IPOL | DIRECTORATE-GENERAL FOR INTERNAL POLICIES
EGOV | ECONOMIC GOVERNANCE SUPPORT UNIT

European Parliament

BRIEFING

Bank stress testing: stock taking and challenges

The general aim of bank stress testing is to find out whether a bank would be able to withstand a severe yet plausible crisis scenario over a certain time horizon. A stress test is thus a hypothetical ('what...if') and forward-looking exercise.

This briefing first summarises the results of the EBA 2016 EU-wide stress test, then outlines the main features and specific new elements of that stress test, and finally turns to the wider context, briefly taking stock of methodological aspects and challenges of stress tests in general, and the supervisory approach to stress test in the United States in particular.

Results of the EBA 2016 stress test exercise

On 29 July 2016, the European Banking Authority (EBA) published the results of its latest EU-wide stress test exercise both at aggregate and individual level for the 51 participating banks from 15 EU and EEA countries.

As the EU banking sector had significantly bolstered its capital base in recent years, the starting point of most banks was this year considerably better than in previous exercises.

The hypothetical losses stemming from EBA's crisis scenario - mainly driven by credit losses - would approximately offset the capital increases achieved since 2011, reducing the average Common Equity Tier 1 (CET1) ratio[1] of 12.6 % at the end 2015 to 9.2% at the end of 2018, which is still well above regulatory minimum capital requirements.

This time, there was no formal threshold setting out how much capital banks would need to be left with in the crisis scenario ("adverse scenario"), hence none of the participating banks officially passed or failed this stress test exercise. However, the results will be an important input for the next Supervisory Review and Evaluation Process (SREP) in which supervisors examine the banks' individual risk profiles and levels of capitalisation.

Moreover, interested parties can still make their own assessment, as the granular information published by EBA for each bank includes, among other relevant information, its capital position, risk exposures, and sovereign holdings.

Overall, the results were said to have demonstrated the resilience of the EU banking sector to an adverse scenario, yet they show a large dispersion across jurisdictions and banks (see Annex for individual results). Only one bank, Banca Monte dei Paschi di Siena, reported a negative CET1 capital ratio of -2.4% in the crisis scenario at the end of the projection period (meaning that ceteris paribus that bank would have become insolvent in the crisis scenario), and one other bank, Allied Irish Banks, showed a CET1 capital ratio of 4.3% which is a level below the regulatory minimum requirement of 4.5% CET1. Those two and three other banks (Raiffeisen-Landesbanken, Bank of Ireland, and Banco

[1] Referring to a "fully loaded" CET1 ratio, calculated without applying transitional provisions set out in the CRD IV Regulation

Authors: M. Magnus, A. Duvillet-Margerit,
contact: egov@ep.europa.eu

Popular Español) would report CET1 capital ratios at the end of the projection period below 7%[2]. At country level, Irish banks would on average have the lowest level of capitalisation (average CET1 ratio of 5.2%), and Swedish banks the highest (average CET1 ratio of 16.6%).

Chart 1: Stress test effect on banks' fully loaded CET1 ratios, at country level

Countries	Starting point Dec-15	Adv. scenario Dec-18	Delta 2018/2015 (in bps)
Total	**12,57%**	**9,22%**	**-335**
Austria	11,40%	7,22%	-418
Belgium	14,80%	11,32%	-348
Denmark	16,42%	13,97%	-245
Finland	19,16%	14,61%	-455
France	12,50%	9,57%	-292
Germany	13,30%	9,44%	-387
Hungary	12,94%	9,22%	-372
Ireland	12,24%	5,21%	-703
Italy	11,41%	7,62%	-380
Netherlands	13,18%	8,96%	-422
Norway	14,31%	14,30%	-1
Poland	13,42%	11,44%	-198
Spain	10,45%	8,13%	-232
Sweden	18,97%	16,61%	-236
United Kingdom	12,49%	8,51%	-398

Source: EBA 2016 EU-wide stress test results

Main features of the 2016 EU-wide EBA stress test

The EBA EU-wide stress test is a bottom up solvency stress test coordinated by the EBA and carried out in cooperation with the ECB, the European Commission, the European Systemic Risk Board and the competent authorities from all relevant national jurisdictions. The first EBA stress test was run in 2009 in the aftermath of the financial crisis. At the time, supervisors felt the necessity to reassure markets and investors on the resilience of European banks, following the collapse of Lehman Brothers. The aim was to restore confidence in the EU financial system. The EBA EU-wide stress test is therefore not a typical supervisory stress test used for supervisory purpose only. It was originally rather intended as a communication tool bringing transparency on banks' balance sheets. The exercise was repeated in 2010, 2011 and 2014 (where it was coupled with the ECB comprehensive assessment). From now on, it has been decided to run the EBA stress test every two year. The next exercise will thus take place in 2018. In-between stress tests, the EBA will run 'transparency exercises' which consist in disclosing standard templates of banks' data without testing any scenario.

In 2016, the size of the sample of banks covered by the test has been reduced compared to previous exercises. It covers 51 banks in 15 EU and EEA countries. This corresponds to 70 % of the banking assets of the Euro Area, of each non Euro Area Member States and of Norway. To be included in the sample banks had to hold over € 30 billion total assets. The Banking Union was considered for the first time as one jurisdiction.

The EBA EU-wide stress test is a complex institutional exercise where the action of several authorities has to be coordinated:

[2] From 2019 onwards, banks will have to hold a total of at least 7% CET1 capital, considering a minimum 4.5% CET1 capital ratio and a mandatory "capital conservation buffer", equivalent to 2.5% of risk-weighted assets.

- The EBA has developed a common methodology and templates and ensures the consistent disclosure of the results; the methodology clearly privileges the comparability of results and has therefore strong limitations; it relies in particular on the static balance sheet assumption (see below); the 2016 methodology is largely based on the one used in the previous exercise with a few improvements and novelties such as the inclusion of conduct risk (in response to a report from the ESRB on the issue) and foreign currency exposures (see below);
- The ESRB and the Commission have developed the adverse and baseline scenarios respectively; the baseline scenario is based on the Commission official forecast; the narrative of the adverse scenario reflects the four systemic risks identified by the ESRB general board as representing the most material threats to the stability of the EU financial sector[3] over the time horizon of the exercise;
- Competent authorities, including the SSM are responsible for assessing the quality of the data submitted by banks and the reliability of the results; they are also responsible for identifying appropriate supervisory action as part of their supervisory review and evaluation process (SREP); there is no predefined response and supervisors have some discretion to determine the appropriate answer which can range from the ban to distribute dividends or the requirement to immediately recapitalise the bank to the resolution of the bank in deteriorated cases.

Specific new elements in EBA's 2016 EU-wide stress tests

The European Parliament's panel of external Banking Union experts recently looked into the design of EBA's 2016 EU-wide stress test, assessing in particular the relevance of the new elements included therein. The two briefing papers received on this subject can be summarised as follows:

In his briefing paper, Andrea Resti finds that the 2016 EU-wide stress test has mainly four new elements, as it 1) includes "conduct risk" (also known as financial misconduct risk), 2) pays greater attention towards risks originated by foreign exchange ("FX") exposures, including the risk that the bank's debtors may struggle to repay foreign currency-denominated loans following a sharp devaluation in their home currency, 3) no longer uses a "pass/fail" threshold that partitions tested banks into "safe" and "unsafe" ones, and 4) makes use of a smaller sample of tested banks.

Resti points out that the first two items cover areas that, at least in principle, were already included in the previous stress test exercises. However, by specifying the methodology to address them, the 2016 stress test may help enhance the accuracy and reliability of the results, stepping up pressure on banks (and local supervisors) on issues that are increasingly sensitive for the European banking industry. Nevertheless, those refinements are unlikely to address the traditional weaknesses of the European stress tests: the lack of a unified supervisory culture, differences across legal frameworks, ambiguity about the political will to rescue weak institutions and uncertainty on how "burden sharing" is to be achieved in practice.

According to Resti, the decision to move away from a binary outcome (which can provide a false sense of security for "pass banks" or cast stigma on "fail" ones) has a real advantage, as investors who take stress results into account are now forced to make themselves more familiar with the tech-

[3] These macro-risks are: i) an abrupt reversal of compressed global risk premia, amplified by low secondary market liquidity; ii) weak profitability prospects for banks and insurers in a low nominal growth environment, amid incomplete balance sheets adjustments; iii) rising of debt sustainability concerns in the public and non- financial private sectors, amid low nominal growth; iv) prospective stress in a rapidly growing shadow banking sector, amplified by spillover and liquidity risk.

nicalities behind them, gaining a better awareness of the simplifying (and sometimes unrealistic) assumptions that are used to simulate stressed capital levels.

The reduction in the EBA sample eases the workload faced by supervisors, but Resti warns that it may end up generating additional opacity, rather than restoring transparency and market confidence, as the EU-wide stress test is paralleled by similar exercises carried out by competent authorities, sometimes on the basis of different scenarios and methodologies.

Given that several tens of banks are no longer part of the publically disclosed sample, investors may wonder whether supervisors have reservations about their financial shape; the fact that, for example, in 2016 none of the Portuguese banks is part of the sample anymore could trigger concerns about their current resilience levels.

Resti therefore recommends that in order to offset the informational damage caused by the reduction in the 2016 stress test sample, EBA should consider to deploy a new "transparency exercise" to provide detailed historical data for institutions not participating in the stress test, which would also improve comparability with past exercises.

In a second briefing paper, Harry Huizinga focusses in particular on the appropriateness of the exchange rate (FX) risk assessment and related hedges, as well as on loss projections related to conduct risk. As regards FX lending, Huizinga points out that this new element in the stress test is in principle useful, given that it may have only a weak correlation with overall macroeconomic risk, and that its independent impact on bank solvency cannot otherwise be inferred from stress test results.

Huizinga criticises, however, that the adverse macroeconomic scenario is limited to a one sided test only, looking only at the effects of a depreciation of the euro vis-à-vis other major currencies such as the US dollar. That is somewhat arbitrary given the unpredictability of the euro exchange rate. Alternatively, banks could have been asked to perform a two-sided exchange rate risk test, considering both a euro depreciation and appreciation against other major currencies.

Moreover, banks were not required to report the independent, marginal impact of exchange rate movements on the revaluation of both assets and offsetting hedges. The partial consideration, looking only at the exchange rate risk for FX lending but not for asset revaluation, will not deliver sufficient information to infer the overall marginal exchange rate risk for bank solvency. Huizinga concludes that the innovations in the 2016 stress test only go half-way in providing the information necessary to assess the impact of exchange rate movements on overall bank stability.

As regards the conduct risk assessment, Huizinga picks up on the fact that banks are required to use either a more sophisticated qualitative approach or a simpler quantitative approach to project future losses from misconduct, depending on the severity of past misconduct losses; specifically, banks that lost more than 10 basis points of CET1 capital due to misconduct fines during the 2011-2015 period are required to apply the qualitative approach.

In order to put that 10 basis point threshold into perspective, Huizinga analyses the impact of fines and settlements related to the LIBOR manipulation for some of the major EU banks involved, and finds that the impact relative to CET1 capital was in all cases well beyond the threshold level, ranging from an impact equivalent to 64 basis points for Barclays to a staggering impact of 495 basis points for Deutsche Bank.

By asking banks to recalculate their provisions for historical risk events, the 2016 stress test appears

to recognize that existing provisions may be inadequate, and that banks may have unduly applied too much discretion in determining their provisions for known misconduct events.

The context: methodological aspects of stress tests

General purpose

As mentioned, the general purpose of bank stress testing is to see whether a bank would be able to deal with a hypothetical severe but plausible scenario. Stress tests may be run by banks themselves at their own initiative. In such cases, the scenarios tested can be very specific and apply only to certain portfolios or activities and not to the entire balance sheet. Large banks are required by EU regulation to run internal stress tests regularly, in particular on their trading book. Stress tests can also be initiated and monitored by supervisors ('supervisory stress test'). In this case, they generally cover several banks, the objective being to test the resilience of the whole (or a subset of the) banking sector. Bank supervisors increasingly use the results of stress tests to set prudential requirements, for example to set minimum capital requirements or capital buffers.

Defining a meaningful crisis scenario

Defining a meaningful crisis scenario is the first crucial step for a stress test. The crisis scenario is typically presented in form of a general storyline, complemented by tables indicating which specific macroeconomic parameters would be affected to what extent if that scenario materialized (specifying, for example, assumed decreases of Gross Domestic Products and currency exchange rates, assumed falls in house prices, and assumed increases in unemployment figures etc.).

A crisis scenario that is optimally tailored to address a bank's individual risk profile and business exposures can be used for stress tests that are autonomously run by an individual bank as a pure in-house exercise - such a stress test has a high informative value, but its results cannot easily be compared. A specific stress test might focus, for example, on freight rate developments on shipping markets, which is only relevant for banks holding shipping loans.

Coordinated stress tests that are run by several banks at the same time, like those initiated by EBA or the European Central Bank (ECB) in its supervisory capacity, are therefore based on common macroeconomic crisis scenarios and common methodologies. The common scenario facilitates a comparison, but one has to have in mind that the chosen scenario may not have the same relevance in all participating banks. All banks in the sample are not vulnerable to the same risks. It is therefore impossible to impose the same intensity of stress to all banks under one single scenario. Such limitation has to be kept in mind when assessing the results of any supervisory stress test.

Stress tests often use more than one scenario: There is typically a "base case" and an "adverse case" scenario, the latter being less probable (but still plausible), but more severe. In the case of the EBA stress test, the baseline is the Commission official forecast. The "Dodd-Frank Act Stress Tests", initiated by the U.S. Federal Reserve, for example even use three scenarios (baseline, adverse, and severely adverse; for more details, see last section of this briefing).

To conclude: A stress test only delivers meaningful results if the assumptions are plausible as regards what can go wrong and how likely that is to happen. The design - the assumed crisis scenario - therefore warrants receiving as much attention in a public debate as the outcome of a stress test. Nonetheless what really matters is the translation of the macro-economic shocks into risk parameters that

directly impact banks' balance sheet. The reliance on banks' internal models to calculate probability of defaults and loss-given defaults parameters introduces an element of discretion which may undermine the credibility of the stress test results if not properly framed.

The use of banks' internal models

Once the crisis scenario is defined, "*...the scenario values of the macroeconomic indicators have to be translated into risk parameter values*", as Thomas Breuer (2014, p. 9) describes the next step.

Figure 1: "Translation" of macroeconomic indicators into risk parameters

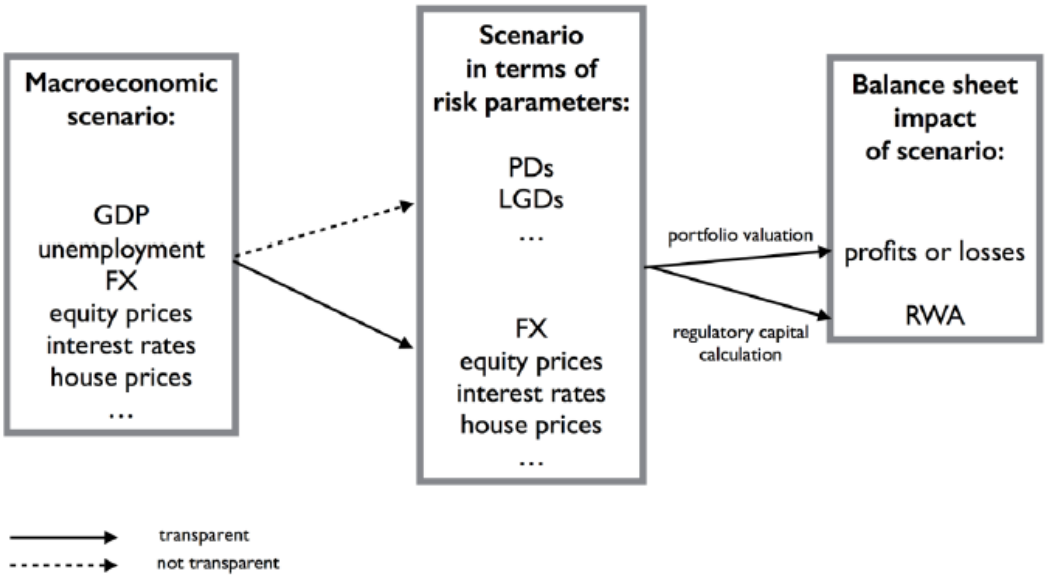


Figure 2: The balance sheet impact of the macroeconomic scenario is calculated in two steps. **First, the change of the macroeconomic factors is translated into changes of the risk parameters; second the changes of the risk parameters determine profits or losses and regulatory capital. Due to the heavy reliance on internal models or unpublished ECB benchmarks, the first step is not fully transparent to the public. Thus it is difficult to judge the severity of the resulting scenario in terms of risk parameters.**

Source: Thomas Breuer "Robustness, Validity and Significance of the ECB's Asset Quality Review and Stress Test Exercise", p.10; briefing provided to ECON in November 2014

In other words, in order to calculate what effect a specific parameter in given crisis scenario will have on a bank's income statement and balance sheet, that parameter needs to be "translated" into a likelihood that the bank's clients will default on their contractual obligations, and into an estimate of the bank's associated losses.

Banks use their internal models for the "translation" of the macroeconomic crisis scenario into risk parameter values, technically speaking into "probabilities of default" and "losses-given-default". Supervisory authorities coordinating the stress test, such as EBA and ECB, provide methodological guidance to limit the amount of discretion that is inevitably involved in using internal models.

Thresholds

Stress test exercises coordinated by a banking supervisor often include thresholds or hurdle rates, typically related to a certain amount of equity or equity-like capital, that banks are supposed to meet in the adverse scenario in order "to pass the stress test".

The technical details, however, often differ, making a comparison difficult: The applicable threshold

in EBA's 2010 EU-wide stress testing exercise, for example, was a "Tier 1 capital ratio" of 6% that banks were expected to meet over a two-year horizon[4], in the 2011 exercise it was a 5% "Core Tier 1 ratio" over a similar two-year horizon[5], and in 2014 it was a 5.5% "Common Equity ratio" for the adverse scenario over a three year horizon[6].

Thresholds make the results look straight forward, as a clear cut separates those banks that passed from those that failed. Such judgement may, however, be misleading if the pass rate is taken as a general clean bill of health; in 2010, for example, EBA was widely criticised for its pass ratings of Ireland's two biggest banks just months before the Irish banking system collapsed.

In the 2016 EU-wide stress test EBA no longer uses a threshold, avoiding the simplistic binary logic. The lack of a threshold will encourage market discipline, as pointed out by Andrea Resti (2016, p. 12), since "*...informed investors will still be able to learn about each bank's prospective capital and profitability levels, but will have to read the small print and become familiar with the methodology used to generate the stress test results*".

The Bank of England took a different approach to thresholds and recently refined its respective framework: According to the 2016 stress test design for the UK banking system, the individually applicable hurdle rate now takes into account whether a bank is designated as a "global systemically important bank", thereby holding systemic banks to higher standards.

Transparency of the results

In the EU, coordinated EU-wide stress test exercises were set up in the wake of the 2008 financial crisis not least to restore confidence into the soundness of the banking system. José Manuel Barroso, at that time President of the European Commission, stated that he "*made a strong plea to make the results public on a bank by bank basis. [...] This should reassure investors by either lifting unfounded suspicion or by dealing with the remaining problems that may exist*."

If the aim of a coordinated stress test is to restore confidence, transparency as regards both the methodology applied and the results obtained is key. This view was also taken by the International Monetary Fund (IMF) in a technical note on stress testing of banks (2013, p. 10): "*Were relevant data not provided, the market would look on the exercise with increased scepticism*".

Consequently, EBA[7] has so far published all results of its EU-wide stress test exercises on a bank-by-bank basis.

The stress test sample[8] of EBA's 2016 EU-wide included 37 banks that are directly supervised by the ECB; that, however, is only the smaller part of all banks under direct ECB supervision (currently 129 banks). The ECB therefore conducted its own stress test of an additional 56 banks, using the same methodology - those results, however, are not published, as the ECB declared the parallel stress test exercise to have been made for purely internal purposes.

[4] See Report on the "Aggregate outcome of the 2010 EU wide stress test exercise coordinated by CEBS in cooperation with the ECB", p. 6

[5] See "European Banking Authority 2011 EU-wide stress test Aggregate Report", p. 3

[6] See Report on the „Results of 2014 EU-wide stress test - Aggregate results", p. 8; contrary to what is stated in the keynote address by the Vice-President of the ECB at the LSE Conference on Stress Testing, the hurdle rates for the adverse scenario were not tightened in the 2014 exercise, but rather reduced compared to the base scenario.

[7] In contrast, EBA's institutional predecessor, the Committee of European Banking Supervisors (CEBS), did not yet disclose details of the outcome of its 2009 stress test exercise.

[8] In total, EBA's 2016 stress test sample comprises 51 banks, considerably less than in previous exercises. The reduced coverage may be considered a problem in particular with regard to banks in countries that received financial assistance (e.g. Greece and Portugal).

Challenges for the design of stress tests

Contagion effects

In the debate on how to design stress tests, a recurrent topic is the question whether stress tests should incorporate more dynamic elements in order to capture the development of real crisis situations, and whether the additional level of complexity in the design of stress tests is justified by the gain in the model's predictive power.

Proponents in any case argue that the neglect of second round or contagion effects is one of the main shortcomings in current stress testing practices, as pointed out by Thomas Breuer (2014, p. 15): "*In reality the reaction of banks feeds back to the markets. [...] Second round effects include chain reactions triggered by defaults or value adjustments of interbank assets and liabilities, as well as market effects of fire sales. Banks as market participants will react to developments on the market, and in turn their reaction will contribute to development of markets*." The argument is that a stress test will only deliver meaningful results if contagion effects in the financial system are taken into account.

Static balance sheet assumption

Not only markets and market participants will react to a financial crisis, banks will also take action. EBA's and ECB stress tests, however, have so far been conducted under the "static balance-sheet assumption", whereby all balance-sheet elements are kept constant throughout the horizon of the test.

Banks have to leave out that they could take action and restructure in order to counter a crisis (e.g. by divesting parts of their business), making the exercise somewhat spiritless. The "static balance-sheet assumption" is hence a simplifying feature, and in the view of Vítor Constâncio, Vice-President of the ECB, "*clearly not very realistic*".

Special rules, however, were applied in EBA's and ECB's stress test exercises for those banks that in the financial crisis received financial support from the state and became subject to a mandatory restructuring plan under State Aid rules: Rescued banks were allowed to use a "dynamic balance sheet assumption" instead, taking all envisaged measures in their restructuring plan into account and taking their implementation for granted, in the end making it easier for them to pass the stress test.

In its 2016 EU-wide stress test exercise, though, EBA no longer makes exemptions from the static balance sheet assumption[9]; while that approach ensures comparability and equal treatment, it sacrifices some realism.

ECB's approach to tackle limitations and add a macro perspective

The ECB, well aware of the limitations of current stress test approaches, pursues improvements to its framework that sets out how to conduct stress tests, a number of which are described in Vítor Constâncio's recent keynote address given in October 2015 in London. He sets out that the improvements shall on the one hand address the known limitations, in particular the static balance-sheet approach, the neglect of banks' reactions to the situation, the insufficient treatment of liquidity aspects, and the absence of interaction between banks and other specific sectors of the economy, and on the other hand they shall add a macro-perspective to the whole exercise. Currently, bank stress test exercises have mainly a micro-prudential function, they are basically solvency assessments of individual banks.

[9] See EBA's methodological note, p. 13, point 32.

Adding a macro-perspective takes a broader view, aiming to measure the resilience of the entire financial system.

In 2013, the ECB already published an occasional paper describing the ECB's macro stress testing framework; in the meantime, new elements have apparently been added to the framework that shall complement it, namely tools to assess household sector vulnerabilities, and models that better catch liquidity aspects, looking at the effects of fire-sales (the quick disposal of assets at very low prices), closure of funding markets and margin calls (additional deposits required in the context of trading activities), credit rating downgrades, and increases in non-performing loans.

As the appropriate inclusion of "dynamic" elements into the design of stress test may increase the predictive power of stress tests, an updated stress testing framework could help to show how to best incorporate those dynamic elements from a technical point of view.

Traditional approaches based on risk-weighted assets vs. market-based assessments

Some authors put fundamentally into question whether the traditional stress test design based on "risk-weighted assets" will lead to meaningful results at all, and suggest to better use unweighted book value of assets and market-based assessments of the value of assets, equity - and eventually, stress test capital shortfalls (see, for example, Acharya, Pierret, and Steffen (2016): Introducing the "Leverage Ratio" in Assessing the Capital Adequacy of European Banks). The application of a market-based approach that uses the so-called SRISK measure resulted in far higher capital shortfalls than the traditional approach. Considering that the ECB puts in a related working paper the usefulness of SRISK as a benchmark for supervisory stress tests into doubt, we feel that the related discussion certainly merits a closer examination.

In comparison: Stress Tests in the United States

The Federal Reserve (Fed) carries out annual stress tests required by the Dodd-Frank Act, scrutinizing the largest bank holding companies (BHCs) in the U.S., with total consolidated assets of $50 billion or more.

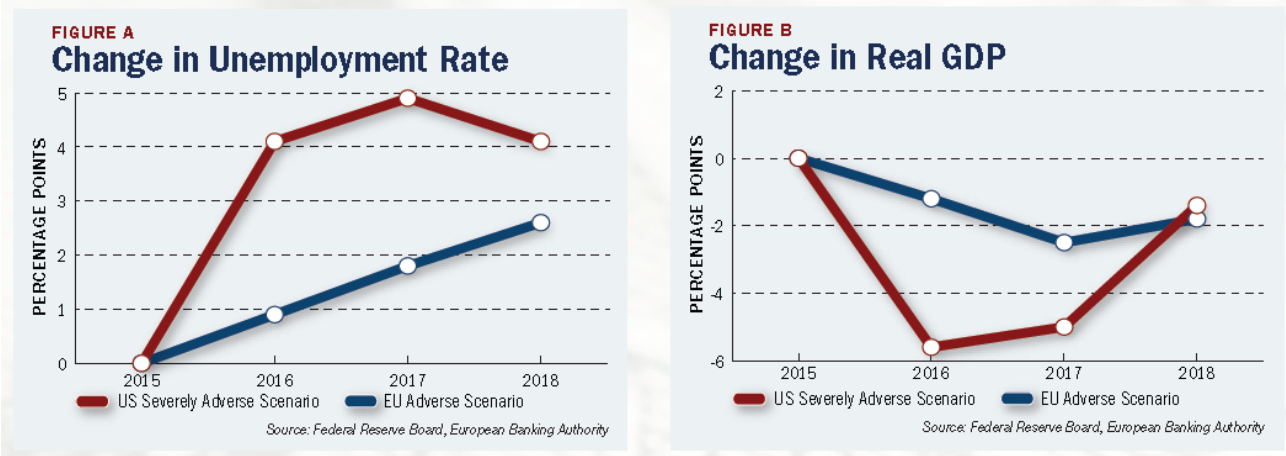
In addition to the annual supervisory stress test as defined by the Fed, each BHC is required by the Dodd-Frank Act to run its own stress tests under company-developed scenarios, the so called "midcycle" test", and to report its results to the Fed. By the same law, smaller financial companies, namely those with more than $10 billion in total consolidated assets, are also required to conduct an annual company-run stress test, making stress tests an obligatory and frequently used monitoring tool for significant banks in the U.S.

In order to achieve its objectives, that is to inform both supervisors and the public with forward looking information to help gauge the potential effect of stressful conditions on the ability of the largest banking organizations to absorb losses, the Dodd-Frank Act requires transparency, both BHCs and the Federal Reserve therefore disclose a summary of their stress test results.

The results of the Dodd-Frank Act stress test 2016 exercise have been published on 23 June 2016. The participating 33 BHCs in total account for more than 80 per cent of US banking assets; among them were five subsidiaries of European banking groups (BBVA Compass Bancshares, Deutsche Bank Trust Corporation, HSBC North America Holdings, Santander Holdings USA, as well as BancWest Corp., a subsidiary of France's BNP Paribas SA).

As customary, the Fed uses three scenarios, with a baseline, adverse, and severely adverse case. In the toughest scenario designed by the Fed, characterized by a severe global recession, stock prices drop about 50 per cent, unemployment raises by 5 percentage points to 10 percent, and gross domestic product declines sharply. The key drivers in the Fed' severely adverse scenario are hence much more difficult to cope with than in EBA's adverse scenario (see figure 2).

Figure 2: EBA Stress Scenario vs. Federal Reserve Severely Adverse Scenario



Source: The Clearing House "Comparison between United States and European Union Stress Tests", May 2016, p. 4

The Fed's final report concludes that in aggregate, all BHCs would experience substantial losses under both the adverse and the severely adverse scenarios: "*Over the nine quarters of the planning horizon, aggregate losses at the 33 BHCs under the severely adverse scenario are projected to be $526 billion. This includes losses across loan portfolios, losses from credit impairment on securities held in the BHCs' investment portfolios, trading and counterparty credit losses from a global market shock, and other losses.*"

95 percent of the projected losses for the 33 BHCs would therefore stem from accrual loan portfolios and trading and counterparty positions subject to the global market shock and counterparty default.

In the severely adverse scenario, the aggregate CET1 capital ratio would hence fall from an actual 12.3 percent in the fourth quarter of 2015 to a post-stress level of 8.4 percent in the first quarter of 2018, which is in any case still higher than regulatory minimum capital requirements.

In the end, the results of the Fed's stress test feed into a supervisory, all-encompassing assessment of the banks' capital adequacy named Comprehensive Capital Analysis and Review (CCAR), which looks both into quantitative factors (like projected capital ratios), and qualitative factors (like the capital planning process itself, risk management, internal controls, and governance practices). The Fed's principle that stress test results are used in a wider supervisory assessment is also applied in the European Union, where the results feed into the SREP.

According to the Fed's report on the CCAR results 2016, the Fed did not object to the capital plan and planned capital distribution for 31 of the 33 participating BHCs. As in the previous year, however, the Fed objected the capital plans of both Deutsche Bank Trust Corporation and Santander Holdings USA on a qualitative, though not on a quantitative basis.

Annex: Effect of EBA's 2016 stress test scenario on banks' fully loaded CET1 ratios, at bank level

Banks	**Starting point** Dec-15	**Adverse scenario** Dec-18	**Delta** 2018/2015 (in bps)
Erste Group Bank AG	12,25%	8,02%	-423
Raiffeisen-Landesbanken-Holding GmbH	10,20%	6,12%	-408
Belfius Banque SA	14,65%	11,41%	-323
KBC Group NV	14,88%	11,27%	-361
Bayerische Landesbank	11,99%	8,34%	-365
Commerzbank AG	12,13%	7,42%	-471
DekaBank Deutsche Girozentrale	13,50%	9,53%	-397
Deutsche Bank AG	11,11%	7,80%	-332
Landesbank Baden-Württemberg	15,98%	9,40%	-658
Landesbank Hessen-Thüringen Girozentrale	13,11%	10,10%	-301
Norddeutsche Landesbank Girozentrale	12,09%	8,62%	-347
NRW.BANK	42,54%	35,40%	-714
Volkswagen Financial Services AG	11,67%	9,55%	-211
Danske Bank	15,48%	14,02%	-147
Jyske Bank	16,00%	13,99%	-201
Nykredit Realkredit	19,19%	13,86%	-533
Banco Bilbao Vizcaya Argentaria S.A.	10,27%	8,19%	-208
Banco de Sabadell S.A.	11,72%	8,04%	-369
Banco Popular Español S.A.	10,20%	6,62%	-358
Banco Santander S.A.	10,19%	8,20%	-199
BFA Tenedora de Acciones S.A.U.	13,74%	9,58%	-417
Criteria Caixa, S.A.U.	9,65%	7,81%	-184
OP Osuuskunta	19,16%	14,61%	-455
BNP Paribas	10,87%	8,51%	-236
Groupe BPCE	12,78%	9,47%	-331
Groupe Crédit Agricole	13,68%	10,49%	-319
Groupe Crédit Mutuel	15,55%	13,38%	-216
La Banque Postale	14,51%	9,82%	-470
Société Générale S.A.	10,91%	7,50%	-341
OTP Bank Nyrt.	12,94%	9,22%	-372
Allied Irish Banks plc	13,11%	4,31%	-880
Bank of Ireland	11,28%	6,15%	-513
Banca Monte dei Paschi di Siena S.p.A.	12,07%	-2,44%	-1451
Banco Popolare - Società Cooperativa	12,39%	9,00%	-339
Intesa Sanpaolo S.p.A.	12,47%	10,21%	-226
UniCredit S.p.A.	10,38%	7,10%	-329
Unione Di Banche Italiane Società Per Azioni	11,62%	8,85%	-277
ABN AMRO Group N.V.	15,44%	9,53%	-591
Coöperatieve Centrale Raiffeisen-Boerenleenbank	11,97%	8,10%	-387
ING Groep N.V.	12,70%	8,98%	-371
N.V. Bank Nederlandse Gemeenten	26,17%	17,62%	-855
DNB Bank Group	14,31%	14,30%	-1
Powszechna Kasa Oszczędności Bank Polski SA	13,42%	11,44%	-198
Nordea Bank - group	16,45%	14,09%	-236
Skandinaviska Enskilda Banken - group	18,85%	16,60%	-225
Svenska Handelsbanken - group	21,25%	18,55%	-270
Swedbank – group	25,08%	23,05%	-203
Barclays Plc	11,35%	7,30%	-405
HSBC Holdings	11,87%	8,76%	-312
Lloyds Banking Group Plc	13,05%	10,14%	-291
The Royal Bank of Scotland Group	15,53%	8,08%	-745