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Long-term fundamental changes to the EU-wide stress test: a discussion paper

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1. Summary and main conclusions

Now that a short-term path for incremental improvements to the next EU-wide stress test exercise has started, it is time to reflect on more fundamental changes that could be made to the stress testing framework within the EU. Stress tests have become an important part of the supervisory toolkit. Increasing their effectiveness and efficiency is therefore not only desirable, but also essential to better accomplish our task in this field.

This paper argues that significant benefits can be achieved by decoupling micro-prudential stress tests from the oversight/macro-surveillance ones. Decoupling the two is not just legally possible, but also consistent with the different tasks assigned to the relevant authorities in the field of stress testing: on one side, Art. 100 CRDIV for supervisory stress tests on institutions ("micro-prudential exercises") and, on the other side, the EBA Regulation, which requires the EBA to initiate and coordinate EU-wide stress tests with the aim of assessing the resilience of financial institutions and contributing to the overall assessment of systemic risk in the EU financial system ("macro-prudential exercises"). Having two separate exercises for two different goals (rather than one exercise for two different goals) would be more effective and cost-efficient, for both authorities and banks, to the extent the design of the exercises is more closely related to their policy goals.

Micro-prudential stress tests for supervisory purposes (i.e. for the SREP process) should be: a) more robust and targeted, with a focus on specific risk areas and shocks identified according to

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the supervisory priorities; b) better balanced between static and dynamic assumptions and more inclusive of the ICAAP process; c) mainly bottom-up, under the control of the competent authority; and d) not necessarily for disclosure.

Macro-prudential stress tests for oversight/macro surveillance goals should be aimed at assessing the stability and soundness of the EU financial sector and its capacity to provide financing to the real economy. They should mainly be top-down and fairly flexible in terms, for example, of the number of scenarios and the inclusion of emerging risks. The results obtained in this way would ensure a consistent assessment of system-wide resilience by providing an aggregate envelope for capital depletion, with some of the aggregate figures made public although possibly without reference to individual banks.

The desirable features of stress tests in relation to their different policy goals (i.e. micro-prudential and macro-prudential) are summarized in Table 1.

Table 1 – Desirable features of stress tests for different policy goals

	Micro-prudential	Macro-prudential
Legal basis	➢ Art. 100 CRDIV (at least annually)	➢ EBA Regulation ➢ ESRB Regulation
Owner	➢ Competent Authority	➢ EBA, in collaboration with the ESRB
Goals	➢ Forward looking assessment of individual institutions' risk profiles, risk management and controls systems and stress testing capabilities ➢ Input for the setting of Pillar 2 Guidance (P2G) within the Supervisory Review Evaluation Process (SREP)	➢ Forward looking assessment of the soundness of the EU financial sector and of its capacity to provide financing to the real economy
Approach	➢ Mainly bottom-up, subject to Quality Assurance by the competent authorities	➢ Mainly top-down, possibly incorporating second round effects via banks' endogenous reaction to stress
Key features	➢ More robust and granular assessment ➢ Possibly targeted to specific risk areas, as identified by supervisory priorities ➢ Possibly more balanced between static and dynamic balance sheets ➢ More inclusive of the ICAAP process ➢ Not necessarily for disclosure	➢ Full consistency and comparability of results ➢ System-wide assessment of capital adequacy ➢ Flexible enough to accomplish multiple scenarios and emerging risks ➢ Account for risk interconnectedness and amplification factors ➢ Much less burdensome for banks and supervisors
Cons	➢ Weaker consistency and comparability across results ➢ Emphasis on individual institutions ➢ Failure to account for direct and indirect interlinkages across institutions ➢ Failure to account for macro-financial feedback and negative externalities stemming from collective behaviours	➢ Use of less granular data ➢ Calibration of models at system-wide level ➢ Focus on systemic risks (i.e. exposure to common shocks) ➢ Not suitable for individual risk assessment

2. Introduction

Stress tests can be used by authorities for micro-supervision or macro-financial surveillance purposes. For both families of stress tests, authorities may opt for a top-down approach or a bottom-up approach. Both approaches have strengths and weaknesses.

In a top-down stress test authorities map macro-financial shocks onto banks' profitability and capital adequacy projections using their own data and methodologies without the involvement of the banks themselves. Banks can be required to provide ad-hoc data, when deemed necessary. With top-down tests, the focus can be on individual institutions or on the banking system as a whole. By applying the same scenarios with the same models and assumptions at the same time, top-down tests allow for direct comparisons across banks, as well as offering a framework that makes it possible to understand and identify specific areas of vulnerability in the banking system as a whole. A weakness of this approach is that models are usually calibrated at a system-wide level and they lack the balance-sheet granularity and detailed firm-specific modelling that bottom-up tests can provide (e.g. by single loan /credit facility). However, top-down models are better able to capture second-round effects (i.e. the impact that the actions of one bank has on the system as whole).

Bottom-up tests are run by banks themselves using their own internal models, which are by definition institution-specific. This means that if two banks have the same balance sheet and income statement as a starting point, the impact of the common stress scenario might differ. The advantage of the bottom-up tests is their use of extremely granular information relating to individual banks' portfolios and overall exposures. This is, for example, especially relevant for market risk and hedges exposures. It allows for a more detailed insight into how an individual bank might be affected by worsening macroeconomic and market conditions. However, if used for regulatory purposes, bottom-up stress tests can induce banks to "optimize" the exercise to contain requirements. Moreover, unlike top-down tests, comparing stress-test results across banks is more difficult; it requires a preliminary assessment and knowledge of banks' specificities and modelling practices. Finally, bottom-up models only capture the impact of the scenarios on individual banks and do not take potential interactions among banks into consideration.

Usually the top-down approach is used for macro-financial surveillance purposes (e.g. as in the IMF's FSAP) while the bottom-up approach is used for micro-supervision purposes (e.g. SSM stress tests). Authorities can also leverage on the strengths of both approaches. The banks run the macroeconomic scenarios used in the top-down stress tests through their internal models, under the supervisory authorities' oversight. The parallel run of top-down and bottom-up stress tests could provide a comprehensive picture of banking sector resilience and each approach could be enriched by insights from the other.

The aftermath of the financial crises spurred the use of macro-prudential stress tests to restore market confidence for both recapitalization and micro-supervision purposes, notably in the U.S. and Europe, making the differences between these two goals (micro and macro) blurred.

The European choice was for a hybrid approach, the publicly disclosed so-called "constrained bottom-up approach", which combines elements of both macro and micro exercises (the EU-wide stress test). Based on a detailed methodology designed by the EBA, in collaboration with supervisors, banks assess the impact of a common macroeconomic scenario on their portfolios. A Quality Assurance (QA) process is established under the responsibility of supervisors, to ensure the consistent application of the methodology and the robustness of results. QA was perceived as crucial to ensure the robustness and the credibility of the exercise. In the QA process, banks' results are challenged with

common top-down benchmarks developed by the supervisory authorities. In the event of any material deviation, banks are asked to explain the reasons and, if these are not satisfactory, eventually forced to apply the benchmarks and correct the results.

The benefits of a hybrid approach, however, could be questionable to the extent that it fails to acknowledge the complementary aspect between a top-down and a bottom-up approach. Top-down benchmark models can inform banks about supervisory expectations; however, by design they fail to fully account for bank specificities. Moreover they are subject to model risk as well and, as such, they must undergo a periodic review to increase awareness about their ability (or inability) to capture bank specificities. In addition, forcing banks to accept top-down benchmarks would discourage them from investing in their stress testing capabilities. Even though there is no easy solution to the trade-off between robustness and consistency, progress could be made, for instance, by spending more time in trying to understand the source of discrepancies and to learn from the complementarities of the approaches.

In the absence of valid and robust alternatives in place and with the aim of avoiding duplication, several supervisory authorities have opted to make use of the EU-wide stress test for micro-supervision objectives, even though the methodological assumptions (i.e. static balance sheet, no recognition of mitigating measure) and constraints envisaged (caps/floors) are ill-suited to the incorporation of the stress test outcome into the supervisory review process (SREP) because those assumptions and constraints do not provide an adequate picture of how banks would effectively react to shocks.

The success of the EU-wide stress test exercises has been much debated both as a macro-surveillance and as a micro supervisory tool. The aim of this note is to draw lessons from such experiences in order to discuss and propose possible ways forward.

3. What the EU Regulation tells us on stress testing

As a micro-supervision tool, Article 100 of Directive 2013/36/EU requires supervisors to run, at least annually, supervisory stress tests on institutions to facilitate the Supervisory Review Evaluation Process (SREP). Supervisory stress tests should help competent authorities to assess institutions in terms of: a) individual risks to capital or risks to liquidity and funding; b) risk management and controls on individual risk areas; c) stress testing programmes; d) stress tests for ICAAP and ILAAP purposes; e) their ability to meet Total SREP Capital Ratio (TSCR) and Overall Capital Ratio (OCR) in stressed conditions. In this respect the EBA Guidelines on common procedures and methodology for the Supervisory Review and Evaluation Process (SREP), in accordance with Article 107(3) of Directive 2013/36/EU, specify the common procedures and methodologies for the functioning of the SREP. In addition, these guidelines provide common methodologies to be used by the competent authorities when conducting supervisory stress tests in the context of their SREP. Supervisory stress tests are also used for setting Pillar 2 Guidance (P2G) for institutions.

As a macro-financial surveillance tool, the EBA Regulation[2] assigns the EBA the tasks of: a) developing an adequate stress-testing regime to help identify those institutions that may pose a systemic risk. Those financial institutions shall be subject to strengthened supervision, and where necessary, to recovery and resolution procedures; b) initiating and coordinating the European Union-wide stress tests, in cooperation with the European Systemic Risk Board (ESRB). The aim of such tests is to assess the resilience of financial institutions to adverse market developments, as well as to contribute to the overall assessment of systemic risk in the EU financial system, ensuring that a consistent methodology is applied.

It follows that, from a legal point of view, there are no impediments to decoupling supervisory stress tests from macro-prudential stress tests, appointing the competent authorities to perform the former and the EBA to run the latter.

4. What does not work?

The current stress testing framework has been subject to several critiques by both policymakers and academics.

A first criticism is that the requirement to conduct stress testing represents an unreasonable burden for financial institutions, especially for smaller and less complex ones (Deseret News, 2013, or McLannahan, 2015). The largest institutions, which pose the greatest systemic risk, are expected to have advanced risk management tools in place, consistently with their high degree of complexity, and to have the resources to undertake stress tests. In contrast, midsize and smaller institutions have limited capabilities to conduct stress tests, with many of them relying on external consultants to conduct the tests, both reducing their value in encouraging improved risk management practices and exposing them to consultant-driven, correlated model risk. Moreover, midsize regional banks and other smaller banks are likely to be less sensitive to the macroeconomic and financial conditions described in regulatory scenarios, as their resilience depends more on local conditions or on the creditworthiness of individual counterparties (P. Kapinos, O. Mitnik and C. Martin, 2015). The excessive burden imposed on banks is also felt by larger institutions. Wilkes (2018) reports banks' and consultancy firms complaints about the difficulties in fulfilling data quality standards required under the quality assurance process during the 2018 exercise.

This literature argues that to increase the net benefits of stress tests, banks' resources must be leveraged to maximum effect as a risk management tool, rather than being employed as a mere compliance exercise. Moreover, overriding banks' risk management tools could even be dangerous (Kupiec, 2014) to the extent that institutions are forced to be part of an opaque process whose outcome-generating model is not known to the banking industry. At the same time, making the stress-testing models transparent is likely to maximize so-called "model risk", where both the regulators and the entire industry are driven by the results of just one particular model.

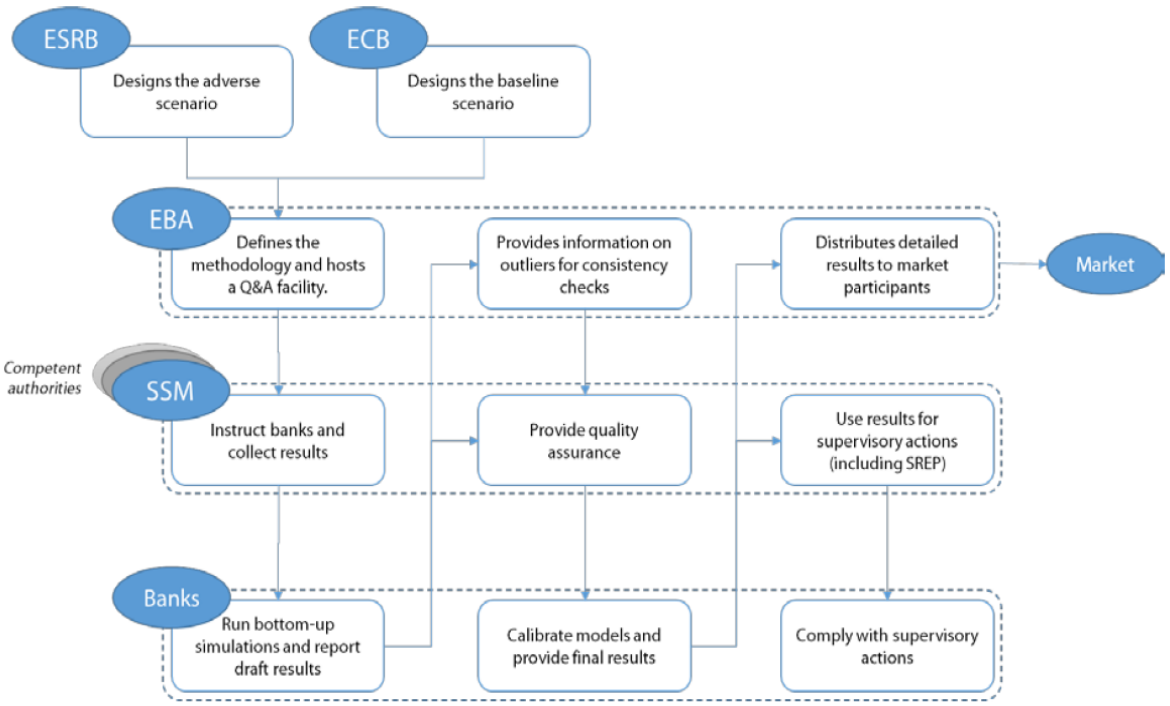
[2] Regulation (EU) No 1093/2010 of the European Parliament and of the Council.

A closely related concern is that stress tests expose supervisors to reputational risk. If markets perceive that supervisors give a particular firm or financial system a passing grade, only for it to fail soon thereafter, then supervisors' reputations may be compromised (Hirtle and Lehnert, 2014). Indeed, this seems to have occurred with the EU-wide stress tests already, as Schuermann (2014) discusses, with a detrimental impact to the reputation of European banking authorities.

BCBS (2018) claims that a stress test is most effective when its design is closely aligned with its policy objectives. Consistency between design and objectives best ensures that an exercise provides the type of information authorities need. Given the objectives of a particular exercise, authorities should evaluate whether common scenarios could be applicable or whether tailored scenarios for specific parts of the banking systems and/or at specific times or in specific circumstances, depending on the relevance for each case of certain risks or scenarios would be more appropriate.

Indeed, the EU-wide stress test framework has become very complex and resource-intensive. Figure 1 illustrates the process underlying the EU-wide stress test for euro-area significant institutions.

Figure 1



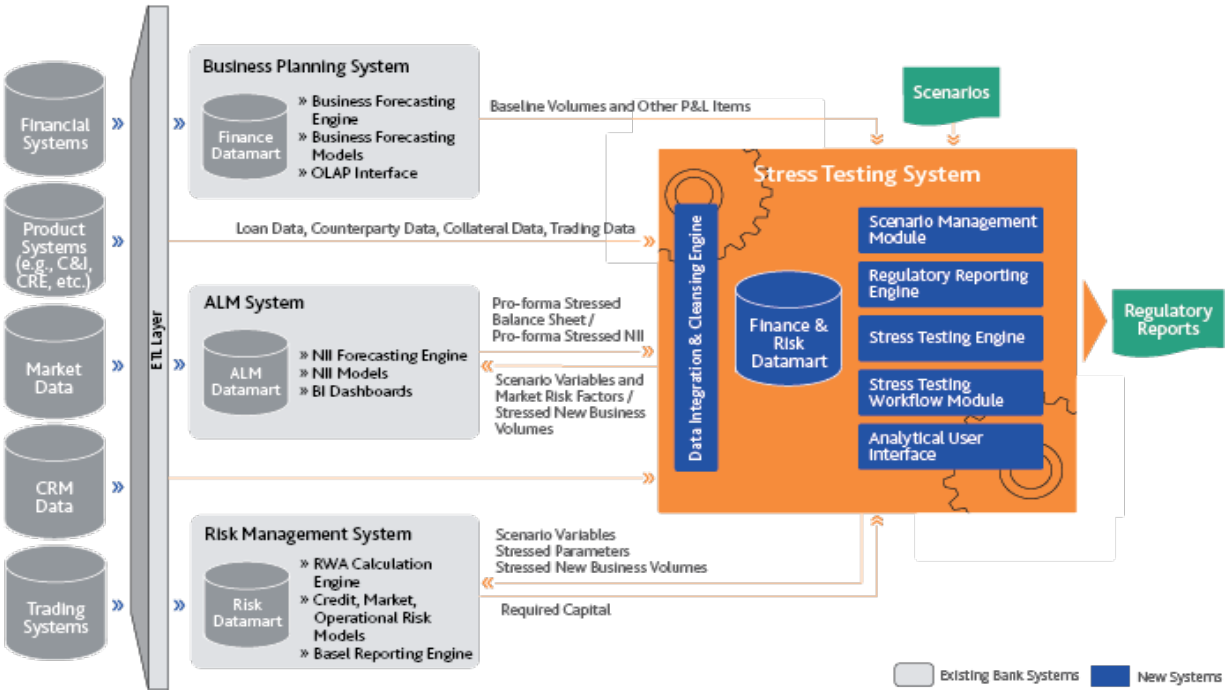
Source: In-Depth Analysis requested by the European Parliament's Committee on Economic and Monetary Affairs. (June 2018): How demanding and consistent is the 2018 stress test design in comparison to previous exercises? http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614511/IPOL_IDA(2018)614511_EN.pdf

The preparation of the exercise typically starts one year before its execution, with the refinement of the EBA methodology. The baseline scenarios are designed by the ECB and the adverse scenario is prepared by the ESRB. During the exercise, the supervisory authorities (i.e. the SSM in the case of significant institutions based in the euro area) interact with the banks and use their own benchmark models to highlight weaknesses

in the banks' preliminary results and they can subsequently request amendments. The final results are publicly disclosed by the EBA through a set of detailed templates. Finally, the competent authorities use stress test outcomes as an input to their supervisory actions, within the annual SREP cycle.

At bank level, the infrastructure needed to implement an EBA-style supervisory stress test is extremely burdensome. Figure 2 illustrates the key building blocks of a sound stress testing system at firm level. The complexity of the infrastructure clearly highlights the need for an adequate solution that facilitates the integration of the data management systems, the models used for the projections and the final reports.

Figure 2



Source: Moody's Analytics

The highly resource-intensive nature of the process, however, is not sufficiently balanced by adequate benefits, especially when the costs associated with the preparation and the execution of the exercise are compared with its actual use for micro-supervision purposes. Indeed, given the focus of the exercise on systemic risks and some methodological assumptions (the static balance sheet in particular), the outcome of the stress test cannot be used as it is, but requires supervisory judgment. First, the supervisory authorities need to assess the credibility of managerial actions that banks might put in place to mitigate the impact of the shocks. Second, additional bank-specific risks, which are not covered by the exercise and are more idiosyncratic in nature, need to be taken into consideration. Third, a revision of the outcome based on more recent developments is also generally required, since it takes almost two years from the preparation of the exercise to its use for SREP purposes. Due to these constraints, enhancing common understanding and transparency on how stress test results actually feed into Pillar 2 capital requirements might be difficult.

So it is legitimate to raise the issue of the efficiency and effectiveness of the framework, whose strategic design cannot be reframed without taking into consideration the policy objectives it intends to achieve. The key question is: Are we using the best possible framework?

A deeper analysis of the net benefits of stress testing would merit additional research. Let's briefly review what the perceived weaknesses of the EU-wide stress testing framework are.

1. **First, the reliance of the exercise on a single adverse scenario, whose narrative and stress parameters are necessarily arbitrary.** The complexity of the framework, however, does not make it easy to incorporate additional scenarios or account for risk correlations. Moreover, it cannot be easily adjusted to include new emerging risks (e.g. environmental/climate risks) making the issue of risk interconnectedness even more compounding. Instead, top-down macro-prudential stress tests allow greater flexibility either with respect to the simulation of multiple scenarios or to the inclusion of emerging risks without necessarily increasing the burden for banks[3].
2. **Second, stress test results are perceived as binding by the market.** Regulators have struggled for years to set out a common framework at G20 Level on minimum capital requirements with the finalization of the Basel III package, but now the EU-wide stress test exercise risks replacing those ratios with others that are just as arbitrary to a large extent. Moreover such a risk cannot be foreseen by the banks and the supervisors until the stress test exercise has been performed and the final impacts measured.
3. **Third, the implementation lag from scenario design to the publication of results is too long.** This exposes the scenario to criticism by market investors, as some of the shocks envisaged in the narrative can become irrelevant or, conversely, inadequate in the meantime.
4. **Fourth, in the interests of fairness and consistency, stress test results rely on hard assumptions and methodological constraints, which are often far from being realistic.** An example is the static balance sheet assumption: although it ensures simplicity and comparability, it does not provide an adequate picture of banks' balance sheets over a three-year time horizon. This can be a serious limitation especially when the aim of the exercise is not transparency and comparability per se but rather the assessment of a bank's loss absorbing capacity in a forward looking manner.
5. **Fifth, results for individual banks are less than robust.** In the past it has happened that banks that passed the test with flying colours then defaulted a few months later.[4] This of course puts the supervisor's reputation at risk and necessarily points to possible issues with the framework itself.

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[3] See, for instance, the stress test run by the De Nederlandsche Bank (DNB) to assess the financial stability impact of a disruptive transition to a low carbon economy: https://www.dnb.nl/binaries/OS_Transition%20risk%20stress%20test%20versie_web_tcm46-379397.pdf

[4] This was the case for two Irish banks, that passed the 2010 stress test and needed a government bailout later that year, and for a Belgian bank that passed the 2011 exercise and collapsed three months later.

5. How can supervisory stress tests be made more efficient and effective?

Generally speaking, running supervisory stress tests on a very comprehensive coverage of risks under a single EU-consistent macroeconomic adverse scenario (i.e. as in the EU-wide stress test), would not add too much value to the evolution of a bank-specific risk profile over time. Instead, a more targeted and flexible approach, with a focus on specific risk areas could be more informative.

Supervisory stress tests for micro-prudential purposes should rely on a framework that allows us to focus on specific risk areas and shocks (e.g. by means of sensitivity analyses) with the aim of capturing both systemic and idiosyncratic risks. The objective is to have in place a robust and severe exercise, while overcoming the abovementioned weaknesses (see section 3).

The key elements of a supervisory exercise for micro-prudential purposes in terms of scenarios, sample size and risk coverage, should be designed to better reflect the evolution of a bank's risk profile over time, including in relation to developments in the external environment. The design of the exercise should also better reflect the supervisory priorities while controlling for the significant heterogeneity across banks in terms of complexity and business models. This could be implemented by running sensitivity analysis on specific risk profiles (including emerging ones, such as cyber risk), as is currently done by the SSM in the years when the EU-wide exercise is not performed.

The trade-off between the static vs. the dynamic balance sheet assumption can also be reconsidered for micro-supervision purposes. While the static balance sheet assumption ensures simplicity and comparability, it does not provide any information about a bank's ability to overcome the shocks over the stress-test time-horizon. Therefore efforts can be devoted to exploring how the dynamic elements can be included in the supervisory stress tests while keeping the exercise simple and manageable. For example, this could either be done beforehand by defining a credit growth path that is conditional on the scenarios (as in the UK approach) or afterwards by adjusting banks' projections to adequately capture banks' management/mitigating actions. An interesting example comes from the US.[5] Of course, the QA process as well as benchmarking should be revised accordingly.

QA should continue to be a cornerstone in supervisory stress tests. However the intensity of the QA should vary depending on the complexity of the banks. Within the SSM, the idea is to split the SIs into three tiers, corresponding to different levels of QA. As supervisory stress tests become more flexible and targeted, the QA could also benefit.

[5] The US Dodd-Frank Act (DFA), enacted in 2010, requires annual supervisory stress tests for banking organizations (firms) with $100 billion or more in total consolidated assets. Supervisory stress tests aim to ensure the largest and most complex firms have sufficient capital to continue operations in a stressful economic and financial environment. In particular, the current stress test regime requires firms to hold sufficient capital to cover: (1) stress losses; (2) all planned distributions; and (3) balance sheet growth. Based on the results of the supervisory stress test, the Federal Reserve may object to a firm's capital plan. An objection prohibits firms from making capital distributions – including dividends and share repurchases – unless the Federal Reserve indicates in writing that it does not object to the distributions. However, this framework may be subject to change: the proposed "Stressed Capital Buffer" is expected to engender a more static balance sheet approach.

As for the choice between top-down vs bottom-up, generally speaking the bottom-up approach is more suitable for micro-prudential purposes because of its inherent granularity. Moreover, the bottom-up exercise would foster a bank's own stress testing and risk management capabilities and could leverage on its internal models. Going forward, supervisory stress tests could also leverage on banks' stress tests under the ICAAP process, as adequately challenged by supervisors. Indeed, ICAAP could play a key role in the SREP framework following the original idea of bringing together the points of view of both supervisor and bank with a forward-looking assessment. The top down approach can also be used for benchmarking, provided that it is specifically designed to challenge the bank's projections in the quality assurance phase within a micro-prudential set-up.

Finally, while we acknowledge that the EBA's efforts are aimed at ensuring transparency and comparability, from a (micro) supervisory perspective the set of goals to be accomplished is very different. Disclosure is not the main objective of a supervisory stress test and in some cases it can be even harmful. A little less disclosure could be envisaged, at the discretion of supervisory authorities.

6. How can the macro-financial surveillance goal of the EBA be achieved more effectively?

When dealing with long-term strategic characteristics of the EU-wide stress tests, the key question is: should the EU-wide stress test continue to serve micro-prudential supervisory needs? The answer is probably not. The key features of the EU-wide stress test (i.e. the publicly disclosed constrained bottom-up approach, static balance sheet assumption, exposure to common shocks, methodological constraints, etc.) stem from its main policy objective, which is to assess the resilience of the EU's financial system to macro-financial shocks and to enhance disclosure by using common methodology, scenarios and assumptions. Those features however make the use of the EU-wide stress test for SREP purposes somewhat problematic.

Leveraging on the experience gained so far, the stress testing framework within the EU should be radically re-thought to better distinguish the role of the EBA for macro-financial surveillance purposes on the one hand and the role of the supervisory authorities in micro-prudential supervision on the other. This would help to make the design of stress tests more suitable to achieve the different goal attached to them.

Similarly to the Financial Sector Assessment Program (FSAP) run by the International Monetary Fund (IMF), the EBA can purse the goal of macro-financial surveillance by assessing the stability and soundness of the EU's financial sector and its capacity to provide financing to the real economy.

To assess financial stability, the EBA can run system-wide top-down stress tests to measure banks' exposure to systemic risks, including domestic and cross-border spillovers and interlinkages between banks in order to assess the capacity of the financial sector to contribute to economic growth in periods of stress.

The use of top-down models would make the EBA stress testing framework extremely flexible, timely and cost-efficient – something the current framework could never be – both with respect to the number of scenarios that can be simulated and as regards the inclusion of new emerging risks. Moreover a level playing field will be ensured up front, by definition. The top-down results would provide an aggregate envelope for capital depletion, hopefully by taking macro-financial feedback and amplification mechanisms into account, with some of the aggregate figures to be published in a report.

7. Conclusions

Given the drawbacks of the EU-wide stress testing framework discussed above, having two different (albeit complementary) exercises, whose respective strengths and weaknesses are well understood, is much better than having a single hybrid exercise whose ultimate working is complicated to the point of opaqueness (for the public and, to an extent, for the supervisors themselves). In practise, decoupling the EBA stress test from the supervisory stress tests would simply: i) require supervisors to carry out annual micro-prudential stress tests with a forward looking assessment of individual banks' risk profile in application of Art. 100 CRDIV and in compliance with the EBA guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP) and supervisory stress testing; and ii) refocus the EU-wide stress test towards its original objective of being used as a macro-financial surveillance tool (art. 32 EBA Regulation).

Similarly to the objectives pursued by the International Monetary Fund (IMF) with its Financial Sector Assessment Programs, the EBA can pursue the goal of macro-financial surveillance by assessing the stability and soundness of the EU financial sector and its capacity to provide financing to the real economy. The use of top-down models would make the EBA stress testing framework more flexible (in terms, for instance, of the number of scenarios and the inclusion of emerging risks). Moreover a level playing field will be ensured up front, by definition. Top-down results would provide an aggregate envelope for capital depletion, with some of the aggregate figures being reported.

On the other hand, when it comes to the supervisory stress tests performed by NCAs – a different stress test approach for a different objective, i.e. gaining insights into bank risk measurement and the type of management that is useful for day-by-day supervisory activities – they necessarily need to be flexible. Flexibility means designing the key elements of the exercise (in terms of scenarios, sample size and risk coverage) in a versatile manner, in order to reflect the evolution of banks' risk profiles over time. From this perspective, a more targeted approach with a focus on bank-specific risk areas (such as the SSM approach in switch years) could be "less consistent across banks but more relevant" (and it also would make the use of multiple scenarios manageable). Flexibility would also be applied to the possible disclosure of the results of the tests, to be decided according to: the nature of the exercise; the external environment at the time in which it is carried out; and the degree of disclosure of the overall SREP process.

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