



EUROPEAN CENTRAL BANK

EUROSYSTEM

Stress testing in Europe: A Macroprudential Perspective

Katarzyna Budnik

Carmelo Salleo

European Central Bank

**Policy Research Meeting on
Financial Markets and Institutions**

Bank of Italy

Rome, 4-5 October 2018

- Starting point: the EBA exercise. The EBA supervisory stress test is a constrained bottom-up. To ensure comparability of bank-level results it rests on a set of assumptions:
 - **Constant balance sheet:**
 - No changes in bank asset size and structure (i.e. zero growth of credit to the non-financial private sector in the baseline and adverse scenario).
 - No changes in bank liability structure.
 - **No recovery or write offs** of non-performing loans (i.e. NPL ratio is increasing both in the baseline and adverse scenario).
 - **Limited role of non-linear effects** and amplification mechanisms (due to close to linear models used for the design of the scenario).
 - **Inconsistencies** e.g. different implicit credit dynamics in macro scenario and on a bank-level .
- **Intuition:** EBA ST may overstate the initial deterioration in bank capitalisation (banks will attempt to restore it e.g. via deleveraging), but it understates the deterioration in general economic conditions. The overall effect of those two channels on bank capitalisation, balance sheets and the economy is difficult to establish *a priori*.

1. An alternative metrics for judging **the resilience of the banking sector** as a whole by acknowledging endogenous reactions of banks.
2. Informs supervisors about **the system-wide consequences** of banks' most likely decisions, possibly **reducing the scope for policy mistakes**.
3. Validates **the appropriateness of the calibration and phase-in of macroprudential measures** (the reaction function of banks depends on the regulatory setup).
4. Macroprudential stress test provides additional information on:
 - Implications of **single but correlated decisions** on the system *and/or*
 - Encourages the reflection on **the optimal adjustment strategy** in adverse circumstances.

1. *An alternative metrics for judging **the resilience of the banking sector** as a whole by acknowledging the endogenous reaction of banks.*
- Macroprudential stress test provides additional information to policy-makers and the public who:
 - Are interested in **the evolution of the system as a whole** (e.g. credit dynamics) *and/or*
 - Are mandated to control (or are interested in) **the magnitude of the second-round effects** (the intensity of endogenous systemic risks) *and/or*
 - Perceive the EBA ST assumptions as serving a supervisory purpose at the cost of realism.

3. *Validates the appropriateness of the calibration and phase-in of macroprudential measures (the reaction function of banks depends on the hurdle rate, and this one depends on the macroprudential setup).*
- Macroprudential stress test allows macroprudential authorities to assess the appropriateness of already decided capital buffers:
 - It introduces **banks' reactions** which depend on their actual and target capitalisation, *while*
 - Target capitalisation reflect the macroprudential policy decisions already taken e.g. phase-in of CCyB, SRB, G-SII/O-SII (no macroprudential policy change assumption), *therefore*
 - The stress-test illustrates the functioning of the buffers in cases when adverse scenario realises, *and*
 - It will also allow **quicker reaction** and recalibration if need be.

Multi-bank model (87 banks) with 19 economies (euro area)

Starting point: a set of structural shocks (no credit supply shock)

- Macroprudential baseline results:

- Path and distribution of credit dynamics across banks, that depend on:
 - Bank-level target capital ratio
 - Bank-level NPLs
 - Bank-level liability structure
- Solvency rates

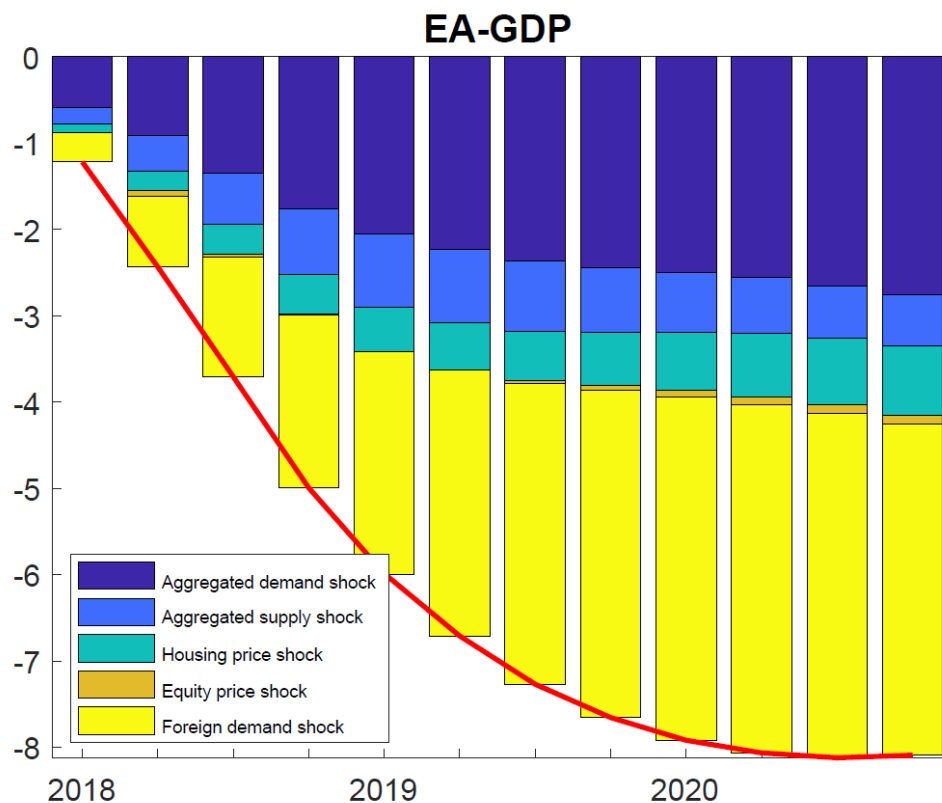
More affected and/or
less capitalised banks
deleverage **more**

- Macroprudential adverse results:

- Path and distribution of credit dynamics across banks, that depend on:
 - Bank-level target capital ratio
 - Bank-level NPLs
 - Bank-level liability structure
 - Banks close to the target capital ratio react non-linearly*
- Solvency rates

Additional
effects of credit
supply shocks

- **Non-linear effect** translates into a second-round effect on the economy



- **Baseline and adverse scenario** assumed to **exclude credit supply shocks**
- **Augmented adverse scenario** will include a series of credit supply shocks generated by the non-linear response of banks

- **Loan growth is a function of:**

Aggregate economic conditions that determine the need for external sources of funding → **loan demand:**

- GDP growth
- Interest rate
- Unemployment
- Stock exchange market

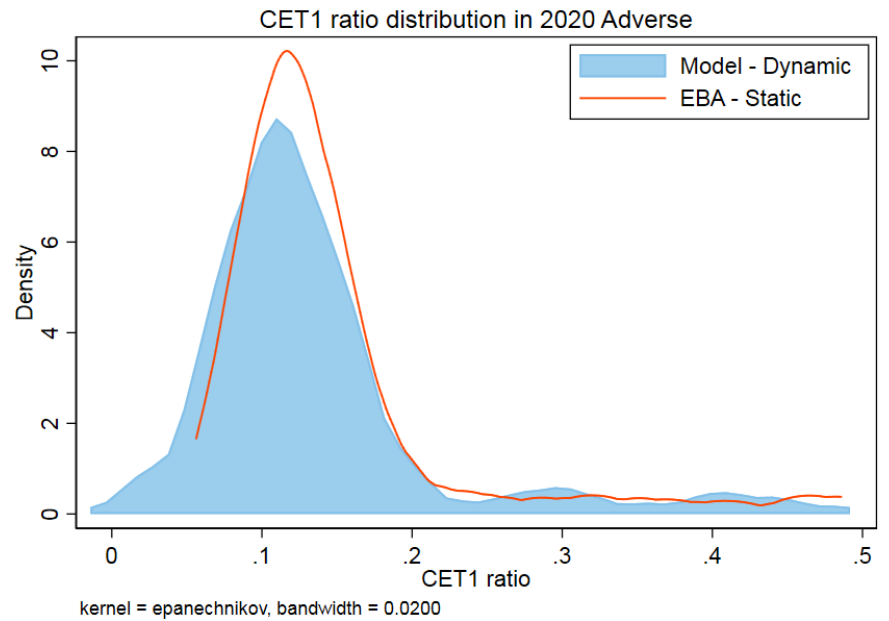
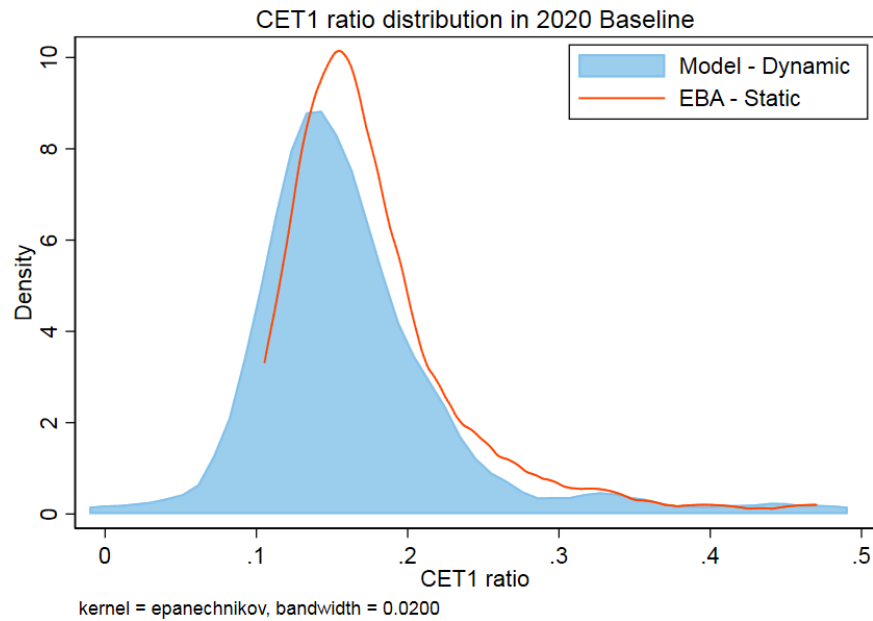
Bank characteristics that determine bank capacity to provide financing sources to the real economy → **loan supply:**

- Solvency
- Asset quality
- Profitability

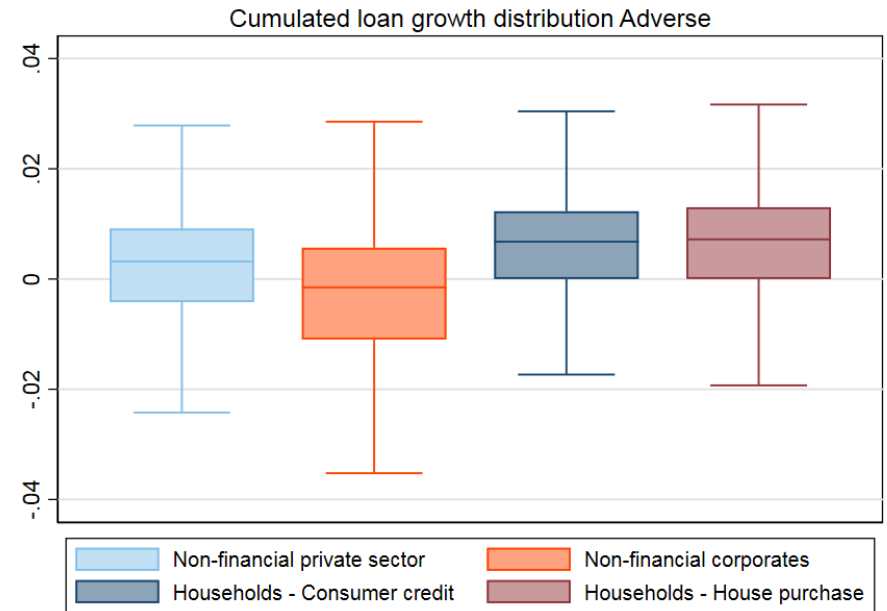
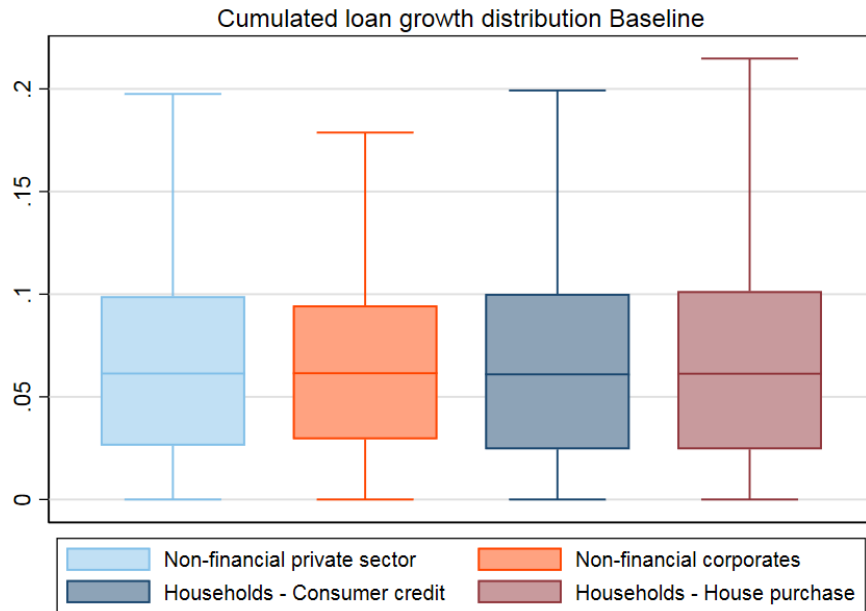
$$\Delta LOANS = f(\Delta LOAN DEMAND, \Delta LOAN SUPPLY)$$

- Model demand side determinants of loan growth controlling for supply side effects.
- Loan demand is separately estimated for the corporate and household sectors.
- Model bank reaction to changing bank characteristics, mainly capitalisation:
 - Intuition: Banks are faced with different capital requirements. Although the CET1 ratio is the same for two banks, the distance to regulatory requirements, and hence bank reaction, can be very different. Less capitalised bank might deleverage in order to meet the regulatory capital requirements.

Baseline vs Adverse: Bank Solvency



Baseline vs adverse: Credit Growth to the Non-Financial Private Sector



We are finalising an integrated macro-micro model which allows us to feed back individual bank reactions into a macro model and assess the amplification effects of shocks.

First tentative results, in line with expectations:

- in normal times banks expand credit more or less in proportion to the increase in equity therefore their capital positions increase less than what a static balance sheet exercise would predict.
- In stress times the amplification effects reduce bank capital by more than what a static balance sheet exercise would predict.
- In stress times banks reduce significantly credit growth, and more so to corporates (which absorb more equity than retail portfolios).

Areas for future development: contagion among banks, spillovers to and from the rest of the financial sector, integration of market variables.