How relevant are the new elements in the 2016 stress test design?

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Provided at the request of the Economic and Monetary Affairs Committee
IN-DEPTH ANALYSIS

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External author: Harry Huizinga

Provided in advance of the public hearing of the Chair of the Single Supervisory Mechanism in ECON on 13 June 2016

Abstract

The 2016 EU-wide stress test requires banks to assess the impact of exchange rate movements on the quality of their foreign exchange lending. This is useful but not sufficient information for supervisors to be able to assess the implications of exchange rate risk for bank solvency. The 2016 stress test further asks banks to report in detail the expected future costs associated with already known misconduct cases. Information of this kind enables supervisors to ascertain whether banks’ current levels of provisioning for such costs are adequate. If not, supervisors should follow up by requiring banks to increase their provisioning levels to reflect projected future costs.
This paper was requested by the European Parliament's Economic and Monetary Affairs Committee.

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LIST OF ABBREVIATIONS

BIS  Bank for International Settlements
CA  Competent Authority
CET1  Common Equity Tier 1
EBA  European Banking Authority
ESRB  European Systemic Risk Board
EU  European Union
FX  Foreign Exchange
GDP  Gross Domestic Product
G-SIB  Global Systemically Important Bank
IAS  International Accounting Standard
IFRS  International Financial Reporting Standard
LGD  Loss Given Default
PD  Probability of Default
P&L  Profit and Loss

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EXECUTIVE SUMMARY

The 2016 EU-wide stress test requires banks to assess the implications of exchange rate variability for the creditworthiness of foreign exchange (FX) borrowers. This is a departure from the general stress test approach which is to consider the implications of different overall macroeconomic scenarios, including different exchange rate paths, for credit quality and bank solvency. This add-on is useful, as exchange rate movements may only be lowly correlated with other macroeconomic risk factors such as GDP growth over relatively short horizons and as banks tend to differ in their exposures to FX lending.

Banks need to report the change in the creditworthiness of their FX borrowers if their local currency depreciates against the loan’s foreign currency of denomination. The adverse macroeconomic scenario implies a depreciation of the euro against other major currencies such as the US dollar. This implies that the new methodology will not deliver any measured exchange rate risk associated with, say, euro loans to US borrowers, which makes the methodology unnecessarily limiting. A remedy would be to ask banks to also assess the implications for FX lending of exchange rate movements that are opposite to the ones supposed in the adverse scenario.

The 2016 stress test requires banks to provide more detail on how the market risk scenario affects the valuations of their hedging positions that are meant to offset asset revaluations. No information, however, is collected on the separate impact of exchange rate movements on the valuations of a bank’s hedges. This implies that the stress test delivers only incomplete information on how exchange rate movements affect a bank’s overall stability. Bank supervisors, however, could request additional information as necessary to be able to fully assess the sensitivity of bank capitalization to exchange rate movements.

The 2016 stress test also requires banks to report extensively on any expected future costs associated with major, already known misconduct cases. This is useful information to collect, as banks’ provisioning for such future costs may at present be inadequate. The stress test results enable supervisors to determine whether current provisioning levels are adequate. If not, banks should be instructed to increase their provisions to reflect the revealed expected costs of known misconduct cases.

The stress test allows banks to use their own models to project any future losses stemming from yet unknown misconduct cases, and the methodology does not include a requirement for banks to provide details on the models that they use to arrive at these projections. In addition, banks are not provided with information on which models, if any, supervisors will use to make their own projections to be able to challenge the projections that banks report. Information on how supervisors plan to make such estimates would impose additional discipline on banks’ projections and on how supervisors will potentially challenge these.
1. INTRODUCTION

Following earlier EU-wide bank stress tests in 2009, 2010, 2011, and 2014, major EU banks will again be subject to a stress test in 2016. The 2016 test applies to 51 banks, each with a minimum of 30 billion euros in assets. The purpose of the stress test is to measure banks’ resilience in terms of capitalization to an adverse macroeconomic scenario using a common methodology. Details of the adverse scenario are provided by the European Systemic Risk Board (ESRB, 2016), while a methodological note, setting out how the impact of the adverse scenario has to be assessed and reported, has been published by the European Banking Authority (EBA, 2016). Main innovations in the 2016 stress test relative to the 2014 test are: i) a methodology for assessing exchange rate risk in the context of foreign exchange (FX) lending, ii) a requirement to provide more information on hedges that the bank has in place to mitigate the impact of market risk including exchange rate risk on asset valuations, and iii) a procedure for projecting losses from conduct risk events such as the recent LIBOR interest rate manipulation case. This briefing paper evaluates the relevance and appropriateness of these new elements in the 2016 stress test design.

Bank stress tests typically compare bank outcomes including capitalization rates between a baseline and a stressed macroeconomic scenario. The two scenarios then differ in several key aspects, including projected Gross Domestic Product (GDP) growth rates and exchange rate paths. This approach makes it impossible to infer from the stress test results what is the independent impact of, say, exchange rate movements on bank solvency. The 2016 stress test departs from a pure scenario approach by requiring banks to specify the separate, marginal impact of exchange rate movements on the quality of their FX lending. This add-on is useful, as exchange rate risk may only be lowly correlated with overall macroeconomic risk as reflected in, for instance, GDP growth rates over a relatively short horizon of one or several years and as banks tend to differ in their exposures to FX lending.

Banks specifically are asked to estimate the impact of a depreciation of the local currency of FX borrowers on their creditworthiness, given that a local currency depreciation makes it more difficult to service FX loans. The adverse macroeconomic scenario, as specified in ESRB (2016), implies a depreciation of the euro vis-à-vis other major currencies such as the US dollar. This implies that, as the dollar is taken to appreciate, the stress test will artificially not deliver any FX lending risks associated with, say, euro-denominated loans to US companies. To remedy this shortcoming, the stress test could have asked banks to consider two opposite exchange-rate scenarios, one with the euro depreciating and one with the euro appreciating vis-à-vis other major currencies.

Banks are also subject to foreign exchange risk, as exchange rate movements change the value of foreign-currency assets in the bank’s own currency. Banks tend to mitigate this risk by various hedges, including borrowings in foreign currencies and positions in exchange-rate related derivatives. The stress test requires banks to consider the implications of market risk, including exchange rate risk, for the valuation of their assets that are carried at fair value. The 2016 stress test newly asks banks to separately report the impact of the market risk scenario on the valuations of their hedging positions. In this overall exercise, however, banks are not required to report the independent, marginal impact of exchange rate movements on the revaluation of their assets and offsetting hedges. As a result, it is not possible to infer from the stress test results whether banks already hedge the FX lending risks discussed above, which would obviate their relevance for bank solvency. More generally, the innovations in the 2016 stress test only go half-way to providing the information that is necessary to assess the impact of exchange rate movements on overall bank stability.

The 2016 stress test further comprises a new methodology for projecting the losses arising from conduct risk events. Banks that have incurred substantial losses from this type of risk in the recent past need to provide detailed projections of any additional losses that may arise from these historical conduct risk events. Related to this, the European Systemic Risk Board (2015) provides information
indicating that banks’ existing provisions for historical misconduct risk events are substantially less than the expected future costs of these events. This suggests that the new requirement for banks to provide detailed information on the expected costs stemming from already known conduct risk events may reflect an assessment that current provisions are insufficient. If so, the 2016 stress test can be a useful tool to obtain more accurate information on expected losses from historical conduct risk events than is available from current bank provisioning. General under-provisioning, if revealed by the stress test, should be followed up by supervisors with supervisory actions to correct this problem.

The stress test instructions allow banks to use their own models to project any losses from future misconduct cases that are yet unknown. In addition, banks are not provided with information on which models or techniques bank supervisors will use to determine whether banks’ projections of losses from unknown conduct risk events are plausible. This contrasts with the way the annual Dodd-Frank stress tests are conducted in the United States, as the Federal Reserve Board publishes ample information on the models used to perform its in-house stress tests that serve as a basis to challenge the results of banks’ stress testing. Such information, if provided to EU banks, would provide additional discipline on banks’ stress testing as well as on the way that supervisors will perceive and potentially challenge the stress test results.

In the remainder, Section 2 evaluates the relevance of new aspects of the stress test methodology related to exchange rate risk. Section 3 evaluates the new methodology for projecting losses from conduct risk events. Section 4 concludes.
2. EXCHANGE RATE RISK AND THE 2016 STRESS TEST

Banks are subject to exchange rate risk that potentially threatens their solvency as measured by, for instance, the ratio of Common Equity Tier 1 (CET1) capital to risk-weighted assets. This section first discusses the main ways in which exchange rate risk can affect bank solvency. Then it discusses some data on the exchange rate risk facing banks that are available from non-stress test sources. Finally, it discusses how data from the revised 2016 stress test helps to understand the exchange rate risk facing banks, even if these data are not detailed enough to get a complete picture of the implications of exchange rate risk for bank solvency.

2.1 Types of exchange rate risk facing banks

Two main types of exchange rate risk can be distinguished. First, banks are subject to ‘economic risk’ as exchange rate movements can undermine the creditworthiness of FX borrowers, especially if their local currency depreciates vis-à-vis the foreign currency in which the loan is denominated. Second, there is ‘translation risk’, as exchange rate movements affect the value of FX lending denominated in a bank’s home currency (which we take to be the euro). An appreciation of the euro, specifically, reduces the value of foreign-currency loans as converted into euros.

Banks can mitigate their exchange rate risk in several ways. First, they can try to match the currency composition of their assets and their liabilities. Second, they can hedge exchange rate risk by taking positions in exchange-rate related derivative contracts, or, alternatively, they can hedge their exchange rate risk in more indirect ways such as by issuing preferred shares in a foreign currency. International Accounting Standard (IAS) 39 on ‘Financial Instruments: Recognition and Measurement’ makes a distinction between rather direct hedges (such as liabilities in foreign currencies and derivative contracts) for which ‘hedge accounting’ can be applied, and more indirect, economic hedges (such as preferred shares in foreign currencies) for which ‘hedge accounting’ is not applied.

To understand the potential threat of exchange rate risk to bank solvency, one needs to know the sensitivity of, say, CET1 capital to the euro exchange rate, taking into account information on the currency composition of bank assets and liabilities, and on all additional hedges that are applied. Next, we discuss non-stress test data that are available to shed light on this sensitivity. Subsequently, we evaluate the contribution of the 2016 stress test to better measure this sensitivity.

2.2 Non-stress test data on exchange rate risk facing banks

Non-stress test data pertinent to bank exchange rate risk are available from i) bank public accounting statements, ii) Bank for International Settlements (BIS) statistics on the currency composition of bank claims and liabilities, and iii) research findings on the sensitivity of bank share prices to exchange rate movements. These three types of data are reviewed in turn.

2.2.1 Banks’ public reporting on exchange rate risk

All companies, including banks, are required to disclose information on their exposure to market risks, which generally includes exchange rate risk, according to International Financial Reporting Standard (IFRS) 7 on ‘Financial Instruments: Disclosures’. In practice, banks have considerable discretion regarding how fully they disclose their exposure to exchange rate risk. As an example of such bank-level disclosure, Table 1 provides information on the foreign currency exposures of Barclays available from its 2015 annual report. Column 1 presents figures on this bank’s net

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1 See Papaioannou (2006) for a discussion of exchange rate risk measurement and management for firms.
2 Banks’ disclosures of the implications of exchange rate movements for valuation vary in detail reflecting in part how strongly a bank’s auditor pushes for comprehensive disclosure.
investments in other currencies including the US dollar and the euro. These foreign currency investments are hedged by i) foreign currency borrowings (in column 2), ii) exchange-rate related derivatives (in column 3), and iii) economic hedges, including preferred shares denominated in dollars and euros (in column 5). Overall, these various hedges reduce the foreign currency exposure of Barclays from about 33 billion pounds in column 1 to about 12 billion pounds in column 6, which is a reduction of 64%. While these data provide considerable insight into the translation risks of Barclays, they do not address its economic risks, i.e., how exchange rate movements affect the creditworthiness of its FX borrowers.

Table 1: Foreign currency exposures of Barclays PLC as at December 31, 2015

<table>
<thead>
<tr>
<th></th>
<th>Foreign currency net investments (1)</th>
<th>Borrowings which hedge the net investments (2)</th>
<th>Derivatives which hedge the net investments (3)</th>
<th>Structural currency exposures pre-economic hedges (4)</th>
<th>Economic hedges (5)</th>
<th>Remaining structural currency exposures (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US dollar</td>
<td>24,712</td>
<td>8,839</td>
<td>1,158</td>
<td>14,715</td>
<td>7,008</td>
<td>7,707</td>
</tr>
<tr>
<td>Euro</td>
<td>2,002</td>
<td>630</td>
<td>14</td>
<td>1,358</td>
<td>1,764</td>
<td>(406)</td>
</tr>
<tr>
<td>South African rand</td>
<td>3,201</td>
<td>4</td>
<td>99</td>
<td>3,098</td>
<td>-</td>
<td>3,098</td>
</tr>
<tr>
<td>Japanese yen</td>
<td>383</td>
<td>168</td>
<td>205</td>
<td>10</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>2,927</td>
<td>-</td>
<td>1,294</td>
<td>1,633</td>
<td>-</td>
<td>1,633</td>
</tr>
<tr>
<td>Total</td>
<td>33,225</td>
<td>9,641</td>
<td>2,770</td>
<td>20,814</td>
<td>8,772</td>
<td>12,042</td>
</tr>
</tbody>
</table>

Notes: Amounts are in millions of pounds. Source is Barclays PLC Annual Report 2015 I, p. 179.

2.2.2 BIS data on the currency composition of bank balance sheets

The BIS publishes information on the currency composition of banks’ claims and liabilities on an aggregate level as part of its Banking Locational Statistics. Information of this kind is available for 13 Eurozone countries and at an aggregated level for the Eurozone as a whole. These data are summarized in Table 2. Total claims of banks located in the Eurozone are reported to be 26.5 trillion euros at the end of 2015. These claims are broken down into cross-border claims (on foreign residents) and local positions (which are claims on domestic residents). For the Eurozone as a whole, cross-border claims and local claims amount to 28.9% and 70.8% of total claims, respectively. The non-euro, foreign currency shares of cross-border and domestic claims are seen to be 37.7% and 2.8%, respectively, while the foreign currency share of total claims amounts to 12.9%. This implies that a 1% depreciation of the euro vis-à-vis all other currencies will increase the value of claims of banks located in the Eurozone measured in euros by 0.129%.3

The value of the total liabilities of Eurozone banks is seen to be 25.2 trillion euros at the end of 2015. Cross-border liabilities are 26% of total liabilities, less than the cross-border share of total claims of 28.9%, while the share of local liabilities in total liabilities is 70.2%. The foreign currency shares of cross-border and local liabilities are 37.8% and 3.4%, respectively. The overall foreign currency share of liabilities is calculated to be 12.2%, less than the foreign currency share of assets of 12.9%. A depreciation of the euro by 1% will thus increase the liabilities of Eurozone banks as valued in euros by 0.122%.4

The data of Table 2 can be used to assess the effectiveness of foreign-currency liabilities as a hedge against the foreign currency risk posed by foreign currency claims. To assess the effectiveness of this

3 Cyprus, Ireland, and Luxembourg report relatively high shares of non-euro bank claims of 29.4%, 28.8%, and 35.0%, implying relatively large increases in the valuation of these claims in euros following a euro depreciation.

4 Cyprus, Finland, and Luxembourg report relatively high shares of non-euro bank liabilities of 32.7%, 28.1%, and 35.2%, implying relatively large increases in the valuation of these liabilities in euros following a euro depreciation.
hedge, we calculate the impact of a 1% depreciation of the euro on the valuation of overall claims minus liabilities.\textsuperscript{5} For the Eurozone as a whole, such a euro depreciation is seen to increase the value of the balance sheet by 0.012\% of claims (column 1 of Table 3). This positive figure reflects that on average more assets than liabilities are denominated in foreign currencies. In line with this, a 1\% depreciation of the euro is shown to increase the value of banks’ claims minus liabilities by 0.268\% of claims minus liabilities (column 2 of Table 3). Bank liabilities by themselves thus provide an incomplete hedge of the exchange rate risk associated with foreign currency bank claims in the Eurozone (similarly to the case of Barclays in Table 1).\textsuperscript{6} While informative, these data by themselves provide an incomplete picture of banks’ exposure to exchange rate risk, as they do not account for off-balance-sheet hedges or the impact of exchange rate risk on loan quality.

\textsuperscript{5} The BIS does not provide a breakdown of the non-euro claims and liabilities of Eurozone banks in the aggregate into separate foreign currencies. Hence, we cannot consider the impact of a depreciation of the euro vis-à-vis, say, only the US dollar on the valuation of bank claims minus liabilities. Such a depreciation would not affect the valuation of bank claims minus liabilities only if dollar-denominated assets and liabilities are perfectly matched.

\textsuperscript{6} For eight individual Eurozone countries, the change in the valuation of claims minus liabilities following a euro depreciation is calculated to be positive, while for four it is negative.
Table 2: Currency composition of claims and liabilities of banks located in the Eurozone at the end of 2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Claims</th>
<th></th>
<th>Liabilities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total, billions</td>
<td>Cross-border, %</td>
<td>Local position, %</td>
<td>Non-euro, %</td>
</tr>
<tr>
<td></td>
<td>Of which non-euro, %</td>
<td>Of which non-euro, %</td>
<td>Of which non-euro, %</td>
<td>Of which non-euro, %</td>
</tr>
<tr>
<td>Austria</td>
<td>780</td>
<td>30.8</td>
<td>29.2</td>
<td>69.1</td>
</tr>
<tr>
<td>Belgium</td>
<td>1,068</td>
<td>48.6</td>
<td>34.5</td>
<td>51.3</td>
</tr>
<tr>
<td>Cyprus</td>
<td>93</td>
<td>26.4</td>
<td>71.2</td>
<td>73.0</td>
</tr>
<tr>
<td>Finland</td>
<td>552</td>
<td>45.0</td>
<td>45.6</td>
<td>54.4</td>
</tr>
<tr>
<td>France</td>
<td>6,485</td>
<td>29.5</td>
<td>41.8</td>
<td>70.4</td>
</tr>
<tr>
<td>Germany</td>
<td>6,804</td>
<td>28.1</td>
<td>30.6</td>
<td>71.8</td>
</tr>
<tr>
<td>Greece</td>
<td>332</td>
<td>28.5</td>
<td>11.6</td>
<td>70.7</td>
</tr>
<tr>
<td>Ireland</td>
<td>583</td>
<td>49.7</td>
<td>50.4</td>
<td>50.2</td>
</tr>
<tr>
<td>Italy</td>
<td>3,776</td>
<td>10.9</td>
<td>17.1</td>
<td>-</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>746</td>
<td>75.4</td>
<td>40.6</td>
<td>24.4</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,493</td>
<td>40.0</td>
<td>49.5</td>
<td>59.3</td>
</tr>
<tr>
<td>Portugal</td>
<td>418</td>
<td>16.2</td>
<td>21.3</td>
<td>83.7</td>
</tr>
<tr>
<td>Spain</td>
<td>2,342</td>
<td>16.0</td>
<td>42.7</td>
<td>83.9</td>
</tr>
<tr>
<td>Euro area</td>
<td>26,478</td>
<td>28.9</td>
<td>37.7</td>
<td>70.8</td>
</tr>
</tbody>
</table>

Notes: Cross-border and local position shares of assets and liabilities do not add up to 100% due to unallocated assets and liabilities. In calculating the non-euro shares of total claims and liabilities, unallocated assets and liabilities are taken to be in euros. Based on data from the Locational Banking Statistics of the Bank for International Settlements.
Table 3: The effect of a 1% euro depreciation on the valuation of Eurozone bank claims minus liabilities

<table>
<thead>
<tr>
<th></th>
<th>Effect as % of claims (1)</th>
<th>Effect as % of claims - liabilities (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0.047</td>
<td>0.415</td>
</tr>
<tr>
<td>Belgium</td>
<td>-0.005</td>
<td>-0.991</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.047</td>
<td>0.191</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.056</td>
<td>-1.237</td>
</tr>
<tr>
<td>France</td>
<td>0.009</td>
<td>0.296</td>
</tr>
<tr>
<td>Germany</td>
<td>-0.003</td>
<td>-0.043</td>
</tr>
<tr>
<td>Greece</td>
<td>0.060</td>
<td>0.281</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.017</td>
<td>-0.771</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.026</td>
<td>0.323</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.055</td>
<td>1.123</td>
</tr>
<tr>
<td>Portugal</td>
<td>-0.003</td>
<td>-0.030</td>
</tr>
<tr>
<td>Spain</td>
<td>0.038</td>
<td>0.832</td>
</tr>
<tr>
<td>Euro zone</td>
<td>0.012</td>
<td>0.268</td>
</tr>
</tbody>
</table>

Note: These are own calculations based on the data in Table 2

2.2.3 The sensitivity of bank share prices to the exchange rate

For banks that are stock market listed, it is possible to estimate how the return on the bank’s stock depends on movements of the exchange rate. The estimated coefficient informs about the relationship between the value of a bank’s common equity and the exchange rate as implicit in share prices. Such a coefficient is a reflection of the stock market’s perception of a bank’s overall exchange rate exposure, including economic risks, net of all hedges. Chamberlain, Howe, and Popper (1997) estimate the relationship between the bank’s stock return and the rate of appreciation of a trade-weighted exchange rate for US and Japanese banks in the period from June 1986 to June 1993. For the set of US banks, the median bank-level estimated coefficient is positive, suggesting that a dollar appreciation increases the share valuation of US banks, while the opposite is true for Japanese banks. Al-Shboul and Anwar (2014) similarly find a positive relationship between the stock returns on Canadian financial firms and the rate of appreciation of a trade-weighted exchange rate of the Canadian dollar.

From a financial stability point of view, the (absolute) size of the coefficient rather than its sign matters, as a large coefficient of either sign suggests that a large exchange rate movement could deplete a bank’s common equity capital. Estimates of a bank’s exchange rate risk derived from stock market data can serve as a useful complement to accounting-based data derived from a stress test.

2.3 Exchange rate risk and stress test innovations

In the 2016 stress test, banks are asked to assess how projected exchange rate movements affect the creditworthiness of their FX borrowers under the baseline and adverse scenarios (EBA, 2016, Section 2.4.4.) The marginal impacts of exchange rate movements on both the probabilities of default (PDs) and losses given default (LGDs) of FX loans have to be quantified.7

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7 For this purpose banks are instructed to use a combination of satellite models and relevant historical information (EBA, 2016, §110). For some FX lending exposures, the necessary data may not be available.
The new requirement for banks to assess the marginal, independent effect of foreign exchange movements on the quality of FX loans is a departure from the general stress test approach which requires banks to assess the quality of their loan portfolios across two macroeconomic scenarios that include different paths for exchange rates. It is useful to consider exchange rate risk separately in the stress test, as the exchange rate may only be lowly correlated with other main macroeconomic risk variables such as GDP growth rates over relatively short horizons which implies that exchange rate risk is distinct from general macroeconomic risk, and as banks differ in their exposures to FX loans.

Banks are asked to assess the creditworthiness of FX borrowers in case the local currency depreciates vis-à-vis the foreign currency in which the debt is denominated. For cross-border lending in euros, this applies if the euro appreciates. In the adverse macroeconomic scenario, the euro depreciates vis-à-vis other major currencies such as the US dollar. This implies that FX risk related to lending in euros to, say, US firms does not have to be assessed in the adverse scenario. This is somewhat arbitrary given the unpredictability of the euro exchange rate. Alternatively, it would have made sense to require banks to perform a two-sided exchange rate risk test by considering scenarios of both euro depreciation and appreciation against other major currencies.

Banks are further asked to assess the impact of market risk, including exchange rate risk, on the valuations of their positions that are carried at fair value (EBA, 2016, Section 3). This revaluation exercise also includes revaluations of hedges that now need to be reported separately (EBA, 2016, §179). Throughout, banks are asked to evaluate the impact of the overall adverse market risk scenario on asset valuations without looking at the independent, marginal impact of the implied exchange rate movements. This approach to exchange rate risk when considering asset revaluation appears to be inconsistent with the focus on marginal exchange rate risk as it relates to FX lending. The only partial consideration of marginal exchange rate risk in the overall stress test (for FX lending, but not for asset revaluation) implies that the stress test results by themselves deliver insufficient information to infer the overall marginal exchange rate risk to bank solvency as measured by bank capitalization measures.

2.4 Supervisory follow-up to the stress test

Supervisors should have an interest in assessing the overall (marginal) exchange rate risk facing banks. They can do this by combining information on the impact of exchange rate movements on the creditworthiness of FX borrowers (as delivered by the stress tests) with information on exchange rate translation risks (after relevant hedges) similar to the data on foreign exchange exposures for Barclays in Table 1 (not available from the stress test). Supervisors should be able to obtain complete information on translation risks (after hedges) as part of the supervisory process. Banks that are found to be subject to too much overall exchange rate risk should be required to reduce this risk by adjusting their balance sheets or derivative positions.

As part of the supervisory process, supervisors could further decide to estimate the relationships between bank share prices and exchange rate movements along the lines of the studies discussed in Section 2.2.3 to obtain a market-based measure of a bank’s exchange rate risk to complement the accounting-based information on exchange rate risk from the stress test. A market-based measure of

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8 For local, non-euro lending inside the Eurozone, this applies if the euro depreciates.
9 The adverse scenario implies the depreciation of the currencies of several Eastern European countries relative to the euro, including the Czech koruna and the Hungarian forint (ESRB, 2016, p. 4). Exchange rate risk associated with FX lending to these countries only materially affects banks with large exposures to these countries.
10 Banks generally take into account the impact of exchange rate movements on the valuations of assets carried at fair value as well as at amortized cost including most loans in accordance with IAS 21 on ‘The Effects of Changes in Foreign Exchange Rates’, which requires firms to account for valuation gains or losses following exchange rate movements by including them in the P&L calculation.
11 In the case of economic hedges, banks may opt, or be required by their competent authority, to recognize the offsetting effect on asset valuation (EBA, 2016, §141).
bank exchange rate risk provides additional information, and it can be used as a benchmark to check the plausibility of accounting-based data on bank exchange rate risk.
3. CONDUCT RISK AND THE 2016 STRESS TEST

In the last several years, banks have incurred large costs in the form of fines related to misconduct cases such as the manipulation of LIBOR interest rates. The 2016 stress test entails a detailed methodology for projecting the Profit and Loss (P&L) impact of losses from misconduct episodes (EBA, 2016, Section 5). Depending on the severity of past misconduct losses, banks are required to use either a qualitative approach or a quantitative approach to project future losses from misconduct. Specifically, banks are required to apply the qualitative approach if they have experienced any material conduct risk event during the 2011-2015 period that has triggered aggregate loss (over the 2011-2015 period) greater than 10 basis points of CET1 capital at the end of 2015 (EBA, 2016, § 340 and § 363). Banks that have not experienced such a material conduct risk event in the recent past are required to apply the quantitative approach.

To put this threshold for defining a material conduct risk event into perspective, we calculate the aggregate losses relative to CET1 capital in 2015 that some major EU banks have experienced on account of fines and settlements related to the LIBOR affair. The numbers are reported in Table 4. The various fines typically reflect the actions of several public authorities (in Britain, at EU level, and in the US) on the same date or on two separate dates. On June 27 2012, for instance, Barclays was fined $200 million by the US Commodity Futures Trading Commission, $160 million by the US Department of Justice, and £59.5 million by the UK Financial Services Authority for attempted manipulation of LIBOR rates, amounting to a total fine of €354.3 million at contemporaneous exchange rates as reflected in column 1 of Table 4. The biggest combined fine – worth €2.3 billion – was imposed on Deutsche Bank on April 23, 2015. Column 2 represents these banks’ CET1 capital in 2015, and column 3 provides the aggregate fine per bank expressed in basis points of CET1 capital. The highest relative aggregate fine of 495 basis points of CET1 capital was incurred by Deutsche Bank, while the lowest fine equivalent to 64 basis points was imposed on Barclays. From Table 4, we see that all major EU banks that have been fined for their participation in the LIBOR manipulation case will have to apply the qualitative approach to projecting future misconduct costs, as actual fines are well beyond the threshold level of 10 basis points of 2015 CET1 capital.

Table 4: Fines related to LIBOR manipulation relative to CET1 capital in 2015 of EU banks

<table>
<thead>
<tr>
<th>Bank</th>
<th>Date</th>
<th>Fine, millions of euros</th>
<th>CET1, billions of euros</th>
<th>Aggregate fine in basis points of CET1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barclays</td>
<td>June 27, 2012</td>
<td>354</td>
<td>55.2</td>
<td>64</td>
</tr>
<tr>
<td>Deutsche Bank</td>
<td>December 4, 2013</td>
<td>725</td>
<td>62.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>April 23, 2015</td>
<td>2,349</td>
<td>62.0</td>
<td>495</td>
</tr>
<tr>
<td>Loyds</td>
<td>July 28, 2014</td>
<td>281</td>
<td>38.7</td>
<td>73</td>
</tr>
<tr>
<td>Rabobank</td>
<td>October 29, 2013</td>
<td>775</td>
<td>28.7</td>
<td>270</td>
</tr>
<tr>
<td>RBS</td>
<td>February 6, 2013</td>
<td>453</td>
<td>50.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>December 4, 2013</td>
<td>391</td>
<td>50.9</td>
<td>165</td>
</tr>
<tr>
<td>Société Générale</td>
<td>December 4, 2013</td>
<td>446</td>
<td>38.9</td>
<td>114</td>
</tr>
</tbody>
</table>

Sources: Financial Times, New York Times, bank annual reports, and own calculations

3.1 The projection of losses from historical conduct risk events and provisioning levels

Banks that are subject to the qualitative approach need to project future losses over 2016-2018 stemming from already known, historical conduct risk events both for the baseline and adverse macroeconomic scenarios. Expected future losses are calculated as expected future costs net of existing provisions. EBA (2016, §367) requires banks to provide detailed information on the expected
future costs related to historical conduct risk events. Projected future losses can only be positive, if existing provisions are less than expected future costs. Figure 1, which is reproduced from ESRB (2015), provides an indication that this is the case for the group of European G-SIBs, as total estimated future costs based on estimates by bank analysts exceed total current provisions. By asking banks to essentially recalculate their provisions for historical risk events, the 2016 stress test appears to recognize that existing provisions are inadequate, as banks may unduly have applied too much discretion in determining their provisions for known misconduct events for these numbers to be sufficiently informative. The 2016 stress test results will provide some additional insight on whether this is the case, and if so supervisors should follow up by overlaying additional provisioning guidelines to ensure that these data will be more informative in the future.

Figure 1: Misconduct costs and provisions of EU G-SIBs in billions of euros

![Figure 1](image-url)

Source: ESRB (2015, p. 15)

3.2 The projection of losses from future conduct risk events and bank modeling

The stress test also requires banks to project losses related to new misconduct cases.\(^\text{12}\) Banks subject to the qualitative approach are required to provide a projection of potential losses that may arise from material conduct cases over the planning horizon under the two scenarios (EBA, 2016, §365), while banks subject to the alternative, quantitative approach are required to project the P&L impact of conduct losses over the planning horizon using banks’ own methods (EBA, 2016, §371). In addition to being free to choose their own methods, banks are not explicitly required to document the models or other techniques that they use to project future losses associated with yet unknown misconduct events.\(^\text{13}\) Hence, it will be difficult for supervisors to assess the plausibility of banks’ own projections of future losses from unknown misconduct events without requesting further information from the banks on how they arrived at these projections.

3.3 Lack of guidance on how supervisors will challenge bank loss projections

Supervisors would be in a better position to challenge banks’ projections of future losses from misconduct events if they made their own, independent projections of such losses. This approach is followed in the US where the Federal Reserve Board conducts its own in-house stress tests of the set

\(^{12}\) Banks subject to the qualitative approach have to report individually the 25 largest new expected material events in terms of aggregate projected losses (EBA, 2016, §366). An aggregate projection of losses from new material events would seem more appropriate.

\(^{13}\) In contrast, US banks are required to provide extensive documentation of the models that they use to project operational risk losses. See Federal Reserve Board (2016, pp. 223-224).
of US banks that are subject to the annual Dodd-Frank stress test exercise in parallel with the stress tests conducted by the banks themselves. Importantly, the Federal Reserve Board publishes the results of its in-house stress tests along with a description of the models that have been applied. In March 2015, for instance, the Federal Reserve Board (2015) published the 2015 supervisory stress test results including projections of losses related to conduct risk, stating that it used a combination of three modeling approaches – a ‘panel regression model’, a ‘loss distribution approach’, and a ‘historical simulation model’ – to estimate individual-bank losses from operational risk including conduct risk (see pp. 59-60). A Federal Reserve Board research paper, Curti and Migueis (2016), shows how the ‘loss distribution approach model’ can be applied to US banking data, concluding that past losses are useful predictors of future loss exposure.

EU banks, unlike US banks, are subject to different competent authorities (CAs) that potentially could challenge banks’ projections of future losses from conduct risk in the stress test. This suggests that the various CAs in the EU each face the challenge of developing the capacity to independently estimate banks’ future losses from misconduct risk. Ideally, the various CAs would then publish the methodology that they apply to arrive at their own projections of banks’ future losses from conduct risk. Such an approach would impose additional discipline on banks’ loss projections and on how supervisors will potentially challenge these.

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14 On February 26 2016, the Federal Reserve Board announced that it will no longer use the loss distribution model to estimate historically-based loss projections for the 2016 exercise. See https://www.federalreserve.gov/bankinforeg/model-changes-20160217.pdf

15 As a complement to econometric models, supervisors can use various benchmarks to assess the adequacy of banks’ loss projections related to operational risk such as conduct risk (see Curti, Ergen, Le, Migueis, and Steward, 2016, for an application to US bank data). The benchmark approach, for instance, compares a bank’s projected operational risk losses relative to total assets to the mean value of this ratio submitted by other banks.
4. CONCLUSIONS

The 2016 EU-wide stress test requires banks to separately assess the implications of exchange rate variability for the creditworthiness of their FX borrowers. This is a departure from the general stress test approach which is to consider the implications of different macroeconomic scenarios, including different exchange rate paths, for credit quality and bank solvency. This add-on is useful, as exchange rate movements may only be lowly correlated with other macroeconomic risk factors such as GDP growth over a relatively short horizon of one or several years and as banks tend to differ in their exposures to FX lending.

The stress test does not require banks to separately report how exchange rate movements per se affect the valuations of their financial positions including their hedges. This implies that the stress test does not deliver all the information that is necessary to determine the sensitivity of bank capitalization and solvency to exchange rate movements. As part of the supervisory process, supervisors could request additional information as necessary to be able to fully assess the impact of exchange rate movements on bank solvency.

The 2016 stress test also requires banks to report extensively on any expected future costs associated with already known misconduct cases. This is useful information to collect, as banks’ provisioning for such future costs may at present be inadequate. The stress test results enable supervisors to determine whether current provisioning levels are adequate. If not, banks should be instructed to increase their provisioning levels to reflect the projected costs of known misconduct cases.
REFERENCES


- Curti, F., I. Ergen, M. Le, M. Migueis, and R. Stewart, 2016, Benchmarking operational risk models, manuscript, Federal Reserve Board. Available at SSRN: http://dx.doi.org/10.2139/ssrn.2741179


