EUROPEAN CENTRAL BANK

EUROSYSTEM

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A flexible tool, STAMP€ (Stress Test Analytics for Macroprudential Purposes in the euro area)

IMF – LSE conference panel *"Objectives of macroprudential stress-testing"*

15th December 2016, Washington DC

A new territory: Macroprudential stress tests

"The macroprudential function has added a new dimension to stress testing. (…) The underlying framework has to embed spillovers – within the banking sector, to other sectors, including the real economy – also allowing for banks' own reactions that can also spillover to other segments of the economy."

Vítor Constâncio:
"The role of stress testing in supervision and macroprudential policy"
Keynote address by Vítor Constâncio, Vice-President of the ECB,
at the London School of Economics, London 29 October 2015
(see R. Anderson Ed. (2016), *Stress Testing and Macroprudential Regulation: A Transatlantic Assessment*, CEPR Press).

ECB Top-Down Stress-Test team needed to operationalise this

1.1 ECB staff conduct a variety of Top-Down STs

- **Top-down – for *macroprudential* purposes**
  - Quarterly risk impact assessment for the **ESRB** (EU-wide)
  - Bi-annual exercise for the **ECB FSR**
  - Macroprudential impact assessment for the Eurosystem
  - Macroprudential extension of micro system-wide STs, see **MPB**

- **Top-down – input to supervisory *system-wide* exercises**
  - Country-specific *and* **EBA/SSM**-wide (Quality Assurance role)
  - e.g. SSM CA 2014 / GR CA 2015 / EBA-SSM 2016

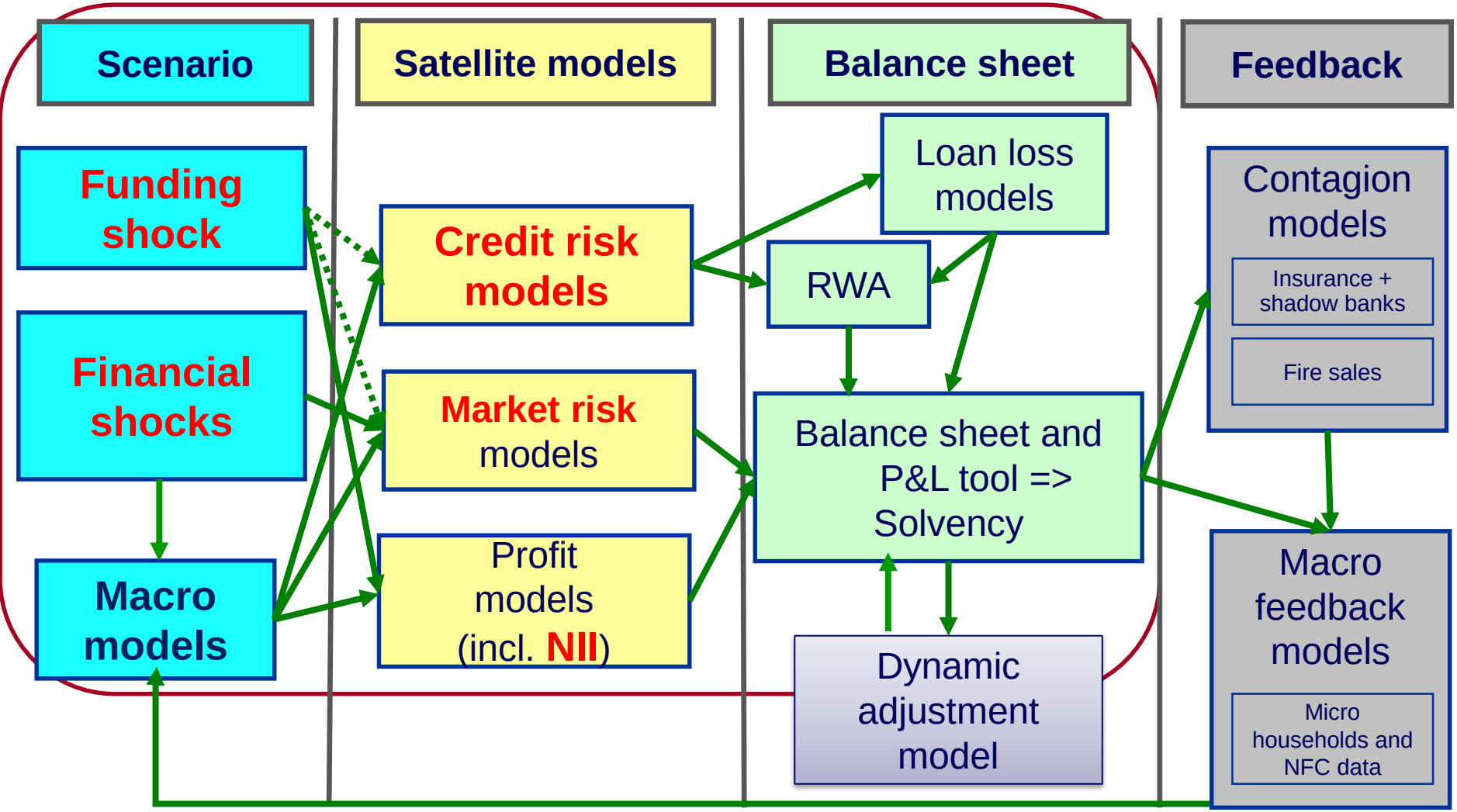
- **Bottom-up – i.e. banks' results – for *microprudential* purposes**
  - SSM-wide (banks' results for publication) – **CA 2014, EBA 2016**
  - Input into regular bank-specific supervision (**SREP**, ICAAP)

  - Input to **EIOPA** and **FSR** ST-based risk impact for insurers
  - Input to **ESMA**, for CCP ST, default and asset price shocks

1.2 The ECB Top-Down stress test "workhorse" – a basis for STAMP€

Forward-looking solvency analysis – beyond driving risks and EBA

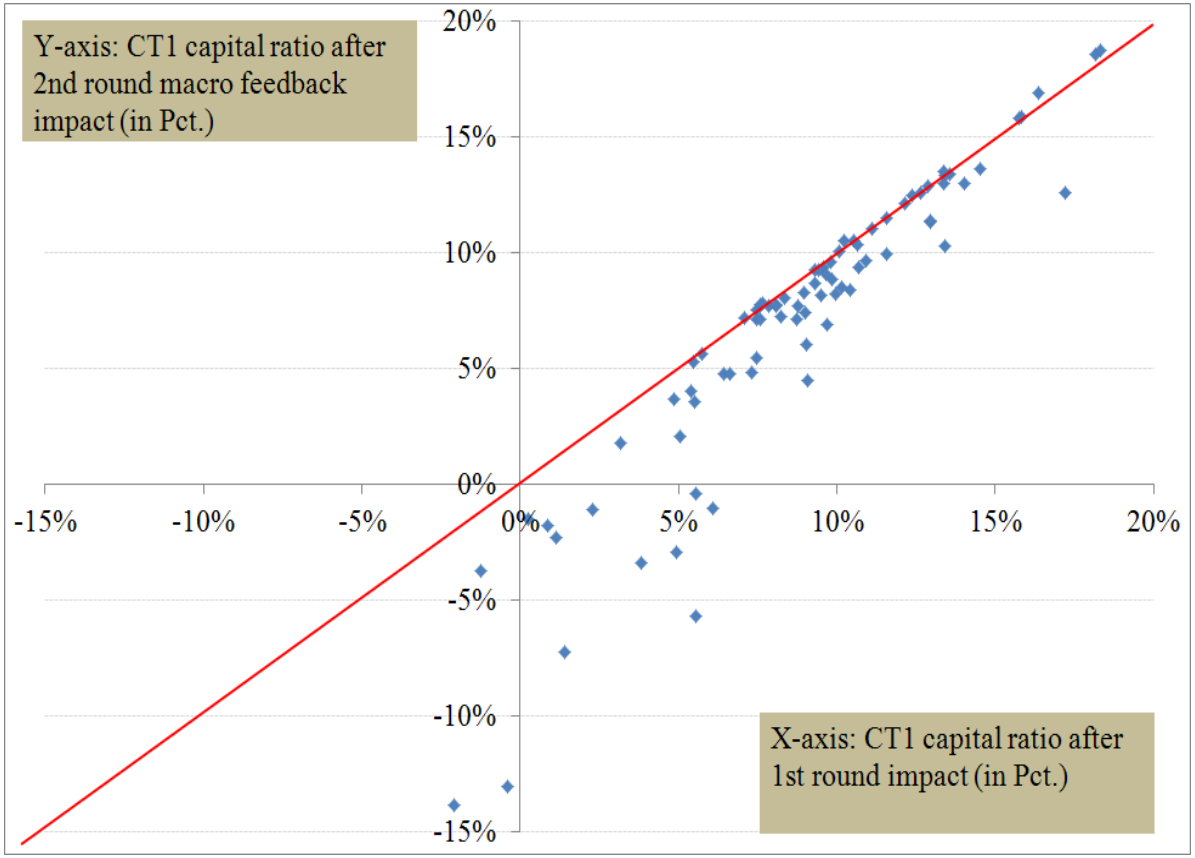
Adapted from Henry and Kok Eds., https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp152.pdf



1.3 Estimating financial-real feedback loops – with macro models

Stress test results fed into macro models – incorporating "dynamic" Balance Sheet reactions from banks

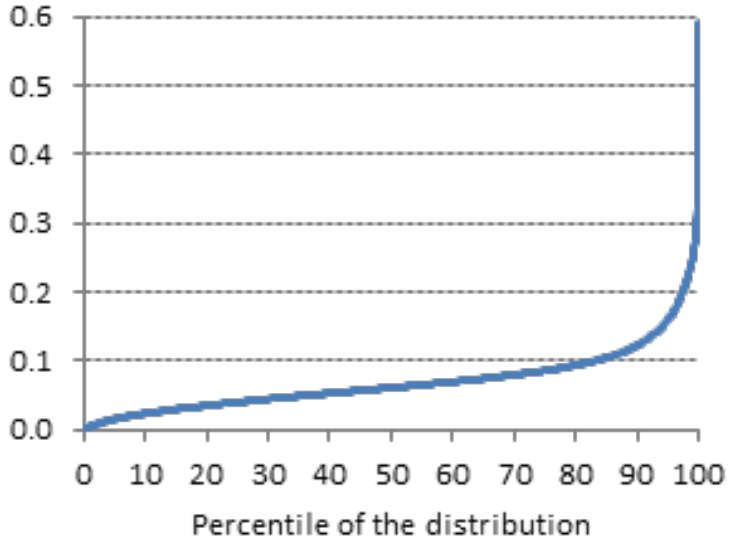
First-round losses under the adverse scenario vs. second round losses – i.e. taking into account macroeconomic feedback of deleveraging



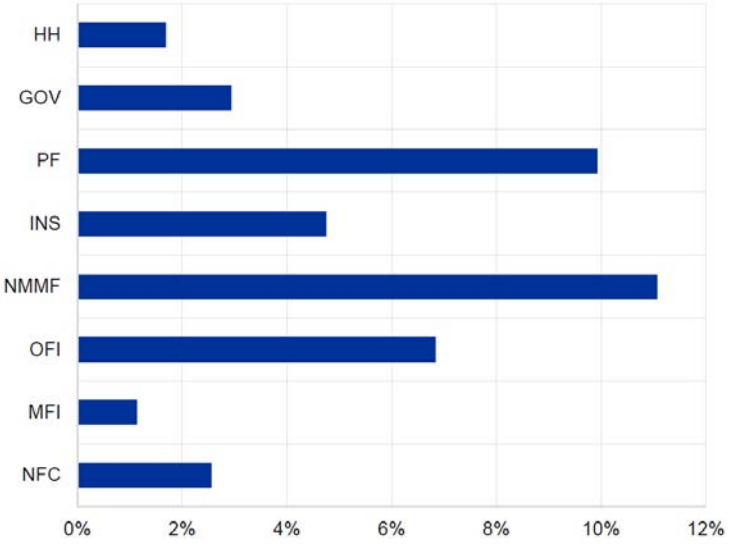
NB: Simulation based on Darracq Pariès et al. (2011).

1.4 MacroPrudential Extension of the micro ST – Spillovers (ECB MPB)

Interbank contagion: distribution of second-round loss on interbank exposures (pp of CET1 ratio)



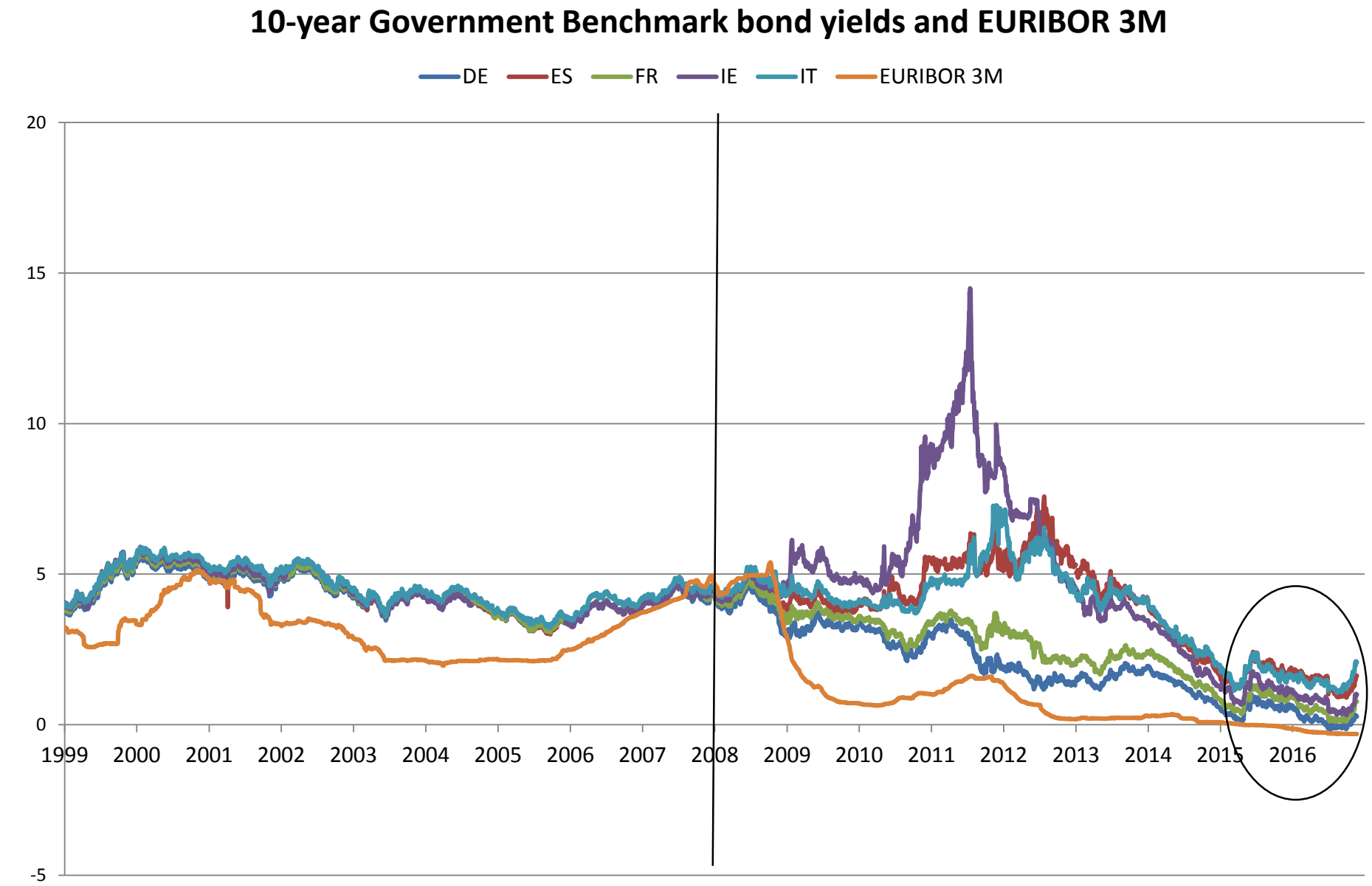
Cross-sector spillover: losses triggered by revaluation of bank equities
(% of total financial assets)



- **Systemic risks arising from interconnectedness usually appear to be contained** further analysis needed on price contagion and funding stresses
- **Interbank contagion** related to direct bilateral exposures remains immaterial, below 10 basis points for most “simulated” interbank networks
- **Investment funds** and **pension funds** most strongly affected by spillovers from reduction in market values of bank stocks

*https://www.**ecb**.europa.eu/pub/pdf/other/**ecb**mpbu201603.en.pdf*

2.1 Short and long “crisi(e)s” / turmoils… followed by “LIR” phase

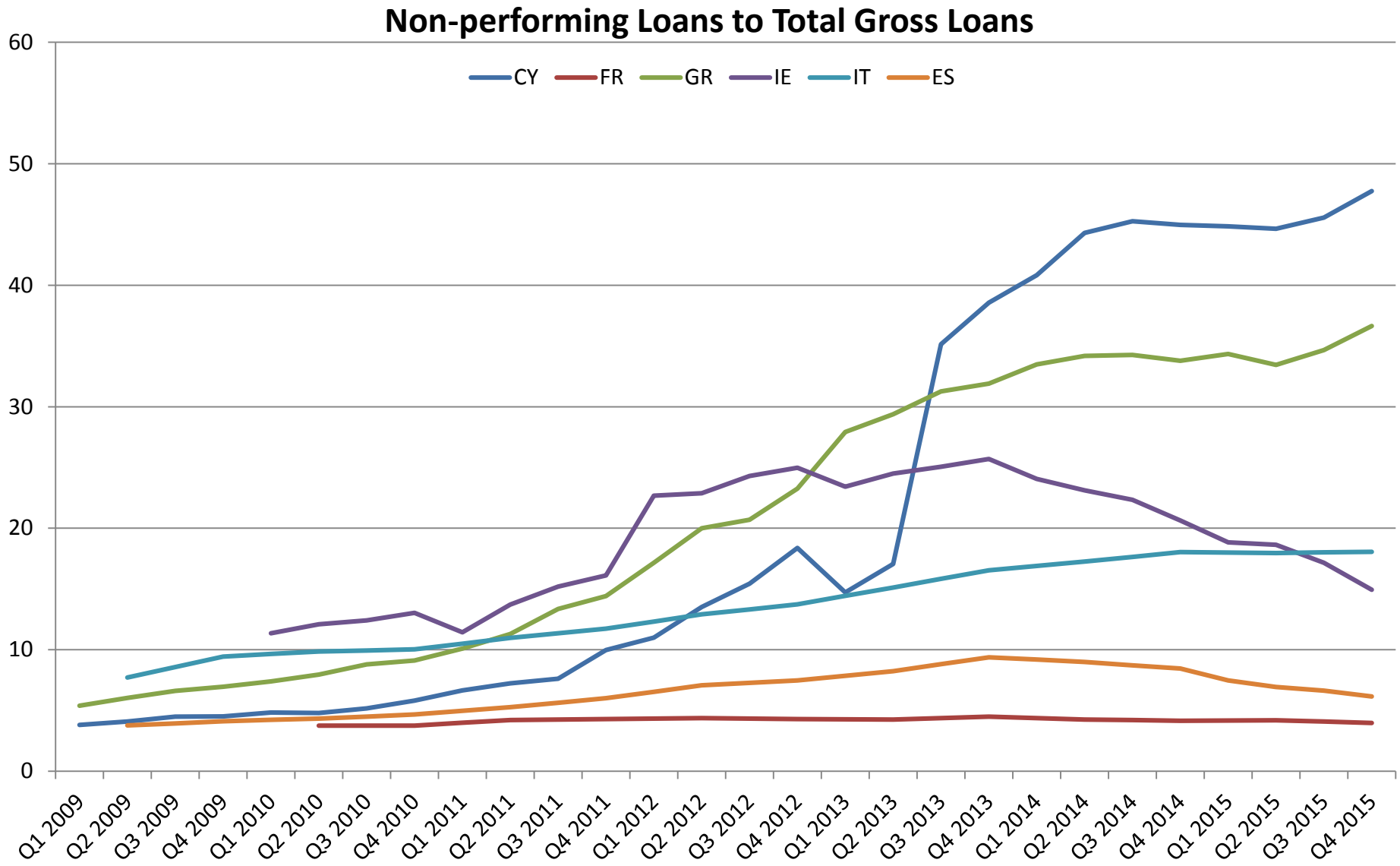


Process and implementation issues

- Scenario: **low growth and low interest rates for long** – affecting profitability, viability, credit supply, risk-taking, market structure…
- Elaborate **a long-term scenario**, ie well beyond 3 years
- Compare the TDST outcome with a **back-to-normal scenario** (higher interest rate levels and steeper yield-curve, higher GDP?)

- Obvious need for some **DBS response** – how, options?
- **Other "credit" sources** to be also assumed, if not modelled?
- Banks' **search for duration** – longer maturity PF
- Banks' assets tilted towards **risk-taking** (credit or market assets)

2.3 CRBB NPL surge and implications… NII / solvency / credit…



Process and implementation issues

- **NPL "modelling"** needed prior to policy analysis – a conservative enough set-up, while being realistic (baseline vs. added stress)
- **NPE buckets** – income recognition on some classes
- **Cure non-0** – related to macrofinancial assumptions
- New loans with **improved risk parameters** – aggregate "PIE"
- Differing **"behaviour" of NPE after write-off's** / restructuring
- Consistent and prudent **use of provisions**

- **Data needs** on NPE composition, cure rates, coverage ratios
- Cure and provisioning **modelling / calibration**
- **Secondary market** – sales as an option, pricing?

Process – TD ST-based cost and benefit analysis

- Needed **development of a "ST" approach**, costs and benefits, input to CCyB calibration, along with other indicators / models.
- **Cost**: higher capital in the short-term with deleveraging
- **Benefit**: more resilient credit supply in a severe downturn

- **Scenario** – country-specific, procyclical severity
- **2 step process** – 1st and 2nd round effects from simulations
- 1st round: **capital shortfall** to a given target (required / market)
- 2nd round: triggered **banks' reactions** (deleveraging vs issuance, consider range of options – e.g deleveraging good loans, all loans, pecking order non-core 1st, PF behaviour)
- **METRIC: GDP** under various assumptions (also other models)

Implementation (host of) issues

- **Policy process** – not clear yet, sequencing of and interaction with P1R, P2R or P2G (beyond our "analytical" scope, not neutral thou)

- Data: **consolidated vs solo**, macropru is a country-level step
- **Cyclical scenario**: How to define it? To cover **which risks?**
- Trade-off **country-specific scenario and € area** relevance?
- Scenario **horizon** – not fully long-term, **preferably a full cycle**

- Further **medium-term benefits**, e.g. on funding costs or IR?
- "Hurdle" rate: How to define the **capital shortfall** - aggregates?
- Banks' reaction – once again the **DBS specification** issue…
- **"Pre-emptive"** add-on-like CCyB – if e.g. a build-up is detected?

Conclusions – an already long-standing basis, still WIP thou…

1. STAMP€, ECB e-book to be published shortly

A running infrastructure for macropru analyses, ie beyond ST QA

A stand-alone projection tool, conditional on (any?) scenario

Externalities, spillovers, agents' behaviour already introduced

2. Need to refine the DBS approach

Shift to PF-based ALM type of bank behaviour (e.g deleveraging)

Deleveraging implications to be specified (eg for NPL)

3. Need to go further beyond bank solvency "only"

Integrate the Liquidity Stress-Test set-up (accounting / contagion)

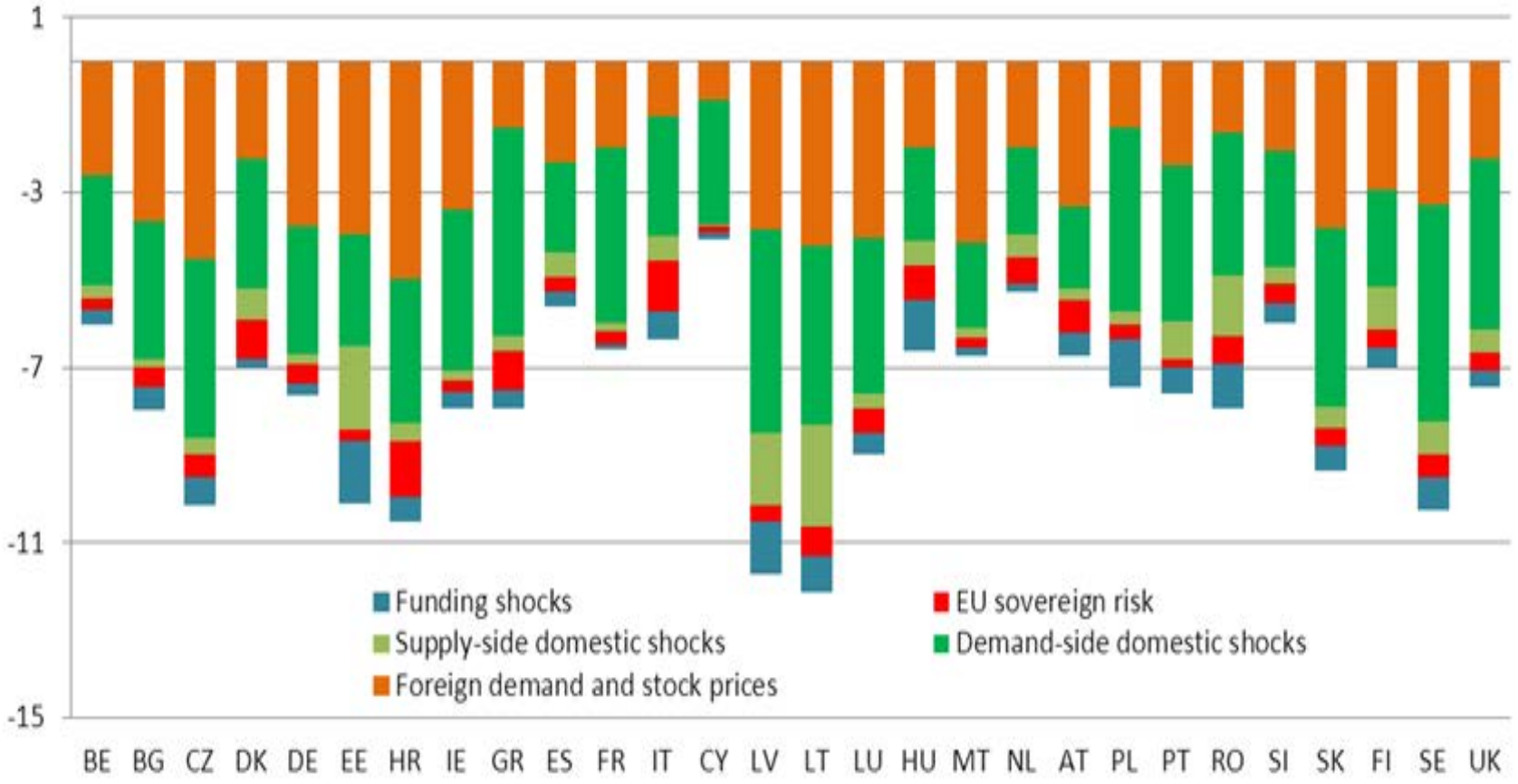
Connect insurers and extend to shadow banking in a broad sense

Background - additional illustrations:

1. Scenario shock decomposition
2. Benchmarks for risk parameters
3. Liquidity Stress Test “basics”
4. Contagion extended channels

B.1 Scenario: GDP [inflation, unemployment, …] from “shocks”

GDP like other macro variables reflecting drivers



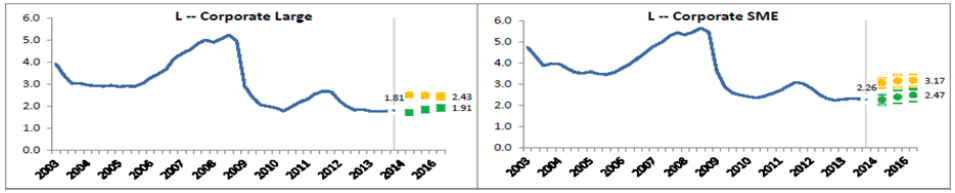
NII – Estimation output, illustrative

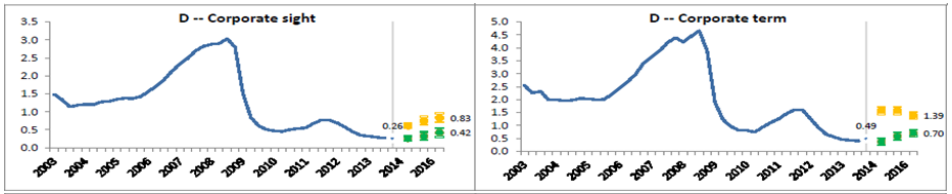
10 asset / liability classes, 28 EU countries, 20 RoW countries/areas

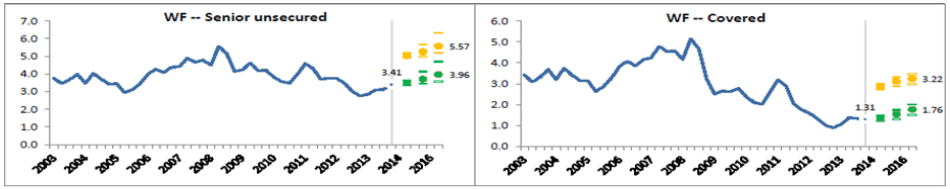
Assets

Liabilities

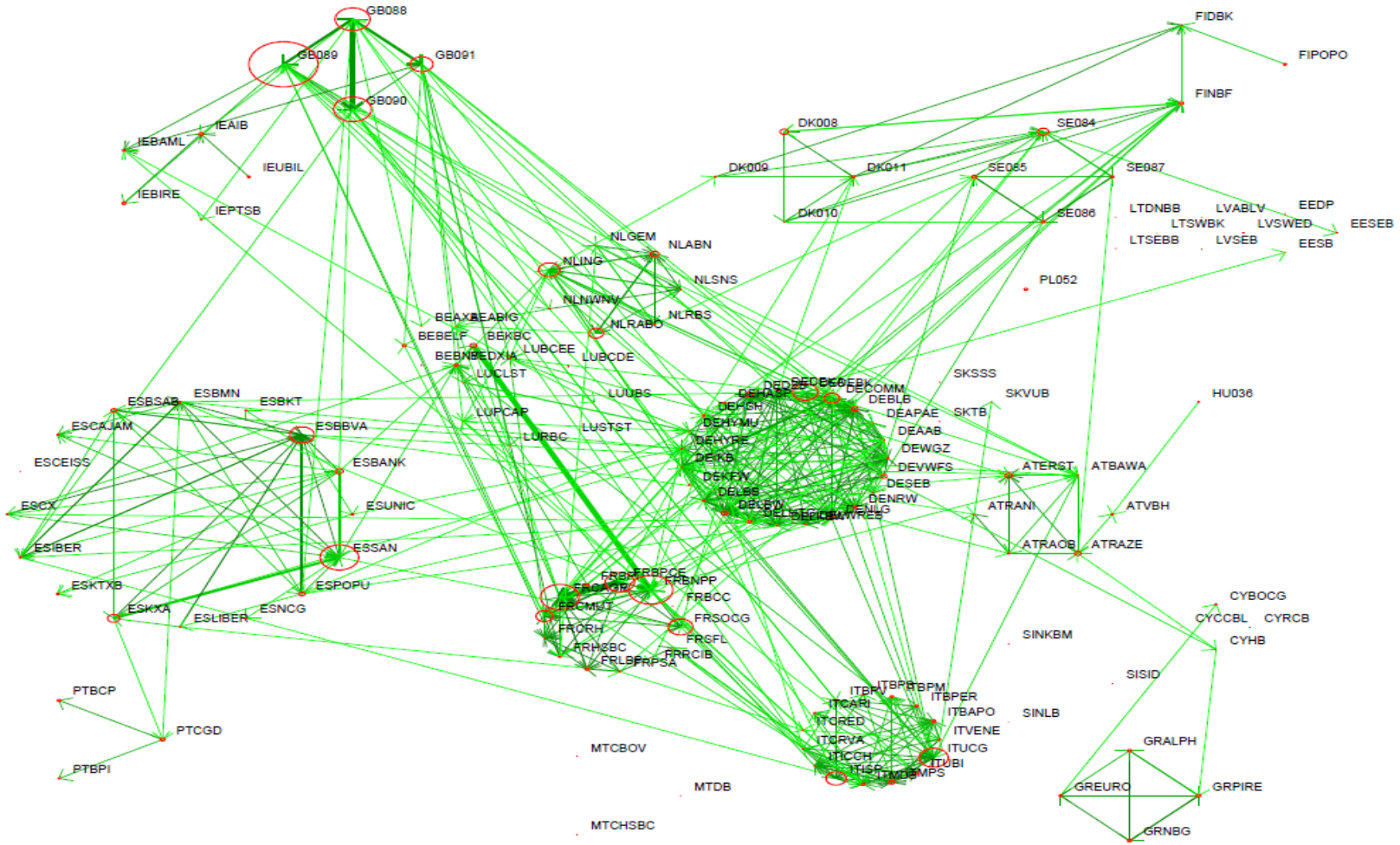
Interest rate projections in percent. Blue: historical. Green: baseline scenario. Orange: adverse scenario. Bars: Respective upper/lower bounds (75th/25th percentile).





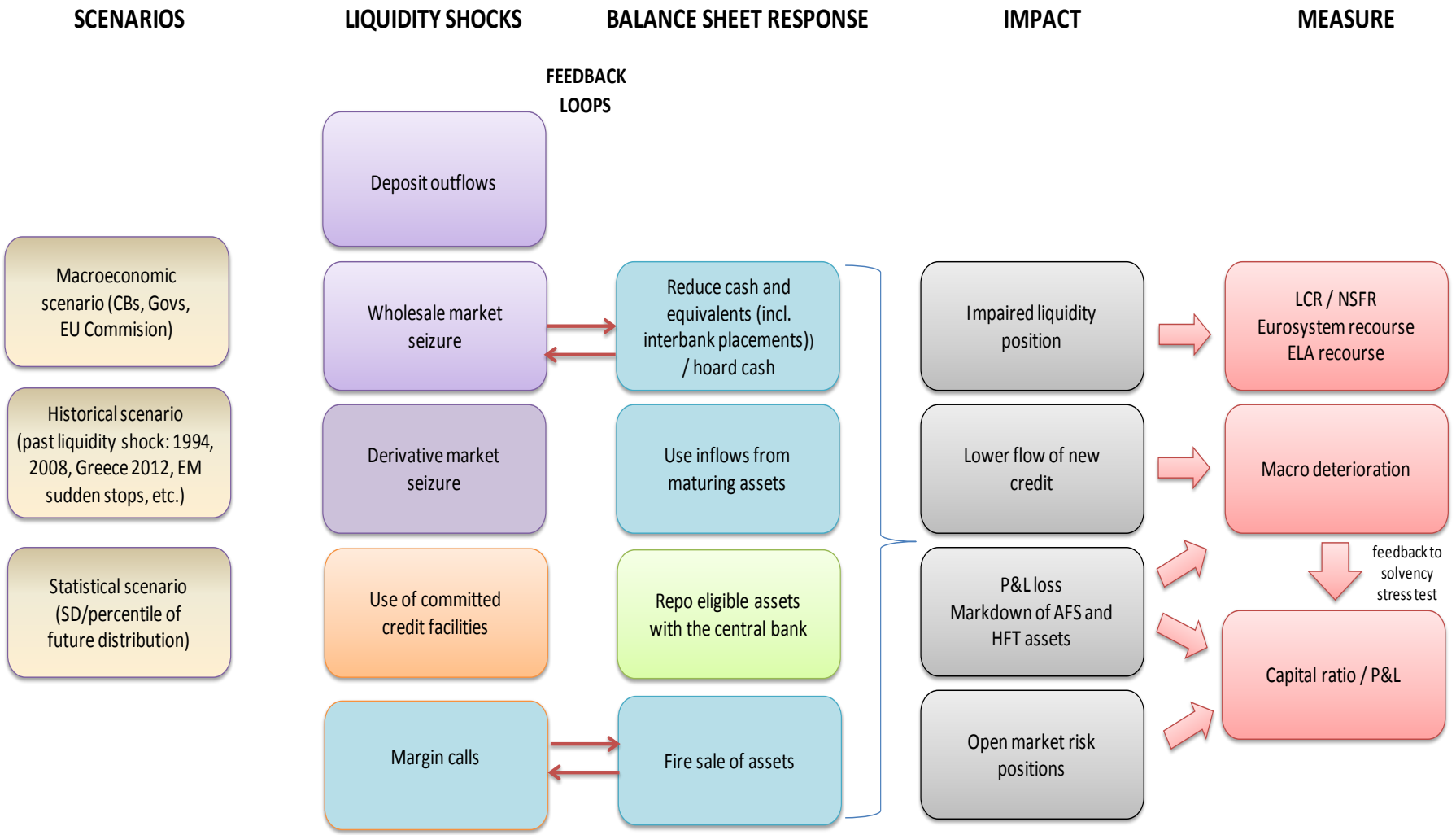


An EU banking system "topography"



Source: Halaj and Kok (2013)

B.4 TD LST - A framework combining quasi-accounting and ABM



B.5 TD LST – funding, herding and solvency needed to see action