the so-called “look-through approach”, whereby sensitivity w.r.t. each of the underlying names within the fund or the index is needed. However, the P&L system usually has one aggregated sensitivity w.r.t. the fund or the index itself.

Similar challenges are there in the FRTB-CVA regulation, which is to cover the risk in

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CVA calculations of derivatives. The calculation is also based on sensitivities, which are, however, defined differently as those reported from the P&L system.

**Topic of this thesis**

This Master thesis project aims to tackle the above mentioned challenges: we derive the calculation formula of FRTB-SA and FRTB-CVA sensitivities, based on conventional (such as ISDA) sensitivity definitions.

We will start with an overview of FRTB sensitivity definitions, compared with conventional definitions.

Then for each case of discrepancy, we will research on the conversion methodology based on mathematical derivation.

All conversion formulas should be tested numerically. The programming language is python.

**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: fangfang@fsquaredquant.nl

**Reference**

[1] Minimum capital requirements for market risk, BCBS, Jan 2019. [https://www.bis.org/bcbs/publ/d457.htm](https://www.bis.org/bcbs/publ/d457.htm)

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