STOCHASTIC OPTIMIZATION SYSTEM FROM BANK REVERSE STRESS TESTING

DISCUSSANT – EDGAR LÖW
Content

- Introduction
- Logic of reverse stress test analysis
- A few remarks
INTRODUCTION
INTRODUCTION

Starting point of the paper

- Stress tests necessary for
  - ICAAP/ILAAP
  - Recovery plans
- Therefore – new issues for risk managers of banks and supervisors regarding
  - Methodological and
  - Operational aspects
INTRODUCTION

Requirements for stress tests

- Considering adverse scenarios (rather than one), to cover
  - Effects of different combinations of risk factors
  - Different degrees of severity (also losses related to rare events) and adopt a high degree of severity
  - Impact of risks that are difficult to quantify, like reputational and strategic risks
- Addressing vulnerabilities of a bank
- Capturing tail events in the medium-long term
  - like non-linearity, second round and feedback effects
- Interaction among risk factors (in particular in relation to solvency-liquidity interlinkage)
INTRODUCTION

Aim of reverse stress test (1)

- Contribution to understand
  - Bank´s vulnerabilities
  - Degree of sustainability of the business model
  - Conditions of default or near default
  - Critical risk drivers

- Output
  - Detection of the reverse stress test scenario
    (also representing the starting point of the recovery plan scenario)
Aim of reverse stress test (2)

- **Advantage**
  - By comparing the reverse stress test scenario with the bank’s stress test
    - Possibility to challenge assumptions and degree of severity of the bank’s stress test
    - Possibility to assess plausibility that the event of default or near default associated with the reverse stress test scenario may occur
    - Estimation and quantifiability of a bank – without identifying the exact adverse event and risk factor magnitude that causes the default
Aim of the article itself

- Presentation – Reverse stress test methodology
- Basis – Optimization system
- Application – within a stochastic simulation framework for stress testing
- Model – Providing a quantitative procedure which allows to derive the combination of risk factors that – by triggering a key indicator threshold (like CET1 ratio) – causes the bank’s default (with a certain degree of approximation)
- Usefulness – for bank risk managers and supervisors in risk assessment processes that require a reverse stress test (RAF, ICAAP Recovery and Resolution Plan, SREP)
LOGIC OF REVERSE STRESS TESTING ANALYSIS
LOGIC OF REVERSE STRESS TESTING ANALYSIS

Technically

- Detecting scenarios between condition of viability and default
  - Finding exact conditions in a small set of risk drivers that trigger a bank’s default

- Method
  - Reduced and simplified modelling framework
  - Here – RoE and RoA
LOGIC OF REVERSE STRESS TESTING ANALYSIS

Reflecting bank’s business model

- Illustration of the bank’s business model by four variables
  - Business growth – financial assets
  - Risk absorption – RWA
  - Profitability – RoE
  - Capital regulatory constraint – CET1 ratio

- Note – the greater the number of risk drivers, the greater the number of possible solutions (in the above model – just one solution)

- Purpose of the paper
  - Presenting a technique to determine the reverse breaking points and suggest a criterion for selecting one breaking point among all those determined and the corresponding set of risk factor assumptions which define the reverse stress test scenario
LOGIC OF REVERSE STRESS TESTING ANALYSIS

Problems included

- Reverse stress testing involves two types of problems
  - Computational issue related to the technique used to derive the reverse solutions – which means to find the reverse breaking points
    - Resolved through quantitative methods
  - Choise of a criterion to select the reverse stress test scenario from among all the solutions obtained
    - Not to be resolved through quantitative methods only – subjective decisional criteria in addition necessary
A FEW REMARKS
A FEW REMARKS

Just a few comments (1)

- Stochastic reverse stress testing – modelling and framework
  - Limitations – limited data set available for the case study
  - Strong focus on mathematical description – more economic background or linkage to be given (non mathematics will have difficulties to understand the technical language)
  - However – well description of the stochastic simulation framework for reverse stress testing – also illustrated in a separate figure

- Optimization system for reverse stress test
  - Getting even more statistical
  - However – well founded by both, underlying literature and well taken argumentation

- Reverse break-even point
  - Clear argumentation, further illustration by a figure
A FEW REMARKS

Just a few comments (2)

- Italien bank case study
  - Very nice that a case study is included
  - Time horizon – 2019 – 2021, considering 2018 financial statement data as the starting point of the analysis
    - First time application might influence the quality of the analysis
- However – it is shown how the theoretical model can work in practice
- Nice description of the reverse stress results and scenario selection
- Conclusion – detailed paper on a possible model with regard to a bank’s reverse stress testing – to be tested (and back tested) by using a larger sample
Thank you very much for your attention