

# How demanding and consistent is the 2018 stress test design in comparison to previous exercises?

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Banking Union Scrutiny



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### Abstract

The 2018 EU-wide stress test requires banks to evaluate the impact on profits and capital of common macroeconomic scenarios for 2018-2020. The methodology set up by the EBA addresses four main sources of uncertainty: credit risk, market risk, financial risks on net interest income and operational risk. Credit risk is assessed on the basis of the new IFRS 9 accounting standard. Market risk includes a valuation of illiquid, hard-to-price level 2/3 financial instruments. Net interest income is assumed to suffer from an asymmetric increase in the rates earned on assets and paid on liabilities. Operating risk includes conduct risk and takes into account past loss events.

This written advice highlights some weaknesses in the EBA methodology, which may lead to a different degree of conservativeness for some business models or countries. It also discusses ways to make future stress tests more realistic and reliable, by addressing resource gaps and improving governance.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.



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## 1. EXECUTIVE SUMMARY

Stress tests measure a bank's reaction (in terms of earnings, capital and liquidity) to a hypothetical macroeconomic scenario. The 2018 exercise was launched last January and banks are expected to provide their preliminary projections by June 2018. Full results for will be disclosed on November 2, 2018.

The exercise is based on historical 2017 year-end data, and tests each bank's resilience to two common macroeconomic scenarios ("baseline" and "adverse") for 2018-2020. The baseline scenario follows the growth forecasts released in December 2017 by the ECB. The adverse scenario entails a real GDP growth in 2018 and 2019, leading to a cumulative deviation of -8.3% from baseline projections.

Banks must analyse the impact of four main sources of uncertainty: credit risk, market risk, financial risks on net interest income and operational risk, including conduct risk.

Credit risk estimates must comply with IFRS 9, a new accounting standard – effective since 2018 – that requires banks to allocate credit exposures into three "stages". These are stage 1 (fully performing exposures), stage 2 (exposures that have suffered a significant increase in credit risk since initial recognition, where expect losses are measured across the whole residual life) and stage 3 (non-performing exposures).

Concerning market risk, banks are requested to evaluate the impact of the adverse scenario onto all financial instruments held at fair value. This includes level 2 and 3 items, that is, assets and liabilities that are illiquid and hard to price, for which an additional haircut will be imposed, to account for model risk. Sovereign exposures will be assessed in terms of either market risk (if booked at fair value) or credit risk (based on country-specific risk parameters dictated by the ECB).

The EBA methodology also requires banks to estimate how changes in market rates may affect their net interest income, as a surge in funding costs may not entirely translate into higher lending rates. While no liquidity shock is assumed (i.e., banks will always be able to refinance their liabilities upon maturity), some stress test rules (known as "asymmetric pass-through") lead to a decrease in the difference between the return on interest-generating assets and the cost of interest-bearing liabilities.

Finally, banks must project losses that may arise from conduct risk and other operational risks using their internal models and taking into account information on past loss events.

In order to ensure that these simulations are carried out in a comparable way by all participating institutions, a number of constraints are introduced through a standard methodology defined by the European Banking Authority. Some of these constraints may prove especially binding for commercial banks transforming deposits into loans with some degree of maturity mismatch. Rules on stage 3 exposures, asymmetric pass-through and "static" (i.e., fixed) balance-sheet are likely to emphasize the effects of the adverse scenario for this category of institutions. This may prove especially true for banks based in peripheral countries, which – under the EBA methodology - will not suffer liquidity shortages under the adverse scenario, but may be trapped in unprofitable businesses facing decreasing margins. On the other hand, banks with a large trading activity may not experience a dramatic impact on their investment portfolios, as the number of adverse scenarios decreases from three to one, and no "quick and dirty" rules are imposed to stress level 2/3 assets.

An additional layer of constraints may come from the "benchmark models" used by competent authorities to scrutinize the banks' bottom-up results. While such models may play a beneficial role in making supervisory expectations more uniform and transparent, they are not subject to the public consultation process that leads to the EBA methodology, hence their possible weaknesses and inability to capture bank specificities may prove harder to challenge.

In order to make supervisory stress tests more flexible and realistic, two factors are key: resources and accountability. As for resources, it is worth noting that the EBA, which in principle is responsible for “initiating and coordinating” the whole stress test exercise, must rely on a very limited headcount (10 units) to carry out its tasks. Such a lack of firepower should clearly be addressed.

Accountability is another pivotal issue, if greater flexibility is to be achieved without causing an increase in discretionary decisions and opacity. In turn, it involves transparency and better governance. As concerns the latter, supervisory actions throughout the stress test should be coordinated by a truly independent entity, e.g. by creating an Executive Board formed by the EBA chairperson and a few “resident” members, to be appointed on the basis of their merits rather than as representatives of a competent authority. Such an independent “steering body” would be less prone to the interests of individual authorities and more inclined to guarantee a uniform application of the EBA methodology.

## 2. INTRODUCTION\*

The 2018 EU-wide stress test, launched on 31 January 2018, requires participating banks to evaluate the impact on profits and capital of the possible evolution in the macroeconomic framework for the period 2018-2020.

The methodology to be used in this simulation exercise has been discussed with the industry in a thorough consultation process that started in mid-2017. Still, there is a risk that such methodology may not provide a consistent picture of the vulnerabilities in the European banking industry.

This document starts by summarizing the main features of the 2018 stress test (§3), then goes on to discuss its main methodological weaknesses (§4). The final remarks (§5) elaborate on whether the 2018 exercise may prove more demanding for some business models or countries, and suggest how future stress tests could be made more realistic and reliable. §6 includes some sample questions that could be raised during the next public hearing of the Chair of the ECB Supervisory Board in the ECON Committee.

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\* Although the views expressed in this report are only mine, I gratefully acknowledge suggestions and advice from Aurelio Maccario and Giuseppe Rapisarda (Unicredit Group), Marcel Magnus (EGOV, European Parliament) Sergio Nicoletti Altimari (ECB), Mario Quagliariello and Raffaele Passaro (European Banking Authority). I also wish to thank Andrea Pinelli (Bocconi) for productive discussions and outstanding research assistance.

### 3. MAIN FEATURES OF THE 2018 STRESS TEST EXERCISE

The 2018 EU-wide stress test exercise (European Banking Authority, 2017) is carried out on a sample of 48 banks<sup>1</sup> (“the EBA sample”), 33 of which are based in the euro area, covering broadly 70% of the banking sector’s total assets<sup>2</sup>.

In terms of process, the 2018 exercise is broadly unchanged from the previous ones (see Figure 1) and involves a “constrained bottom-up approach” where the banks’ own estimates are reviewed and amended by competent authorities, under the statistical oversight of the EBA. More specifically:

- the ECB and the ESRB design the macroeconomic scenario, while the EBA is responsible for the methodology that banks must follow when running their own simulations;
- competent authorities (including the SSM in the case of significant institutions based in the euro area) instruct banks and collect preliminary results, based on which the EBA performs a statistical analysis to spot outliers;
- competent authorities use information on outliers, as well as results generated by their own benchmark models, to highlight weaknesses in the banks’ draft results and request amendments;
- the final results are publicly disclosed by the EBA through a set of detailed templates. Although no hurdle rates or capital thresholds have been defined, competent authorities use stress test results as an input to their supervisory actions, including additional capital cushions requested to individual banks as part of the annual Supervisory Review and Evaluation Process<sup>3</sup> (“SREP”).

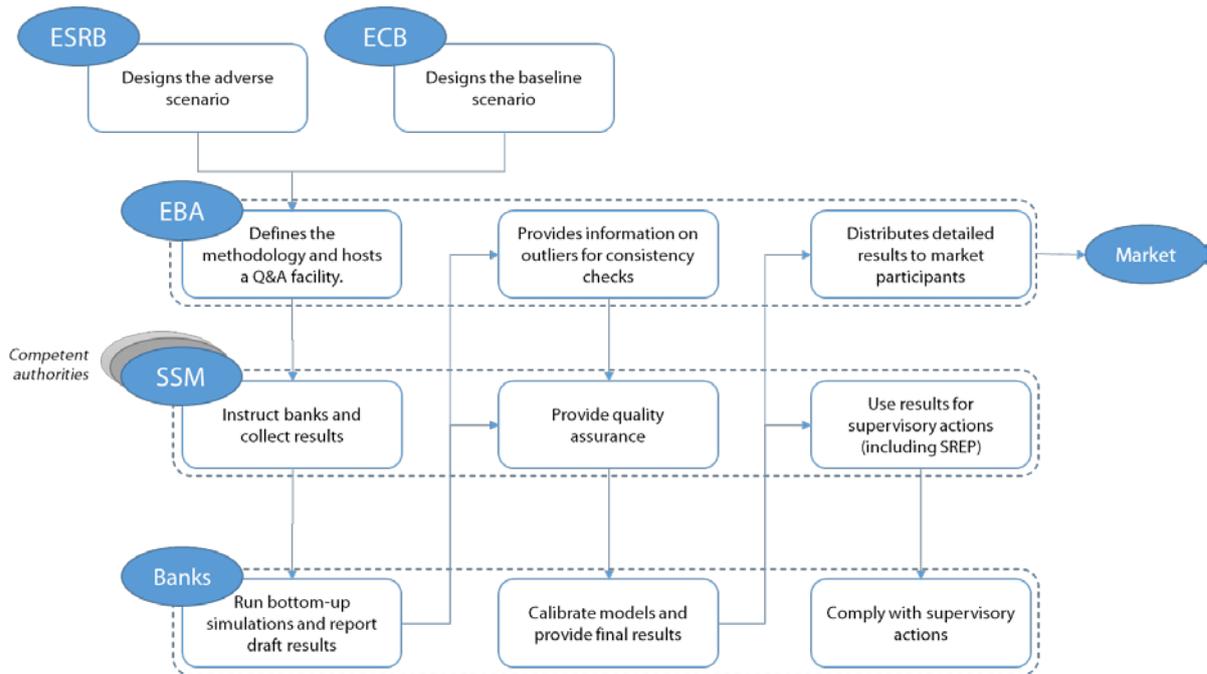
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<sup>1</sup> While the EBA originally indicated a sample of 49 banks, two of them merged (Bankia and Banco Mare Nostrum), leading to a total of 48 institutions.

<sup>2</sup> To be included in the sample, banks must have at least €30 billion in assets. This threshold is consistent with the criterion used for supervisory reporting to the EBA, as well as with the SSM definition of a significant institution. Competent authorities may request to include additional institutions having a minimum of EUR 100 billion in assets. The exercise is run at the highest level of consolidation, but insurance activities are excluded.

<sup>3</sup> (Resti, 2017a)

**Figure 1 - The process underlying the 2018 stress test**



Banks are expected to provide their preliminary projections by June 2018. Full results for the EBA sample will be disclosed<sup>4</sup> on November 2, 2018<sup>5</sup>.

The exercise is based on historical 2017 year-end data, and tests each bank’s resilience to two common macroeconomic scenarios (“baseline” and “adverse”) for 2018-2020.

The baseline scenario follows the growth forecasts released in December 2017 by the ECB. The adverse scenario entails four shocks: a sudden increase in risk premia on global financial markets, low nominal growth rates, uncertainty regarding public and private debt sustainability, liquidity risks in non-bank financial institutions, which may spread to the whole financial system. As a result, real GDP growth is negative in 2018 and 2019 (-1.2% and -2.2%, respectively), with a slight rebound in 2020 (+0.7%). This implies a cumulative deviation of -8.3% from baseline growth. Although the severity of this adverse shock is unprecedented for EU-wide stress tests, it should be borne in mind that – due to the improvement in macroeconomic conditions – the baseline scenario looks more favourable than in some past exercises<sup>6</sup> (see Table 1).

<sup>3</sup> While some competent authorities have decided to run the stress test also on banks not included in the EBA sample, these results will not be disclosed to the public. This is the case, e.g., for other significant institutions supervised directly by the ECB.

<sup>5</sup> For Greek banks the exercise was accelerated and the results were disclosed on May 5, 2018, in order to leave enough time for any required follow-up action to occur before the end of the third European Stability Mechanism (ESM) Programme for Greece (20 August 2018).

<sup>6</sup> Furthermore, while the average EU GDP growth is a measure of the stress test’s overall conservativeness, specific conclusions may hold for individual countries. It has been noted, e.g., that the adverse scenario for Italy looks extremely demanding when compared to the forecasts generated

**Table 1 - GDP growth estimates across different stress test exercises**

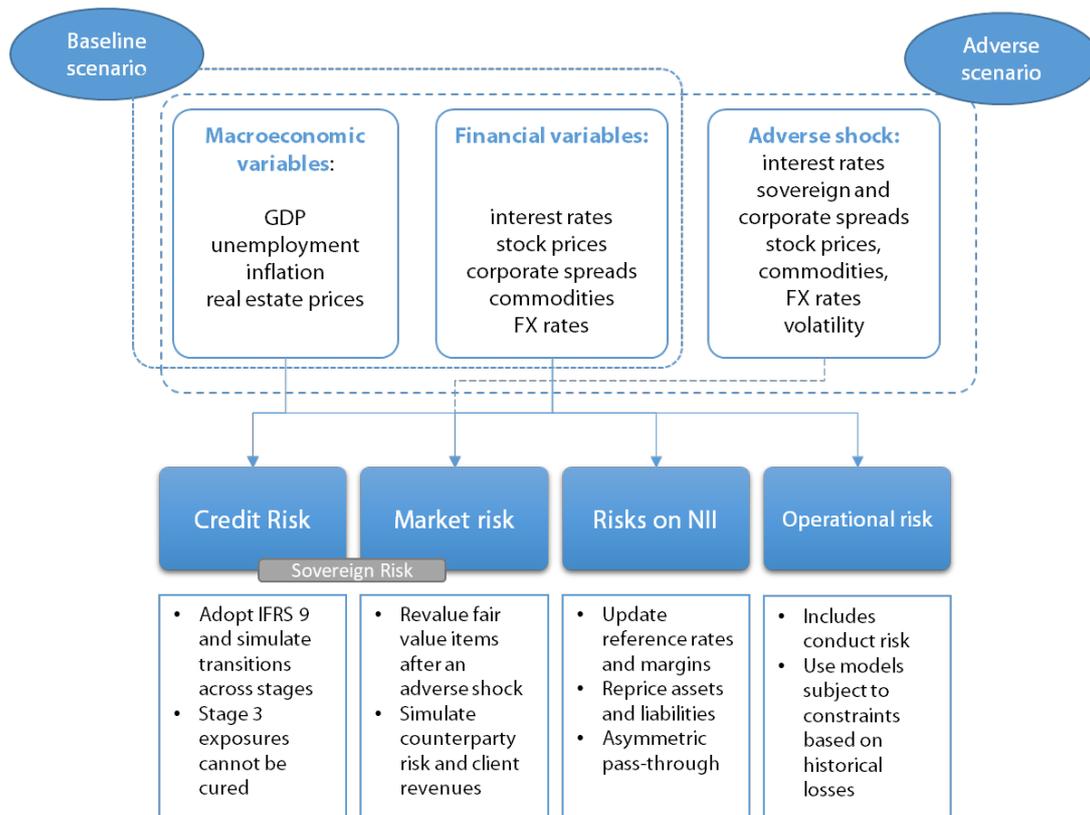
Stress test exercise	Year	Baseline GDP growth	Adverse GDP growth
2018	2018	2.2	-1.2
	2019	1.9	-2.2
	2020	1.8	0.7
2016	2016	2.0	-1.2
	2017	2.1	-1.3
	2018	1.7	0.7
2014	2014	1.5	-0.7
	2015	2.0	-1.5
	2016	1.8	0.1

Source: ECB

Against this backdrop, banks are required to analyse the impact of four main sources of risk (see Figure 2): credit risk, market risk, financial risks on net interest income and operational risk, including conduct risk. These are discussed in greater detail in the following sections.

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by a well-established econometric model (Bonucchi et al., 2018); in the case of Greece, the forecasts were seen by bankers as unprecedentedly harsh, as they entailed a 16 per cent fall in house prices (Arnold and Hope, 2018), well above the maximum drop experienced in the last decade (12%), although still below the reductions experienced e.g. by Baltic countries.



**Figure 2 – Scenario variables and their impact on different sources of risk**

### 3.1 Credit risk and the advent of IFRS 9

As concerns credit risk, the logic underlying the stress test involves:

- measuring the starting values of each bank’s risk parameters (such as the borrowers’ probability of default, PD, and loss rate in the event of default, LGD);
- estimating the impact of the baseline and adverse scenarios on those parameters;
- updating risk-weighted assets and computing impairment flows that affect the bank’s income statement.

All values (including the starting values at end 2017) must comply with IFRS 9, a new accounting standard – effective since 2018 – that requires banks to allocate credit exposures into three “stages” (Novotny-Farkas, 2015). In stage 1, PDs and LGDs are estimated over a one-year horizon. Stage 2, which includes exposures that have suffered a significant increase in credit risk since initial recognition<sup>7</sup>, requires PDs and LGDs to be measured until final maturity (“lifetime”). Stage 3 includes defaulted exposures and other non-performing assets; here, losses are computed on a lifetime basis (including the workout period) and interest revenues accrue on the exposures’ value net of impairments.

<sup>7</sup> Regardless of the banks’ definitions of “significant increase in credit risk”, Stage 1 exposures experiencing a threefold increase of lifetime PD since initial recognition must be moved to Stage 2 according to the EBA methodology, unless their PD remains below 0.3%.

For each year in the simulation horizon, banks must estimate transition rates across stages<sup>8</sup>, while providing lifetime expected loss rates for exposures in stages 2 and 3. The EBA methodology assumes “perfect foresight” on economic projections, meaning that lifetime loss estimates must account, at any time, for all future macroeconomic developments dictated by a given scenario. Accordingly, when simulating impairments on stage 2/3 exposures in 2018, banks must use information on economic variables for 2019 and beyond<sup>9</sup>.

For every simulated year in 2018-2020, additional impairment losses for each stage translate into the P&L account. Changes in PDs and LGDs also affect risk-weighted assets, either directly (for banks using internal rating models) or through a shift in the loan portfolio’s rating mix and an increase in defaulted exposures (under the standardized approach).

The banks’ internal estimates are subject to several constraints dictated by the EBA in order to make simulations more stable and comparable across institutions. E.g., stage 3 exposures are not allowed to return to a better stage, meaning that they act as a “cumulative” variable containing an initial stock, plus all subsequent flows from performing stages<sup>10</sup>. Additionally, stage 3 items cannot experience negative impairments (otherwise stated, no increase is allowed in expected recoveries) and cannot earn an effective interest rate greater than the historical 2017 value. Stage 2 exposures may move back to stage 1, based on the bank’s estimated transition rates. The coverage ratio<sup>11</sup> for stage 1 exposures cannot decrease over time.

Participating institutions will be allowed to take into account the transitional rules introduced in late 2017 by the co-legislators in order to avoid a sudden decrease in regulatory capital<sup>12</sup>. However, as such rules will be adopted by banks on a voluntary basis, the EBA will also disclose a “fully loaded” version of the stress test results, accounting for the whole impact of IFRS 9 on capital.

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<sup>8</sup> Transition rates must be based on internal models used for IFRS 9 purposes (or for risk management purposes, if the former are not available); when no reliable models exist, historical transition rates for 2017 must be used, after removing any one-off effects that would lead to less conservative estimates.

<sup>9</sup> After the end of the scenario horizon, the credit risk parameters in the baseline scenario are assumed to stay flat, while the credit risk parameters in the adverse scenario are assumed to revert to the baseline.

<sup>10</sup> This assumption also implies that no write-offs take place within the simulation horizon of the stress test. Note that, although Stage 3 exposures cannot be cured within the simulation window, still the LGD parameters estimated by the bank take into account the historical cure rates on non-performing exposures.

<sup>11</sup> The coverage ratio is the ratio between impairments and gross exposures.

<sup>12</sup> Regulation (EU) 2017/2395. See (Stamegna, 2017) for a concise introduction.

### 3.2 Market risk

Market risk is assessed for all positions booked at fair value. This is done by performing a full revaluation<sup>13</sup> that incorporates a set of market shocks consistent with the adverse macroeconomic scenario<sup>14</sup>. The overall impact of the shocks on P&L and capital must be fully recognised in 2018<sup>15</sup>.

Banks must also simulate a shock to the so-called “liquidity reserve”<sup>16</sup>. The latter accounts for the additional fair value losses that would ensue from a drop in market liquidity (above and beyond the shocks experienced by individual risk factors). In practice, banks must apply a 230% shock to the bid/ask spreads of the financial instruments under scope and update their liquidity reserve accordingly<sup>17</sup>.

Besides this 230% shift, an additional increase (of 180% and 220%, respectively) must be applied to the bid/ask spread of illiquid, hard-to-price “level 2” and “level 3” financial instruments<sup>18</sup>, in order to account for price uncertainty, close out costs and model risk.

Losses due to counterparty credit risk (CCR) are estimated by simulating a default of the two most vulnerable counterparties among each bank’s top ten. Banks also forecast client revenues generated by their trading activities (due e.g. to trading fees and/or to the bid/ask spread), in a way that prudently takes into account past values.

### 3.3 Sovereign risk

The stress test methodology dictates two different approaches for dealing with sovereign exposures, depending on whether the latter are booked at amortised cost or at fair value. In the former case, banks must estimate credit losses by applying a set of country-specific stressed PDs and LGDs dictated by the ECB. As for the latter, losses on positions booked at fair value are estimated using the methodology for market risk, which also includes shocks on yields paid on sovereign bonds.

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<sup>13</sup> The revaluation extends to the bank’s credit valuation adjustment (“CVA”), that is, the drop in value due to the fact that the market risk portfolio is not risk-free, as the bank’s counterparties may default.

<sup>14</sup> Unlike in previous stress tests, banks have to consider only one adverse market scenario (instead of three different shocks). No impact is expected under the baseline scenario.

<sup>15</sup> However, for items booked at fair value through other comprehensive income (“FVOCI”), fair value changes translate directly into capital (meaning that, e.g., a fair value loss would lead to a decrease in capital) but are recognised in the P&L account on the basis of the “staging” rules dictated by IFRS 9. Accordingly, it could be that no losses are recorded if a security experiences a drop in its fair value, but does not suffer a significant increase in credit risk.

<sup>16</sup> The liquidity reserve is held against all instruments booked at fair value, to account for the adjustments required by IFRS 13 and the prudential cushions (namely, the additional valuation adjustment, “AVA”) dictated by Article 105 of the CRR.

<sup>17</sup> E.g., assuming that the bid and ask prices for a given security are 100 and 99.9, the bid/ask spread (0.1) must be multiplied by 230%, getting 0.23. Half of it (0.11) will then be applied to the estimated fair value of the security to generate the liquidity-related loss that must be covered by the liquidity reserve.

<sup>18</sup> The fair value measurement of financial instruments is addressed by IFRS 13, where financial instruments are ranked on three “levels”, according to the inputs available to estimate their expected sale price: level 1 (L1) instruments are actively traded, so quoted prices are available; level 2 (L2) items are priced using directly observable inputs for similar instruments or related market variables; level 3 (L3) require inputs that must be estimated, as market quotes are unobservable or unreliable.

### 3.4 Financial risks on net interest income

Changes in interest rates, besides triggering market risk through changes in the value of fixed income assets and liabilities, also affect a bank net interest income (“NII”), as a surge in funding costs may not entirely translate into higher lending rates. Accordingly, the EBA methodology requires banks to use internal models to project their future NII in 2018-2020, looking at all interest-bearing assets and liabilities<sup>19</sup>. In doing so, two possible sources of stress must be considered: a shift in risk-free rates on various currencies and maturities (the “reference rates”) and a change in the risk premium required for specific counterparties and products, reflecting their creditworthiness and liquidity (the “margin”).

In the projection, interest income and expenses evolve over time as a result of the repricing, at new interest rate conditions, of the maturing assets and liabilities<sup>20</sup>. Additionally, under stress, performing assets decrease in size to make room for the increase in stage 3 exposures (as described above in §3.1), leaving total assets unchanged.

The banks’ simulations are subject to several constraints imposed by the EBA to ensure that results cannot be manipulated and remain comparable across institutions. First, sight deposits are assumed to reprice instantaneously (even though their rate conditions have proven “sticky” in the past). Second, calls on liabilities must always be exercised, even when this means that new funds must be raised at a higher rate. Third, no increase in the NII may occur – compared to the 2017 figure – under the adverse scenario.

Additionally, the change in the margin of repriced instruments must comply with the so-called “asymmetric pass-through”<sup>21</sup> rules, which set the flowing floors for interest-bearing liabilities and caps for interest-earning assets:

- the increase in the margin paid on liabilities should reflect<sup>22</sup> the greater between the change in the sovereign spread for the country of location and the change in the bank’s own credit spread<sup>23</sup>;

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<sup>19</sup> This also includes interest-bearing assets and liabilities that are booked at FVPTL and FVOCI. However, one would expect the effect of a change in market rates for such items to be already measured in the market risk portion of the stress test exercise (see §3.2). If this were the case, then the impact of a shock on interest rates on items booked at fair value would be recorded twice: first, through a one-off revision, in 2018, of their market value; then, by updating interest income and expenses throughout the simulation window. This may lead to counting the same effect twice. E.g., in the case of a fixed-rate long term Treasury the stress test would capture both the decrease in its fair value and the increase in the cost of floating-rate liabilities used to fund the investment, although those two effects relate to the same phenomenon.

<sup>20</sup> Interest income and expenses are also affected by changes in the reference rates of floating-rate assets and liabilities.

<sup>21</sup> An example of asymmetric pass-through will be provided in §4.4 below.

<sup>22</sup> For short-term and secured liabilities, the adjustment to the change in credit spreads is only partial.

<sup>23</sup> A set of minimum values for the change in the banks’ credit spreads has been specified in the EBA methodology, which depend on the bank’s rating at end 2017. E.g., a AAA-rated bank is expected to suffer an increase in the credit spread of no less than 0.25%, while a BBB-rated bank will experience at least a 0.80% rise. The impact must be applied at the beginning of the simulation horizon.

- any rise in the margin earned on repriced assets must be capped at a proportion<sup>24</sup> of the change in the sovereign spread.

Although the asymmetric pass-through exerts a negative impact on the NII, the EBA methodology assumes that banks will always be able to roll over their liabilities. Hence, one may say that the 2018 stress test is more conservative in modelling price effects to compensate the fact that it does not include a liquidity shock on the availability of bank funding.

### 3.5 Operational and conduct risk

Banks must project losses arising from conduct risk<sup>25</sup> and other operational risks<sup>26</sup> using their internal models and taking into account information on past loss events. Such simulations are subject to the following constraints:

- under the baseline scenario, forecasts of losses due to new conduct risk events may not be less than the average losses reported in 2013-2017 (excluding losses due to “material” conduct risk events<sup>27</sup>). Under the adverse scenario, historical losses must be multiplied by a stress factor before being used as a floor for the bank’s projections;
- estimates of conduct losses connected to new material conduct risk events are subject to a “rebuttable” floor (that is, the floor is waived if the bank can convince its competent authority that it would lead to overly conservative results);
- estimates of other operational losses may not fall below the historical average of such losses in 2013-2017, times a multiplier;
- capital requirements for operational risk in 2018-2020 may not fall below the level reported at end 2017.

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<sup>24</sup> The proportion is set at 15% for exposures to non-financial companies and households, 50% for exposures to banks, 100% for exposures to governments.

<sup>25</sup> Conduct risk is defined as the current or prospective risk of losses arising from an inappropriate supply of financial services, including cases of wilful or negligent misconduct. For further details, see (Resti, 2017b).

<sup>26</sup> Operational risk is the risk of losses resulting from inadequate or failed internal processes, people and systems or from external events. It includes legal risk.

<sup>27</sup> A conduct risk event is considered material if it triggered aggregate gross losses in 2013-2017 greater than 10 bps of a bank’s end-2017 consolidated CET1 (“common equity”) capital.

## 4. HOW CONSISTENT AND DEMANDING IS THE 2018 EXERCISE?

We now highlight some characteristics of the 2018 stress test that may undermine its internal consistency and/or lead to heterogeneous levels of conservativeness for different types of institutions. Some of these concerns have been raised by industry representatives and other stakeholders as part of the consultation process that led the EBA to issue its final methodology in January 2018<sup>28</sup>. Others have become apparent last May, when the stress test results for Greek banks were released by the ECB, showing that some business areas were especially hit by the rules underlying the exercise.

### 4.1 The “static balance sheet” assumption

As in previous exercises, the 2018 stress test relies on a “static balance sheet” (“SBS”) assumption. This means that assets and liabilities that mature within the time horizon of the exercise are replaced with similar financial instruments in terms of type, currency, original maturity<sup>29</sup> and credit quality (also with regard to IFRS 9 stages). The business mix (in terms of geographical areas, products and operations) is also bound to stay constant throughout the simulation. Expected revenues and costs must be in line with these constraints.

As concerns market risk, the notional values of all assets and liabilities are expected to remain constant throughout the exercise. This means that banks in this stress test exercise are not allowed to counter the market shocks in the adverse scenario by any portfolio management actions (e.g., asset sales). Generally speaking, banks cannot withdraw from (or even reduce their involvement in) businesses that have become unprofitable, but must keep piling up losses over time. Additionally, the SBS approach ignores the fact that cash flows generated by net interest income are usually reinvested in order to replace expensive liabilities or to fund new performing assets.

While such remarks suggest that the static balance sheet assumption may prove unnecessarily conservative, it also shields banks from dynamic second-round effects that might be associated with the adverse scenario. This is the case, e.g., of liquidity risks. In fact, as noticed above, the constant size hypothesis implies that banks will always be able to roll over their liabilities, even under a stressed scenario where the market for wholesale funding is disrupted (and liquidity dries up as it did e.g. in the last part of 2008). To offset this (possibly optimistic) assumption, the EBA methodology assumes the “asymmetric pass-through” described in §3.4 (and further discussed in §4.3 below), whereby banks experience an increase in funding costs and may not be able to translate it onto higher returns on the assets side.

The static balance sheet assumption also requires that any divestments, capital measures or other transactions that were not completed by end 2017 cannot be taken into account in the projections. Although a similar provision was present in the 2016 methodology, supervisors allowed for different degrees of flexibility in its implementation, making it more difficult for market participants to compare

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<sup>28</sup> See e.g. (Bonucchi et al., 2018; French Banking Federation, 2017; German Banking Industry Committee, 2017). A thorough discussion by PricewaterhouseCoopers of the rules related to IFRS 9 implementation within the 2018 stress test is available as a video on <https://www.youtube.com/watch?v=XhZRIkxzZTM&t=1304s>.

<sup>29</sup> However, for the purpose of computing risk-weighted assets and of estimating lifetime losses, the assets’ residual maturity is kept constant throughout the exercise.

results across institutions<sup>30</sup>. Such an approach, which hardly contributed to a level playing field, was also the result of the fact that the EBA's Board of Supervisors is formed by representatives of the competent authorities, including a large number of participants in the Single Supervisory Mechanism (making it more difficult for the Board to reverse their proposals).

#### 4.2 The implementation of IFRS 9

As discussed in §3.1, the EBA methodology includes a set of rules aimed at making the stress test exercise consistent with IFRS 9. However, when compared to the actual requirements dictated by the new accounting standard, those rules show several simplifications and constraints, that were introduced in order to ensure that IFRS 9 can be simulated by all banks in a comparable and reliable manner. Such a "simplified" approach has been criticized by industry participants as it requires banks to use data and criteria that are not entirely consistent with the banks' implementation of the "real" IFRS 9, and therefore creates an additional layer of complexity, above and beyond the changes required by the new accounting framework.

To begin with, the EBA methodology may require banks to produce evidence on the transitions across states that were experienced in 2017, meaning that exposures must be restated according to IFRS 9 stages also at end 2016, in order to provide a meaningful starting point. Secondly, the criteria for moving exposures to stage 2 in the stress test (including a threefold increase in the PD) differ from those used for accounting purposes. Third, the request that non-performing exposures are used to identify stage 3 assets creates a further gap between the EBA methodology and the accounting criteria. Finally, the assumption that stage 3 exposures can be neither cured, nor written off, marks an additional misalignment with management practices and IFRS 9 rules.

The last constraint (no cures, no write-offs) also leads to overstating the funding costs on stage 3 exposures. The example in Figure 3 shows why this is the case. Here, a bank experiences a flow of new stage 3 exposures for €100 in June 2018. However, based on reliable historical data, it anticipates that €30 will be cured in one year (i.e., return to a performing state) and another €25 will be recovered in two years. Accordingly, it expects a loss of €45 (implying an LGD of 45%<sup>31</sup>).

In principle, given the above, the bank accounts should evolve as follows:

- in December 2018, the new stage 3 exposures are impaired according to the estimated LGD rate, meaning that €45 are written down and translate into an accounting loss, eroding the bank's capital<sup>32</sup>. The remaining €55 keep generating an interest income, although at a rate

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<sup>30</sup> One may recall, e.g., that Deutsche Bank's sale of its stake in China-based Hua Xia, (agreed in December 2015), which was included in the 2016 stress test's results even though it was completed in 2016. This special treatment – which lifted Deutsche Bank's capital ratios by 0.3%-0.4% according to the bank's estimates - was introduced by the SSM and apparently endorsed by the EBA's Board of Supervisors, although the decision was highlighted by the EBA in a footnote. Conversely, deals by Barclays and HSBC were not considered eligible (see Magnus et al., 2016 for further details). Similarly, in the 2018 stress test, Greece-based Ergasias bank could not factor in the sale of its Romanian operations closed in April 2018, missing a capital benefit of approximately 0.4% of its risk-weighted assets.

<sup>31</sup> For the sake of simplicity, the example assumes a zero discount rate in the computation of the LGD.

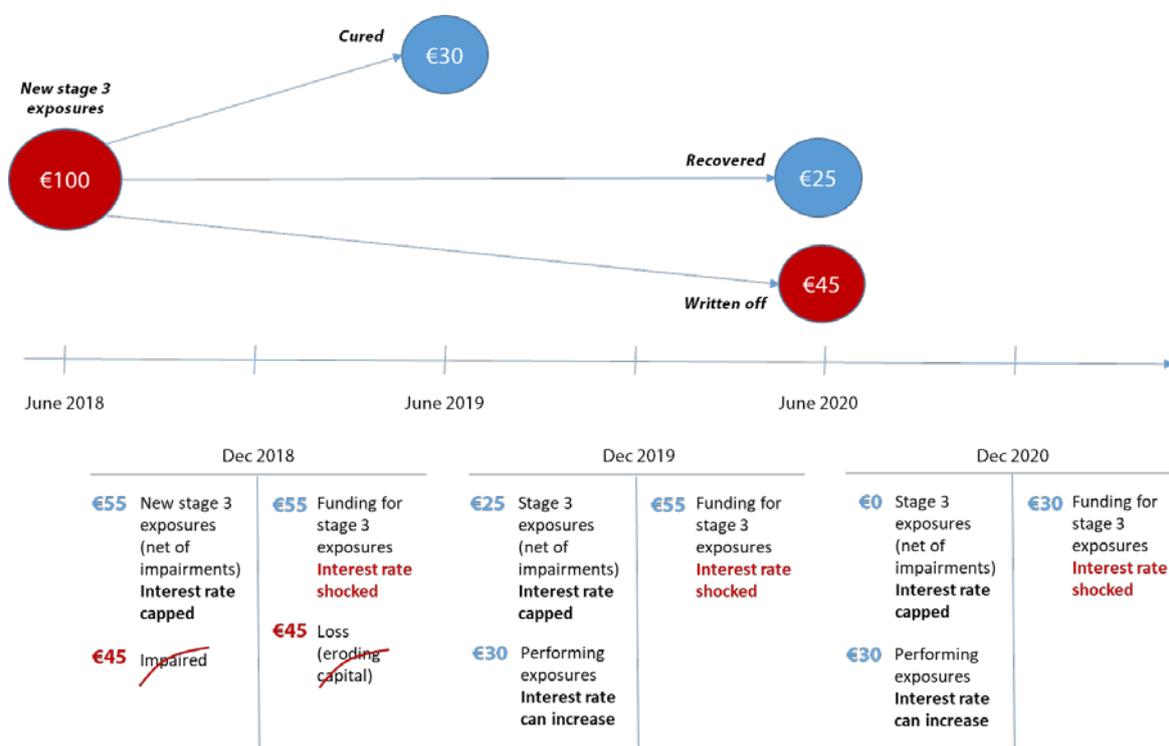
<sup>32</sup> To make our example more readable, Figure 3 assumes that credit losses entail no tax benefit, meaning that the bank's capital decreases by an equal amount.

capped at 2017 levels (consistent with the stress test rules for impaired exposures); to fund this amount, the bank may have to roll over its liabilities at a higher cost (following the interest rate shifts indicated in the stress test scenarios);

- in 2019, €30 are cured, as per the bank’s expectations. As they have gone back to a performing state, the bank may raise the interest rate above the 2017 levels (although with the constraints dictated by the “asymmetric pass-through” assumption, see §3.4), partially offsetting the increase in funding costs;
- in 2020, €25 are recovered<sup>33</sup>, and the bank can pay back an equal amount of (expensive) funding.

Such an evolution, however, is made impossible by the stress test rules: in fact, the EBA methodology does not allow for stage 3 exposures to be cured or recovered, and would keep the bank’s accounts “frozen” at their 2018 configuration. Accordingly, the imbalance between the (capped) rate of return on impaired exposures and the (shocked) unit cost of liabilities would keep weighing on the bank’s profits throughout the whole simulation window, generating additional losses and further capital depletion.

**Figure 3 – An example of how the stress test rules overstate funding costs on Stage 3 exposures**



It should be noted that the increase in non-performing exposures will be accelerated by the so-called “perfect foresight hypothesis” (see §4.2), based on which any further deteriorations in the

<sup>33</sup> The assumption that the recovery process can be performed in two years is in line with the “supervisory expectations” recently issued by the SSM for unsecured exposures (European Central Bank, 2018).

macroeconomic cycle for 2019 and beyond have to be included in the bank's lifetime expected losses since 2018. In fact, instead of gradually absorbing the effects of the stressed scenarios, banks will have to front-load impairments in a way that anticipates the whole slowdown expected in the subsequent years (immediately taking into account, e.g., a 19.1% decrease in residential real estate collateral).

### 4.3 The "asymmetric pass-through"

The rules on asymmetric pass-through are bound to generate adverse effects for most banks, as they will experience an increase in funding costs – especially under the adverse scenario – that cannot be entirely translated onto the asset side<sup>34</sup>.

It is worth mentioning that such an effect will not hit all institutions in the same way. Indeed, non-investment grade banks operating in the Eurozone's periphery will be more heavily affected by the imbalance between a relatively large surge in funding costs and a more limited increase in interest income<sup>35</sup>. This is visualized through an example in Table 2, which compares two hypothetical banks: "A", AA-rated and based in Core Europe, and "B", BB-rated and operating in the Eurozone's periphery. A and B have the same assets and liabilities: they fund themselves through a mix of sight deposits (30%), time deposits (50%) and wholesale sources (bonds and banks, 50%), while investing in loans to households and non-financial companies (70%), as well as in interbank lending (30%). By assuming that all items reprice instantaneously, and applying the two pass-through constraints presented in §3.4 above, one can simulate the increase in funding costs and interest income experienced by both banks at the end of the stress test horizon.

**Table 2 - How the "asymmetric pass-through" may affect different banks (all data are in basis points)**

	<i>Bank</i>	<i>A</i>	<i>B</i>
	Initial rating	AA	BB
(a)	Idiosyncratic shift	35	125
	Area	Core Euro Area	Periphery
(b)	Shift in long term sovereign yields	110	190
(c)= $\lambda \times \max(a,b)$	Rate increase on sight deposits ( $\lambda=0.1$ )	11	19
(d)= $\lambda \times \max(a,b)$	Rate increase on term deposits ( $\lambda=0.5$ )	55	95
(e)= $\lambda \times \max(a,b)$	Rate increase on bonds and banks ( $\lambda=1$ )	110	190
(f)= $\varepsilon \times b$	Rate increase on loans to households and corporates ( $\varepsilon=0.15$ )	16,5	28,5
(g)= $\varepsilon \times b$	Rate increase on loans to banks ( $\varepsilon=0.5$ )	55	95
(h)= $30\% \times (c) + 20\% \times (d) + 50\% \times (e)$	Average increase in funding costs	69	120
(i)= $70\% \times (f) + 30 \times (g)$	Average increase in interest income	28	48
(l)=(h) - (i)	Additional funding costs not offset by additional income	41	71

Apparently, bank B enjoys the advantage of being able to increase its average margin on assets by a larger amount than bank A (48 basis points vs. 28). However, it suffers a significantly worse impact on

<sup>34</sup> The EBA methodology deliberately ignores the possible intervention of the central bank to provide banks with additional liquidity at lower costs. However, such an intervention has occurred in past crisis episodes, leading to an improvement in the liabilities structure and funding costs of the banking sector (Affinito et al., 2016; Angelini et al., 2014).

<sup>35</sup> According to (Alpha Bank, 2018), the pass-through constraints were a key methodological driver of the (disappointing) evolution of the bank's NII under the adverse scenario.

net margin, since the increase in funding costs that is not offset by additional income is almost double (71 basis points *versus* 41) compared to bank A's. The main factor behind this result is the assumption that rates on new loans to households and corporates can only rise by 15% of the increase experienced by yields on sovereign debt. Also, while the cost of interbank funding is fully hit by such increase, only half of it translates into the rate earned on interbank lending.

To make things worse, as noted above, the static balance sheet constraint – while protecting both banks from the risk of an abrupt deleveraging due to a liquidity shock - prevents them from discontinuing businesses that start generating a negative interest margin (due to the asymmetric repricing of assets and liabilities). Additionally, as stage 3 exposures grow under the stress scenarios, performing exposures must shrink to keep the bank size unchanged, leading to a further deterioration in the average return on assets.

#### **4.4 Level 2 and level 3 financial instruments**

As mentioned in §3.2, level 2/3 financial instruments are assets and liabilities that are hard to price, difficult to trade and therefore might become highly illiquid (and suffer significant valuation discounts) under an adverse market scenario.

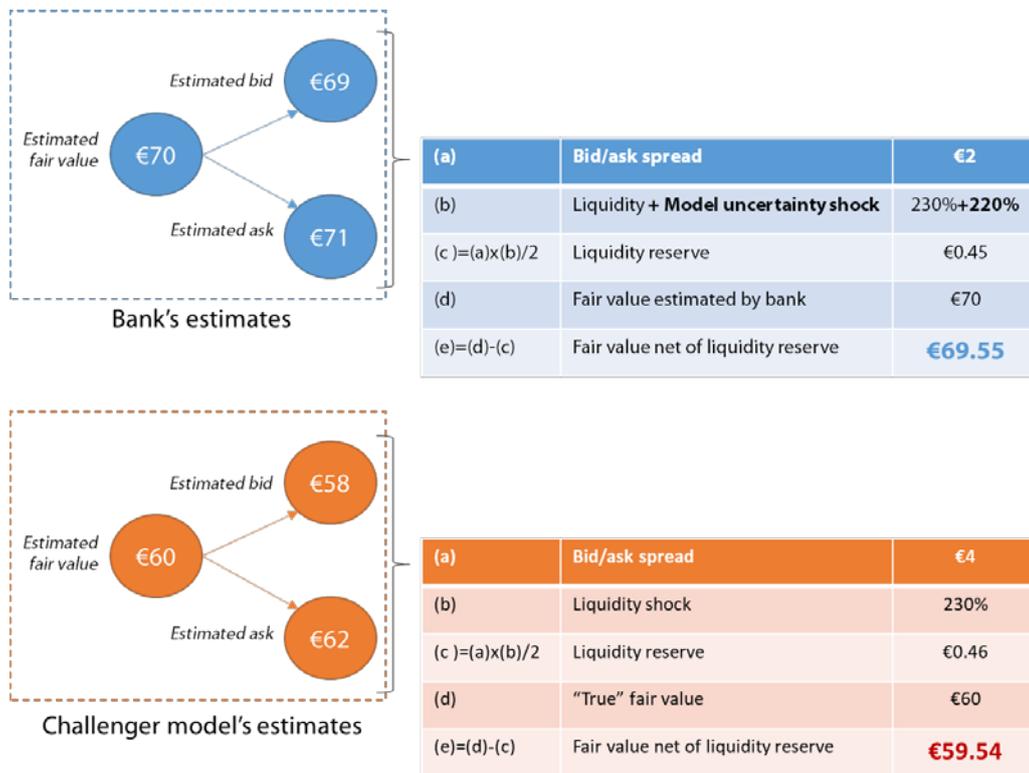
According to (Roca et al., 2017), who use on data from SNL Financial, at December 2016, total L2 and L3 assets of the SSM's significant institutions stood at €3.4 trillion and €189 billion, while L2 and L3 liabilities were €3.1 trillion and €141 billion, respectively. According to the same source, the distribution of these instruments was highly concentrated in the top 15 institutions. Additionally, French and German banks accounted for approximately 75% of the total. Given the sheer size of these portfolios, modest valuation errors might have considerable effects on profitability and capital ratios<sup>36</sup>.

As indicated in §3.2, when assessing the value of level 2/3 financial instruments under the adverse scenario for market risk, banks must apply a "model uncertainty shock", above and beyond the "liquidity shock" aimed at accounting for an unexpected widening of the bid/ask spread. All other things being equal, this additional shock leads to a more conservative assessment of the losses incurred under the adverse scenario.

However, the starting point for this adjustment are the fair value estimates carried out by the banks holding the Level 2/3 instruments. In other words, the mid-price and the bid/ask spread that serve as the basis for applying the "model uncertainty shock" will be generated by the banks' internal pricing models. The results of such models, however, may be hard to scrutinize, given that most level 2/3 assets have complex payout structures, depending on a large number of unobservable risk factors that must be estimated via sophisticated procedures. As shown in Figure 4, this means that the supervisors' ability to deploy "challenger models" (through which the banks' own simulations can be verified and possibly amended) is crucial to deal with weaknesses that the "model uncertainty" adjustment cannot, by itself, address.

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<sup>36</sup> As argued by (Roca et al., 2017, p. 4), "the complexity and opacity of these instruments create substantial room for discretionary accounting and prudential choices by financial intermediaries, which have incentives to use this discretion to their advantage. The current regulatory reporting standard is not sufficient to make a comprehensive assessment of the overall risks stemming from L2 and L3 instrument."



**Figure 4 – The effect of the “model uncertainty shock” and the need for challenger models**

Accordingly, there is a risk that, by introducing *ad hoc* adjustments for level 2/3 assets, the 2018 methodology may provide a “false sense of security” when it comes to the resilience of institutions holding a considerable portfolio of illiquid, hard-to-price financial instruments. In fact, the only way to ensure that the banks’ simulation are sound enough and do not undermine the reliability of the stress test is by performing independent valuations and using challenger models against which internal estimates can be benchmarked and possibly realigned.

This can be done in two ways: either by significantly increasing the resources deployed by supervisors in this area (in terms of human experts and IT infrastructures) or by imposing a set of simplified rules to ensure a conservative valuation, while possibly “erring on the safe side”. The former approach is clearly expensive, while the latter (which was adopted in the past, e.g., to put pressure on institutions underestimating the risk of non-performing loans) may lead to inaccurate results and force banks to quickly offload illiquid assets, causing their market value to drop in a sort of “self-fulfilling prophecy”. Accordingly, supervisors should consider a combination of the two, focusing most investments and skills on institutions that are significantly involved in level 2/3 assets, while using simplified models to discipline smaller and/or less vulnerable banks.

#### 4.5 The role of benchmark models in the “constrained bottom-up approach”

Under the “constrained bottom-up approach”, competent authorities use their own “benchmark models” to review (and possibly amend) the bank’s estimates. Such benchmark models are developed by supervisors to translate the macroeconomic scenario into risk parameters at bank level, measuring their impact on profitability and loss-bearing capacity. They may be shared in advance with supervised institutions, providing guidance for (and setting constraints to) their own internal modelling choices. In fact, as banks know that, by deviating from the benchmark models’ logic and assumptions, they

increase the risk of having their numbers revised, they may preemptively align their own forecasts to such models to avoid a significant overhaul of their estimates.

When benchmark models become too stringent and little room is given to bank specificities, it may be argued that supervisors are *de facto* running the stress test (some would say: running the banks) from inside. If this is the case, the banks' top management does not perceive stress test results as meaningful, but rather as a data collection exercise aimed at feeding the supervisors' own models and evaluations.

It may be hard to strike a balance between the banks' call for flexibility and the need to deploy a methodology that is uniform enough to ensure meaningful comparisons across institutions. In fact, benchmark models, while constraining the institutions' ability to "be in the driver's seat", ensure that supervisory expectations are explicitly stated and can be known in advance by all banks. Accordingly, they should be seen as a useful tool, while paying due attention to avoiding unnecessary rigidities.

To this aim, two desirable tools emerge: transparency and dialogue between competent authorities and banks.

Transparency requires that the content of benchmark models be disclosed in advance and subjected to debate before it is used in a stress test exercise. In this respect, progress has been achieved by the ECB, as the key assumptions of the "satellite models" used in microeconomic supervision (as well as for macroprudential purposes) have sometimes been made public (Dees and Henry, 2017; Henry et al., 2013), together with some high-level indications on the resulting estimates. However, details (e.g. country-specific calibrations of the models) are still kept confidential, making it hard for outsiders to challenge the soundness and plausibility of the models.

Supervisory dialogue means that banks should be allowed to disregard the indications coming from benchmark models if they can provide enough evidence that their own forecasting tools are accurate and consistent with past events. Such a dialogue can certainly benefit from increased transparency on benchmark models, in order to enable banks to perform a comparison between the latter and their own algorithms, identifying and addressing weaknesses.

## 5. FINAL REMARKS

Stress tests are meant to measure a bank's reaction (in terms of earnings, capital and liquidity) to a hypothetical macroeconomic scenario. However, in order to ensure that they are carried out in a comparable way by all participating banks, a number of constraints must be introduced, which may lead to less plausible results and create an uneven playing field for different business models.

In the 2018 stress test, e.g., some constraints may prove especially binding for commercial banks transforming deposits into loans with some degree of maturity mismatch. Rules on stage 3 exposures, asymmetric pass-through and static balance sheet are likely to emphasize the effects of the adverse scenario for this category of institutions. This may prove especially true for banks based in peripheral countries, which – under the EBA methodology - will not suffer liquidity shortages under the adverse scenario, but will be trapped in unprofitable businesses facing decreasing margins. On the other hand, banks with a large trading activity may not experience a dramatic impact on their investment portfolios, as the number of adverse scenarios decreases from three to one, and no “quick and dirty” rules are imposed to stress level 2/3 assets.

As noted above, an additional layer of constraints may come from the “benchmark models” used by competent authorities to scrutinize the banks' bottom-up results. While such models may play a beneficial role in making supervisory expectations more uniform and transparent, they are not subject to the public consultation process that led to the EBA methodology, hence their possible weaknesses and inability to capture bank specificities may prove harder to challenge.

In light of the above, one may wonder if supervisory stress test can be made more flexible and realistic, and how. Although no easy recipe exists, two elements may prove helpful to that aim: resources and accountability.

In terms of resources, it is worth noting that the EBA, which in principle is responsible for “initiating and coordinating” the whole stress test exercise, must rely on a very limited headcount to carry out its tasks: approximately 10 units, compared to several hundreds in the competent authorities. In turn, the latter look considerably less staffed than supervised institutions, where the stress test exercise can be assumed to involve approximately 2,000 employees and consultants. Such an overwhelming disparity should clearly be addressed, if stress tests are to remain a meaningful and reliable tool for European supervisors. More resources would also enable the EBA to use the additional powers enshrined in Article 32 of Regulation 1093/2010 (the EBA “Founding Regulation”) whereby – during a stress test exercise – it may request information directly from financial institutions and/or participate in on-site inspections together with competent authorities.

Accountability is another key issue, if greater flexibility is to be achieved without causing an increase in discretionary decisions and opacity. In turn, it involves transparency and better governance.

Greater transparency could be given to the results obtained for banks that are not part of the EBA sample, as well as to the choices made throughout the stress test process, e.g., in terms of departures from the general methodology that were introduced to accommodate special cases. In fact, in order to strengthen the EBA's ability to ensure that the stress test rules are applied uniformly, the EU legislator may introduce a duty, for its chairperson and/or executive director, to provide the public with a clear report of all significant exceptions (or even to veto proposals by competent authorities that clearly override the agreed methodology).

As for governance, supervisory actions throughout stress test exercises should be coordinated by a truly independent entity. As noted above, the present structure of the EBA Board of Supervisors, a plenary body where all competent authorities are represented, may make it harder for it to harmonise

supervisory actions carried out by its own members<sup>37</sup>. Accordingly, in a recent consultative document (European Commission, 2017), the Commission has floated the idea of assigning a stronger operational role, similar to what happens with the SSM, to the EBA's Management Board. The latter would become a full-fledged Executive Board formed by the EBA chairperson and a few permanent members, to be appointed on the basis of their merits rather than as representatives of a competent authority. These could be "resident members", working full time with the EBA staff, with no permanent link with other institutions. Such a move would certainly benefit the management of stress test exercises, as an independent "steering body" would be less prone to the interests of individual authorities and more inclined to guarantee a uniform application of the EBA methodology.

In a nutshell, the key to making future stress tests more consistent and equally demanding for all types of institutions does not (only) lie in further methodological refinements. It calls for the whole management of the stress test exercise to be revisited, addressing weaknesses in terms of budgetary resources, technical skills and governance.

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<sup>37</sup> As noted by (European Commission, 2014), "the current governance structure [...] does not favour decisions or proceeding against individual members of the Board of Supervisors, given that most decisions [...] are taken by qualified majority in the Boards of Supervisors".

## 6. SAMPLE QUESTIONS

This written advice was requested by the European Parliament in preparation of a public hearing of the Chair of the ECB Supervisory Board in the ECON Committee. As part of that mandate, the author was asked to include some exemplary questions that could be raised during the Q&A part of the hearing. Such questions are listed below:

### 6.1 Benchmark models

Unlike the EBA methodology, the SSM's benchmark models are not fully illustrated to the public ahead of a stress test exercise (the STAMP€ introductory materials, while disclosing a number of relevant details, do not perform a complete disclosure). Yet, based on the "constrained bottom up approach" they can play a significant role in shaping the final results produced by individual banks. Would the SSM consider introducing a transparent consultation process on those models, including their country-specific calibrations, in order to demonstrate and possibly increase their robustness *vis à vis* empirical data, as well as their ability to accommodate for different situations?

### 6.2 Level 2 and level 3 financial instruments

The 2018 stress test methodology introduces a "model uncertainty shock" to be applied to the valuations of level 2/3 financial instruments to account for valuation errors. Still, such shock is limited in size and the starting valuation is produced by the participating banks, meaning that the SSM's ability to perform benchmark valuations will be crucial in ensuring reliable results. What share of the level 2/3 assets of the 33 SSM banks participating in the EBA sample will be cross-checked by the SSM and its consultants through independent valuations?

### 6.3 EBA role and rules of procedure

Following the 2016 exercise, doubts have been raised in the press concerning the supervisors' ability to apply the stress test methodology uniformly to all participating banks (e.g., concerning Deutsche Bank's sale of China-based Hua Xia). In order to strengthen the EBA's mandate to ensure that rules are applied consistently, the EU legislator may introduce a duty, for its chairperson and/or executive director, to provide the public with a comprehensive report of all significant exceptions agreed throughout the stress test exercise (or even to veto proposals by competent authorities and the Board of Supervisors that clearly override the EBA methodology). What would be the risks associated with such an option? What alternative solutions would you suggest?

### 6.4 Introduction of an independent "steering body"

In a recent consultative document on the ESAs, the Commission has floated the idea of assigning a stronger operational role to the EBA Management Board. The latter would become a full-fledged Executive Board formed by the EBA chairperson and a few permanent members, to be appointed on the basis of their merits rather than as representatives of a competent authority. These could be "resident members", working full time with the EBA staff, with no permanent link with other institutions. Such a move may benefit the management of stress test exercises, as an independent "steering body" would be less prone to the interests of individual authorities and more inclined to guarantee a uniform application of the EBA methodology. What is your opinion in this respect?

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