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Aggregate outcome of the 2010 EU wide stress test exercise coordinated by CEBS in cooperation with the ECB

Executive summary

The Committee of European Banking Supervisors (CEBS) was mandated by the ECOFIN of the European Council to conduct in cooperation with the European Central Bank (ECB), the European Commission and the EU national supervisory authorities a second EU-wide stress test exercise.

The overall objective of the 2010 exercise is to provide policy information for assessing the resilience of the EU banking system to possible adverse economic developments and to assess the ability of banks in the exercise to absorb possible shocks on credit and market risks, including sovereign risks.

The stress test has been conducted on a bank-by-bank basis and using bank's specific data and supervisory information.

CEBS has coordinated the exercise and conducted extensive cross-checks over the results, which were submitted to a peer review and challenging process in order to ensure the consistency and comparability of the results. This report provides details on the scenarios, methodologies and aggregate results of the stress test exercise. Results of the individual banks and comments on follow-up actions, where needed, are provided by the banks participating in the exercise and/or their national supervisory authorities. The results are re-published by CEBS on its website.

National supervisory authorities routinely conduct stress testing exercises in their respective jurisdictions, both at system-wide and individual institutions' levels, in order to assess potential risks facing the institutions individually and/or collectively. The CEBS exercise is intended to complement these national

analyses by providing a coordinated assessment of European banks, using common scenarios and methodologies.

However, as with any stress test exercise, the results are not forecasts of expected outcomes, since the scenarios are designed as "what-if" situations reflecting extreme assumptions, which are therefore not very likely to materialise. Against this background, the aggregate results discussed in this report as well as the individual results presented by banks and/or national supervisory authorities, aim at supporting the supervisory assessment of the adequacy of capital of European banks, and should be interpreted with caution.

Sample of banks

The 2010 stress test exercise has been conducted on a sample of 91 European banks[1]. In total national supervisory authorities from 20 EU Member States participated in the exercise. In each of the 27 Member States, the sample has been built by including banks, in descending order of size, so as to cover at least 50% of the respective national banking sector, as expressed in terms of total assets. As the stress test has been conducted on the highest level of consolidation for the bank in question, the exercise also covers subsidiaries and branches of these EU banks operating in other Member States and in countries outside Europe. As a result, for the remaining 7 Member States where more than 50% of the local market was already covered through the subsidiaries of EU banks participating in the exercise, no further bank was added to the sample. The 91 banks represent 65% of the total assets of the EU banking sector as a whole.

Given the differences in size and complexity, business models, scope of operations and risk profiles of the institutions included in the sample, it should be borne in mind that the aggregate results presented in this report cannot be directly applied to individual institutions, nor can be directly extrapolated to other banks in the EU. This point is of special importance as regards the assessment of banks' continued reliance on government support measures, as the sample of banks contains both institutions making use of various support measures, and institutions which did not revert to public support.

Risk factors included in the stress test exercise

[1] The sample of the 2009 exercise was composed of 22 large cross-border banks.

The stress test focuses mainly on credit and market risks, including the exposures to European sovereign debt. The focus of the stress test is on capital adequacy; liquidity risks were not directly stress tested.

The exercise has been carried out on the basis of the consolidated year-end 2009 figures and the scenarios have been applied over a period of two years - 2010 and 2011.

Scenarios used in the exercise

For the purpose of stress testing the credit risk and simulating the profit and losses, two sets of macro-economic scenarios (benchmark and adverse) have been developed, in close cooperation with the ECB and the EU Commission. The benchmark scenario was based on the EU Commission Autumn 2009 forecast and the European Commission Interim Forecast in February 2010, with several adaptations to reflect recent macro-economic developments in a number of countries. The adverse macro-economic scenario was based on ECB estimates. Within the adverse scenario, the exercise also envisages a "sovereign risk shock", reflecting adverse conditions in financial markets.

For each macro-economic scenario, a set of key macro-economic variables (including GDP, unemployment, interest rate assumptions) was provided for the domestic situation for each EU Member State, the US, and the rest of the world collectively. Some of the input parameters and assumptions have been provided by CEBS, and by the participating supervisory authorities outside of the narrative of the macro-economic scenarios as provided by the EU Commission and the ECB, notably the evolution of the real estate prices.

The benchmark macro-economic scenario assumes a mild recovery from the severe downturn of 2008-2009, whereas the adverse scenario assumes a "double-dip" recession. For the euro area, the GDP growth under the benchmark scenario is assumed at a level of +0.7 (2010) and +1.5% (2011), whereas under the adverse scenario the euro area would see a decrease of GDP by -0.2% in 2010 and -0.6% in 2011. For the whole European Union (EU27) the benchmark scenario assumes a +1.0% growth of GDP in 2010 and +1.7% in 2011, whereas under the adverse scenario the GDP would not grow in 2010 and would decline by -0.4% in 2011. On aggregate and over the two-year time horizon, the adverse scenario assumes a three percentage point deviation of GDP for the EU

compared to the benchmark scenario. It should be noted that current macro-economic developments remain in line with the assumptions provided in the benchmark scenario.

In addition to a global confidence shock, that affects demand worldwide, the adverse scenario envisages an EU-specific shock to the yield-curve, originating from a postulated aggravation of the sovereign debt crisis. The latter impact is differentiated across countries, taking into account their respective situation.

In particular, related to prevailing sovereign debt risks, a common upward shift in the yield curve was applied for each country in the EU (reaching 125 basis points for the three-month rates and 75 basis points for the 10-year rates at end-2011), supplemented with country-specific upward shocks to long-term government bond yields (overall amounting to 70 basis points at end-2011 for the euro area). The rise in short-term rates reflects an assumption of tensions in the interbank market – as was seen during earlier financial turmoil episodes. The country-specific bond yield shock in turn accounts for differentiated fiscal situations and related market perceptions. This results in a set of haircuts to be applied to all EU sovereign bond holdings in the trading books of the banks in the sample.

For the purposes of the market risk stress test, a set of stressed market parameters was applied to the trading book positions. It should be noted that the parameters developed for the market risk stress test are in-line with the macro-economic scenarios, and therefore could be considered as directional, meaning that depending upon the size and direction of their exposures, banks were able to make gains on certain portfolios, thereby reducing the overall amount of stress coming from the market parameters.

Key common assumptions used in the exercise

The exercise was conducted, using common templates, a common methodology and under key common assumptions. In particular, the exercise assumes, both for the benchmark and for the adverse scenarios, a "zero growth" assumption for the evolution of exposures for market and credit risks over the whole stress horizon. However, any regulatory imposed decisions (e.g. restructuring plans agreed with the EU Commission under the State Aid reviews) as well as management actions (e.g. capital raisings or divestment programmes) publicly

announced before 1 July 2010 have also been taken into account. The results do not include any government support of recapitalisation measures taken after 1 July 2010.

In conducting the exercise, for the major cross-border banking groups, the macro-economic scenarios were translated using internal models, internal risks parameters and granular portfolio data, whereas for the less complex institutions more simplified approaches were used in general (e.g. use of the reference parameters provided by the ECB for instance).

Securitisation positions have been tested under the assumption of rigorous and uniform reductions in the credit quality of the positions as of end 2009, which already incorporated very material reductions in external credit ratings, as compared to their original level. For the adverse scenario, the assumed reduction in credit quality of the positions is equivalent to four external rating notches over two years. The impact of such reduction has been recorded as an increase in risk-weighted assets (the denominator of the solvency ratio) and as a direct reduction of regulatory capital (the numerator of the solvency ratio).

Equity exposures in available for sale portfolios have been subject to a cumulative haircut over two years of 19% in the benchmark scenario, and 36% in the adverse scenario. Other exposures in available for sale portfolios (i.e. bonds and loans) have been tested along with other credit exposures in the banking book.

In light of these assumptions, the information provided for the benchmark and forecast scenarios should in no way be construed as forecasts.

Although the exercise did not prescribe any specific restrictions to the profitability of operations and reduction of income, especially generated in the regions not covered directly by the macro-economic scenarios, the assumptions and forecasts used by the banks have been challenged by the respective national supervisory authorities and brought to the attention of CEBS.

Aggregate results

Based on the results of the calculations, the aggregate Tier 1 capital ratio, used as a common measure of banks' resilience to shocks, would decrease under the adverse scenario including sovereign shock from 10.3% in 2009 to 9.2% by the

end of 2011. It should be noted that the aggregate Tier 1 capital ratio incorporates approximately 169.6 bn € of government capital support provided until 1 July 2010, which represents approximately 1.2 percentage point of the aggregate Tier 1 capital ratio. It should be noted that the maturity of government support measures extended to banking institutions in the sample goes way beyond the two-year time horizon of the exercise. As such, government support form an integral and stable part of the Tier 1 capital ratios of the banks in question. It is not expected that any withdrawal of government support measures could take place without appropriate substitution by private funding sources, where relevant.

The downward pressure on capital ratios under the adverse scenario including sovereign shock is mostly stemming from impairment losses (472.8 bn € over the two-year period) and trading losses (25.9 bn € over the two-year horizon). Losses associated with the additional sovereign shock would reach 67.2 bn € over the two-year period (among which 38.9 bn € associated with valuation losses of sovereign exposures in the trading book). In total, aggregate impairment and trading losses under the adverse scenario including the additional sovereign shock would amount to 565.9 bn €.

The average two-year cumulative loss rates associated with these losses are 3.0% for corporate exposures and 1.5% for retail exposures under the benchmark scenario, and 4.4% for corporate and 2.1% for retail exposures under the adverse scenario, compared with average loss rates of 1.5% for corporate exposures and 0.8% for retail exposures in 2009.

As a result of the exercise, under the adverse scenario 7 banks would see their Tier 1 capital ratios fall below 6%, with an overall shortfall of 3.5 bn € of Tier 1 own funds. The threshold of 6% is used as a benchmark solely for the purpose of this stress test exercise. This threshold should by no means be interpreted as a regulatory minimum (according to the CRD[2] the regulatory minimum for the Tier 1 capital ratio is set to 4%[3]), nor as a capital target reflecting the risk profile of the institutions, the latter being the outcome of the supervisory review process under Pillar 2 of the CRD.

[2] Directive EC/2006/48 – Capital Requirements Directive (CRD)
[3] The CRD regulatory minimum for the overall capital adequacy ratio is set to 8% with a minimum Tier 1 capital adequacy ratio set to 4%. Several EU Member States have opted for higher minimum capital adequacy ratios.

The aggregate results suggest a rather strong resilience for the EU banking system as a whole and may appear reassuring for the banks in the exercise, although it should be emphasized that this outcome is partly due to the continued reliance on government support for a number of institutions. However, given the uncertainties over the actual path of the macro-economic recovery, the result should not be seen as a reason for complacency.

The adverse macro-economic developments seen in 2008-2009 (EU27 GDP falling by -4.2% in 2009) led to record high loan losses reported in 2009, whereas in early 2010 we witnessed improved macro-economic conditions which suggest an increase of capital ratios attributed to higher retained earnings affected by lower loan losses. In addition, it should be noted that interest assumptions of the macro-economic scenarios, while having a minor impact on the loan losses, may have a sizable offsetting impact on the income side, leading to an increase of net interest income in some cases and thus positively affecting the profitability of some banks. Last, but not least, many of the banks in the exercise have significant operations outside the EU. Some of these countries have weathered the crisis comparably well and continue to show strong economic growth. Further, increased revenue streams from those economies positively contribute to these banks overall profitability, offsetting loan losses and building sizeable retained earnings.

Follow-up on the stress test results

Part of the mandate of CEBS is to undertake on a periodic basis these EU-wide stress testing exercises. CEBS will continue with testing the resilience of the EU banking sector by means of periodic EU wide and thematic risk assessments and stress testing exercises, and will continue its work on improving convergence in supervisory practices across Europe by addressing the topics both from a policy and practical perspective.

CEBS supports the greater transparency of this exercise and of the results of this stress test exercise, given the specific market circumstances under which banks currently operate and thus welcomes the decision to publish bank individual results, as well as detailed information on banks' exposures to EU sovereign debt.

With respect to the situation of individual institutions that fail to meet the threshold for this stress test exercise, the competent national authorities are in close contact with the banks in question to assess the results of the test and their implications, in particular any potential need for recapitalisation.

The banks are expected to propose a plan to address the weaknesses that have been revealed by the stress test. The plan will have to be implemented within an agreed period of time, in agreement with the supervisory authority.

Details of the follow-up actions are provided at national level by the supervisory authorities.

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1. Background and introduction

1. Following the mandate given by the EFC in 2009, the Committee of European Banking Supervisors (CEBS), in cooperation with the European Central Bank (ECB), the European Commission and the national supervisory authorities, has conducted the first EU-wide supervisory stress testing exercise aimed at assessing the overall resilience of the financial sector in Europe and banks ability to absorb future shocks.

2. The results of the 2009 stress test were presented to the September 2009 Financial Stability Table of the Economic and Finance Committee of the EU Council (EFC) and then to the October 2009 meeting of the ECOFIN. Further to the discussion of the results of the 2009 exercise, the EFC has requested CEBS to carry out another stress test in 2010, with a broader objective of assessing the overall resilience of the EU banking sector and the banks' ability to absorb further possible shocks on credit and market risks, and to assess the current dependence on public support measures. This mandate has been confirmed by the ECOFIN at its 2 December 2009 meeting[4].

3. Following the mandate, CEBS and the involved participants have started with the preparation for the 2010 exercise in early 2010, and have carried out a first phase of the analysis aimed at 26 major cross-border banking groups in Europe in April-May 2010. In June 2010, it was decided to extend the exercise to a wider share of the EU banking system also covering relevant domestic financial institutions, so as to cover at least 50% of each Member State's banking sector, as expressed in terms of total assets.

4. In the design and conduct of the 2010 exercise, CEBS took into account the mandate given by the ECOFIN, and also addressed areas where improvements compared to the 2009 exercise were deemed necessary as a result of a "lessons learnt" analysis conducted by the CEBS Secretariat and the authorities which participated in the exercise in early 2010. The exercise has been also tailored to address the acute developments on the sovereign debt market in Europe observed in May 2010.

5. This aggregate report presents the process, scenarios, key assumptions, methodology and aggregate results of the EU-wide stress testing exercise. The report is also complemented by a set of annexes detailing the scenarios and assumptions, and should be read in conjunction with the supplementary information on bank specific results for each of the 91 banks included in the sample.

6. The EU-wide stress test was conducted, according to the Terms of References agreed by CEBS and all involved parties, including the ECB, EU Commission, national supervisory authorities and the Economic and Finance Committee (EFC) of the EU Council. The exercise was conducted on a bank-by-bank basis, on the highest level of consolidation, at the level of every participating Member State. Banks' calculations have been rigorously reviewed and challenged by the respective national supervisors, before being analysed, discussed and aggregated by the CEBS Secretariat, which

[4] See http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/111706.pdf

conducted in-depth consistency checks and challenged the results with national supervisors.

7. The analysis presented in this report is based on the aggregation of the results of the stress tests done at the level of participating institutions. Therefore the analysis should not be directly extrapolated to the EU banking system as a whole. The reader should also bear in mind the differences in business models, risk profiles and financial standing of the institutions in the sample as well as in their use of government support measures.

8. In interpreting the results of the exercise, it should be noted that a stress testing exercise does not provide forecasts of expected outcomes, since the scenarios are designed as "what-if" situations including, in particular for the adverse scenario, plausible but extreme assumptions which are therefore not very likely to materialise. Against this background, the aggregate results discussed in this report as well as individual results presented in the annexes should be interpreted with caution and should not be considered as representative of the current situation nor a forecast for the future.

2. Objectives of the exercise

9. Given the mandate received from the ECOFIN, the overall objective of the 2010 stress test is similar though broader than the one conducted in 2009, which assessed the overall resilience of the EU banking sector and banks ability to absorb possible shocks and overall financial stability implications by conducting a stress test of a sample of European cross-border bank.

10. The overall objective of the exercise is to increase the level of aggregate information among policy makers in assessing the resilience of the European financial system as a whole. To this end, this report provides aggregate information illustrated by dispersions of individual results.

11. However, in order to increase the transparency of the exercise and to provide more granular information to the markets and wider audience given the specific market circumstances under which banks currently operate, the European Council decided to publicly disclose the bank-specific outcomes of the exercise[5]. To this end the aggregate information presented in this report is supported by the individual outcomes and follow-up actions disclosed by the participating supervisory authorities and banks, where applicable.

3. Overview and main features of the exercise

3.1 Timeline

12. The preparatory phase of the exercise has started in January-February 2010 with the analysis and the "lessons learnt" from the 2009 exercise. In March 2010, agreement between all involved parties, including CEBS, national

[5] EU Council conclusion of 17 June 2010, see: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/115346.pdf

supervisory authorities, the ECB and the EU Commission was reached on the main features of the macro-economic scenarios, which were later complemented by the supplementary sovereign risk scenario to reflect acute developments in the sovereign debt markets in Europe. The exercise was later enlarged to a wider sample of banks and finalised in July 2010.

3.2 Scope of the exercise

3.2.1 Sample of banks subject to the exercise

13. The 2010 EU-wide stress test exercise is carried out on a much wider sample of banks compared to the 2009 exercise. In addition to the 26 major cross-border banking groups in Europe, which are followed by CEBS in its work on regular micro-prudential risk assessment, the stress test also covers 65 other predominantly domestic credit institutions in Europe. Altogether the exercise covers 91 banks in Europe, with total assets of 28 032bn € as of end of 2009, representing approximately 65% of the EU banking system.

14. The sample of banks covers at least 50% of the national banking sectors in each EU Member State, as expressed in terms of total consolidated assets. Banks have been included in the exercise in descending order of their market shares by total assets in each Member State, without any omissions. As the exercise is conducted at the highest level of consolidation covering all subsidiaries and branches operating in foreign countries, this effectively means that if the market share in terms of total assets of EU banks subsidiaries and branches in any given Member State was more than 50%, no other bank had to be included from that Member State, unless he wished to on a voluntary basis. As a result, 20 national authorities participated in the exercise. The list of banks included in the exercise is attached in Annex 1 to this report.

15. The reader should be mindful that the sample of institutions is quite diverse in terms of size, business models and risk profiles of institutions. In particular, it contains banks which have received government support (in the form of capital injections, asset relief measures and guarantees on liabilities) as well as banks that have not been subject to any government support measures. CEBS is confident that the sample is representative enough to provide a good proxy of the overall resilience of the EU banking sector.

3.2.2 Risk factors tested and scope of consolidation

16. With respect to the risk factors covered in the stress and similar to the 2009 exercise, the focus was put on assessing credit and market risks. Both trading and banking book assets (including off-balance sheet exposures) have been subject to stress testing at the highest level of consolidation for the banking group (or banking arm of a financial conglomerate). The focus on credit risk is fully in line with the outcomes of the regular CEBS micro-

prudential risk assessments, which highlighted the credit risk and associated losses as a top source of concern for major cross-border banking groups.

17. Although the focus of the exercise remains on credit and market risks, capital requirements for operational risk were also taken into account in the exercise by computing a proxy of year-on-year changes in operating profit of the participating institutions, with the actual capital charge as of year-end of 2009 acting as a floor.

3.3 Time horizon and reference date

18. The exercise has been carried out on the basis of the consolidated year-end 2009 figures and the scenarios have been applied over a period of two years – 2010 and 2011. The time horizon of two years is consistent with the approach used in the 2009 exercise and most current stress testing practices of institutions and national authorities, as well as in line with the principles set forward in the draft CEBS's Guidelines for stress testing[6].

19. Government support measures received by institutions in the sample as of end 2009 have been taken into account and subject to specific analysis (see Section 4.5 of the report). The actual maturity of most government support measures and instruments goes beyond the time horizon of the exercise.

20. Any regulatory imposed decisions (e.g. restructuring plans agreed with the EU Commission) as well as management actions (e.g. capital raisings or divestment programmes) announced before 1 July 2010 have also been incorporated in the assessment.

3.4 Conduct of the exercise by institutions and national supervisors

21. The exercise has been conducted on a bank-by-bank basis as a centrally coordinated process, where the responsibility for the actual conduct of the stress tests lies with national supervisory authorities of the banks subject to the exercise, subject to guidelines provided by CEBS and the ECB and agreed by all participants.

22. Given the relatively diverse sample of banks covered by the exercise both in terms of their size and complexity, but also sophistication of risk management techniques, the actual conduct of the exercise varied. Most of the cross-border banking groups in the sample were tested in a bottom-up fashion, using internal models and granular portfolio data. Less complex institutions were subject to a simplified stress test, based on reference parameters provided by the ECB.

23. Regardless of the way the exercise was conducted, the supervisory authorities discussed the results of the exercise with the banks involved,

[6] CEBS Guidelines on stress testing currently available as consultation paper (http://www.c-ebs.org/documents/Publications/Consultation-papers/2009/CP32/CP32.aspx).

and, where appropriate, challenged the results, data, parameters, business and other key assumptions used in the exercise, before submitting them to the CEBS Secretariat.

24. Although there are some differences in the way the macro-economic scenarios have been translated into the risk parameters and in the actual application of the reference parameters provided by the ECB (see discussion on the methodology in Section 4.1.2), all participants in the exercise made efforts to ensure the consistency of internal parameters with the ECB reference parameters leading of the overall consistency and comparability of individual results. The actual parameters used have been discussed between the institutions and their respective supervisors as a part of the consistency checks.

25. In addition, parameters and overall results were analysed and submitted to CEBS Secretariat for a challenging process with each of the participating authorities. In order to further increase the overall consistency of the approaches and methodologies used, especially for the exercises run directly by banks, a special meeting between the respective participating authorities and CEBS Secretariat has organised ("peer-review" meeting). At this meeting parameters used in the exercise were discussed and commonly analysed, in a way that did not compromise the confidentiality of individual parameters and proprietary information[7].

3.4 Relation of the exercise with proposed regulatory changes

26. The timeline of the exercise coincided with the Quantitative Impact Study (QIS) exercise conducted in Europe to gauge the impact of the December 2009 proposals from the Basel Committee on Banking Supervision (BCBS)[8] and the respective proposals for the review of the Directive 2006/48/EC (CRD IV) under consideration by the European Commission outlined in its public consultation launched on 26 February 2010[9], which was coordinated by CEBS for its European part.

27. However, it should be noted that the 2010 EU-wide stress test exercise is completely separate from the QIS exercise and is by no means aimed at duplicating or front-running QIS outcomes. Therefore the stress test has been conducted based on the current regulatory regime, as well as on the regulatory changes agreed before end February 2010. Policy options put forward by the BCBS in December 2009 and the EU Commission in its consultation on CRD IV were not considered. In effect, the regulatory changes still under discussion will be implemented well after the period covered by the stress test exercise, and will in all likelihood include grandfathering provisions and phasing-in mechanisms.

[7] Such collective analysis was already conducted as a part of the "lessons learnt" exercise post 2009 stress test.
[8] See: http://www.bis.org/press/p091217.htm
[9] See: http://ec.europa.eu/internal_market/consultations/docs/2010/crd4/consultation_paper_en.pdf

28. With respect to the regulatory changes introduced by the CRD II and III amendments, elements related to the revision of the trading book and securitisation requirements (treatment of re-securitisations in particular) have been taken into account in the design and conduct of the exercise.

4. Scenarios and methodologies used in the exercise

4.1 General features of the macro-economic scenarios

29. The exercise has been conducted using two sets of macro-economic scenarios (benchmark and adverse), including a sovereign shock scenario developed in close cooperation with the EU Commission and the ECB and covering the period of 2010 - 2011. The adverse scenario for GDP, cumulated over 2010-11, is around three percentage points lower than the benchmark one for the European Union (EU27) and for the euro area as a whole.

30. The benchmark scenario is mainly based on European Commission forecast numbers that were available when work on the exercise began in March 2010, i.e., the Autumn 2009 European Economic Forecast (November 2009) and the European Commission Interim Forecast (February 2010). This was complemented with more up-to-date information on country forecasts in cases of significant changes. Assumptions for market interest rates as well as for exchange rates were set in line with the methods employed by the European Commission to construct their forecast.

31. Under the benchmark scenario, the slow recovery initiated in 2010 is expected to gain further momentum, with e.g. GDP growth for EU27 reaching 1.7% in 2011 after 1.0% in 2010 – largely in response to the ongoing world trade pick-up. At the same time, unemployment remains high – even increasing in a number of countries, owing to the lagged effects of the past activity slowdown. Consumer price inflation is assumed to be contained and stable overall, as the upswing occurs in economies where the degree of slack is substantial. There is however a number of countries where inflation declines or increases significantly – reflecting their cyclical positions or fiscal policy measures.

32. Both sets of macro-economic scenarios were commonly agreed by all participating authorities. Specific scenarios were provided for the domestic situation of each of the EU Member States, Norway, the US, and the rest of the world collectively. The scenarios also came with a set of reference risk parameters (PDs and LGDs) proposed by the ECB. Some of the input parameters and assumptions were also provided by CEBS and the participating authorities outside of the narrative of the macro-economic scenarios as provided by the ECB (evolution of real estate prices for 20 different geographies, notably – see Annex 3). It should be noted that in coordination with national authorities banks were allowed to use more conservative macro-economic assumptions, if this would realistically reflect their specific risk exposure.

33. For the purposes of the market risk stress test, a set of stressed market parameters has been applied to the trading book positions (Annex 5). It should be noted that the parameters developed for the market risk stress test are in-line with the macro-economic scenarios, and therefore could be considered as directional, meaning that depending upon the size and direction of their exposures, banks were able to make gains on certain portfolios, thereby reducing the overall amount of stress coming from the market parameters.

34. The following sub-sections introduce the features of the macro-economic and sovereign shock scenarios used in the 2010 exercise, whereas Annex 2 provides greater details on the methodologies and techniques used to develop the scenarios, reference risk parameters and haircuts on sovereign debt holdings.

4.1.1 Features of the adverse macro-economic scenario

35. The adverse macro-economic scenario has two main features, a global confidence shock, that affects demand worldwide, and an EU-specific shock to the yield-curve, also originating from a postulated aggravation of the sovereign debt crisis. The latter impact is differentiated across countries, taking into account their respective situation.

36. The global confidence shock occurs in a context of downgraded employment and profit expectations worldwide. It affects both private investment and consumption, through a lasting downward shock to these variables, cumulating overall to some 2 percentage points of GDP, concentrated over the second half of 2010 and the first quarter of 2011. The EU is directly affected by this confidence shock and by the effect on exports of the implied lower world demand.

37. In addition, a common upward shift in the yield curve was applied for each country in the EU (reaching 125 basis points for the three-month rates and 75 basis points for the 10-year rates at end-2011), supplemented with country-specific upward shocks to long-term government bond yields (overall amounting to 70 basis points at end-2011 for the euro area). The rise in short-term rates reflects an assumption of tensions in the interbank market – as was seen during earlier financial turmoil episodes (although not as large as in the immediate aftermath of the Lehman episode, where short-term inter-bank market spreads temporarily increased by close to 200 basis points). The country-specific bond yield shock in turn accounts for differentiated fiscal situations and related market perceptions.

38. The upward shift of the long-term rates can be associated to possible concerns about the fiscal outlook in the EU.

39. The interest rate shock was assumed to persist over the whole exercise.

40. The results for the adverse macro-economic projections were obtained by means of simulations. More details on the different macro-economic scenarios, including country specific parameters, are provided in Annex 2 of the report, whereas Table 1 below provides a snapshot of key macro-economic variables of the both sets of the macro-economic scenarios.

41. In the adverse scenario, the value of the haircuts for valuation losses in the trading book and of reference probabilities of default (PDs) and loss given defaults (LGDs) change both on account of the changes in the macro-economic scenario and of the introduction of the sovereign shock. On the banking book, these shocks induce a change in PDs and LGDs for the household and corporate sector, given that higher long-term government bond yields also imply higher borrowing costs for the private sector, which in turn imply higher PDs and LGDs for the non-sovereign exposures (see Section 4.1.2).

Table 1. Evolution of aggregate key macro-economic variables in the scenarios

	Realised			2010 Exercise			
				Benchmark		Adverse	
	2008	2009	2010 Q1	2010	2011	2010	2011
EU27							
GDP (y-o-y)	0.7%	-4.2%	0.2%	1.0%	1.7%	0.0%	-0.4%
Unemployment (% of labour force)	7.0%	8.9%	9.6%	9.8%	9.7%	10.5%	11.0%
Euro area							
GDP (y-o-y)	0.6%	-4.1%	0.2%	0.7%	1.5%	-0.2%	-0.6%
Unemployment (% of labour force)	7.5%	9.4%	10.0%	10.7%	10.9%	10.8%	11.5%
US							
GDP (y-o-y)	0.4%	-2.4%	0.7%	2.2%	2.0%	1.5%	0.6%
Unemployment (% of labour force)	5.8%	9.3%	9.7%	10.0%	10.2%	10.2%	11.1%

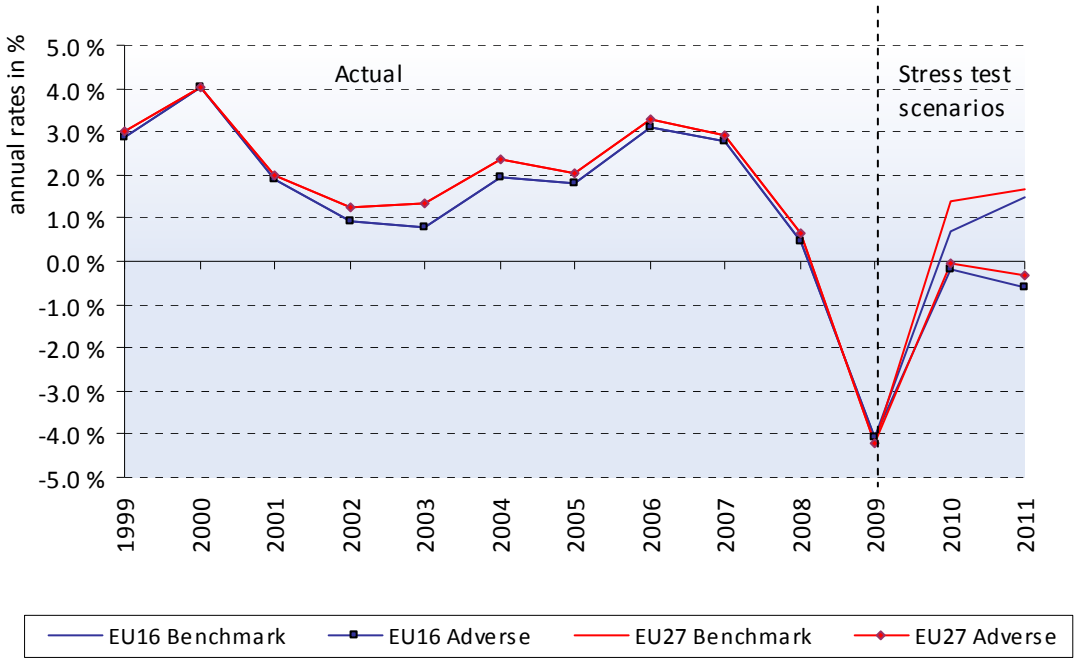
Notes: GDP changes for realised is real GDP growth rate, Q1 2010 GDP growth is compared to Q4 2009
Source: Eurostat for realised figures, stress test scenarios

42. As can be seen from the table, the benchmark scenario assumes a mild recovery, with GDP increasing by 1.0% in 2010 and 1.7% in 2011 in the EU (+0.7% in 2010 and +1.5% in 2011 for the Euro area). The adverse scenario assumes a "double dip" situation, with an unchanged GDP in 2010 (0.0%) and decrease in GDP by 0.4% in 2011 for the EU27 (-0.2% in 2010 and -0.6% in 2011 for the Euro area).

43. GDP growth is particularly affected in the adverse scenario, and is lower than in the benchmark scenario for all countries, on average by about one percentage point in 2010 and by close to two percentage points in 2011. The unemployment rate is higher, especially in 2011, while inflation is significantly lower in 2011. . Given the deterioration of the macroeconomic environment observed in 2009, the adverse scenario appears severe enough and substantially below available forecasts and projections, thereby corresponding to the materialisation of downside risks to economic growth prospects.

44. Putting the macro-economic scenarios into the historical perspective (see Chart 1) one can clearly see under the benchmark scenario a mild recovery from the severe downturn of 2008-2009, whereas the adverse scenario assumes a "double-dip" recession.

Chart 1. Real GDP growth for EU27 and euro area under the benchmark and adverse scenarios in comparison to historical developments



Source: Eurostat up to 2009, 2010-2011 stress test scenarios

45. Overall, the comparison of realised GDP figures for 2008 and 2009 with the scenarios used in the 2009 stress test exercise shows that realised figures were in between the benchmark and adverse scenarios. Current trends for 2010 (based on Q1 2010 GDP growth figures) suggest that the macro-economic situation remains relatively in line with the benchmark scenario, especially for the larger economies.

46. The main feature of the sovereign shock scenario included the series of valuation haircuts constructed to be applied to the outstanding trading book exposures to European sovereign debt (see Table 2 below and Annex 2, which provides details on the actual values of the valuation haircuts and the way they have been constructed). Modelling sovereign risk based on market yields implies that sovereign defaults are excluded from the exercise.

Table 2. Valuation haircuts to sovereign debt holdings as applied in the exercise

Country	Haircut value
Austria	5.6%
Belgium	6.9%
Cyprus	6.7%
Finland	6.1%
France	6.0%
Germany	4.7%
Greece	23.1%
Ireland	12.8%
Italy	7.4%
Luxembourg	6.9%
Malta	6.4%
The Netherlands	5.2%
Portugal	14.1%
Slovakia	5.0%
Spain	12.0%
Slovenia	4.2%
Denmark	5.2%
Sweden	6.7%
UK	10.2%
Czech Republic	11.4%
Poland	12.3%
Other non-euro area EU	*11.8%*
EU average	*8.5%*

Source: Stress test scenarios (see Annex 2 for more details)

47. Annex 4 provides more granular comparison between the realised values and assumptions for key macro-economic variables used in the 2009 and 2010 EU-wide stress test exercises.

4.1.2 Translation of the macro-economic scenarios into reference risk parameters and their application

48. The macro-economic scenario assumptions were translated, for the banking book exposures (except for securitisation exposures, which were tested with a separate methodology, see Section 4.4), into a set of risk parameters. Reference PD and LGD parameters were projected by the ECB over the time horizon of 2010 to 2011, consistently with both the benchmark and adverse macro-economic scenarios. This in turn translated into impairment loss estimates and risk weighted assets.

49. Reference PD and LGD parameters were computed at the country level for five main portfolios (financial institutions, sovereign, corporate, consumer credit and retail real estate). The details regarding the way the reference parameters provided by the ECB were calculated are provided in Annex 2.

50. The use of reference risk parameters varied depending on the approach institutions and supervisors chose to run the stress test. As mentioned above, generally larger cross-border institution in the sample with access to better modelling and risk quantification techniques used predominantly

bottom-up approaches. In such cases, macro-economic scenarios have been translated using institutions' models and impact on the institutions own risk parameters have then been computed. Those internally computed impacts (or multipliers) have been applied to the institutions' internal parameters as of end of 2009 in order to calculate the impact of the stress. The actual parameters used have been reviewed by the respective national authorities, compared with the reference parameters provided by the ECB, as all banks were expected to use the same valuation haircuts as provided by the ECB for debt exposures on the trading book, and discussed between all participants at the "peer review" meeting.

51. In the case of top-down approaches largely used for a smaller and less complex banks in the sample, national supervisory authorities used as a starting point their own PD and LGD levels for 2009 and applied to these values the relative changes of the parameters provided by the ECB in 2010 and 2011 with respect to their reference values in the respective year according to the outcomes of the ECB models.

4.2 General features of the trading book stress test

52. Apart from the sovereign risk shock modelled via the valuation haircuts, the exercise employed a detailed and granular set of market risk parameters provided by CEBS (see Annex 5).

53. The set of parameters, consistent with the general direction of the macro-economic scenarios, included assumptions on interest rates and volatilities for major currencies (EUR, GBP, USD), exchange rates and volatilities for the abovementioned currency pairs, haircuts and changes in volatility for major equity commodity and debt instrument indices, changes in credit spreads for debt instruments as well as bid/ask spreads to be used for the assessment of the impact on the market liquidity. To highlight some of the key features, the scenario assumed a drop in the value of major equity indices by 10% under the benchmark and 20% under the adverse scenario. for AFS exposures, these assumptions were translated into a haircut of 19% (benchmark scenario) and 36% (adverse scenario) of equity exposures during the two years.

54. For the computation of the impact from the market risk shocks, the assumption was that instantaneous shocks (both benchmark and adverse), applied to the positions as of 31 December 2009. The different portfolios/books were stressed using the most appropriate parameters from the set provided. For presentation purposes, the impact of the resulting shock was distributed evenly between 2010 and 2011 results.

55. It should be noted that the parameters were in line with the macro-economic scenarios and therefore could be considered as directional, allowing for some compensation between gains and losses on different portfolios.

4.4 Treatment of securitisation transactions

56. The exercise applied a specific approach to the treatment of securitisation exposures in the banking book (securitisation exposures in the trading book were stressed along the rest of trading exposures). All exposures (traditional and synthetic, as well as liquidity lines on securitisation transactions) for which there was significant risk transfer (in the meaning of the CRD) were included in the scope of the exercise.

57. It should also be noted that the exercise took into account the forthcoming changes in the CRD, notably proposals included in the draft CRD III in relation to the treatment of re-securitisation. For the purpose of the exercise it was assumed that the new amendments would be in place from 31 December 2010 onward.

58. The stress was designed as a deterioration of the credit quality of securitisation exposures, expressed in changes of their credit rating ("de-notching"). The application of the stress was adapted to take into account of the different regulatory treatments applying to the exposures, depending on whether they are treated under the standardised or the IRB approaches.

59. For the adverse scenario, the assumed reduction in credit quality of the positions is equivalent to 4 external rating notches over two years. The impact of such reduction translated into an increase of risk weighted assets.

4.5 Government support measures

60. The public support measures introduced in the course of the financial crisis to support banks in difficulties as well as to maintain funding to the real economy can be classified into four broad categories: (i) capital increases, through equity shares or hybrid instruments provided by governments, (ii) guarantees of banks' assets provided by governments, (iii) guarantees of liabilities or funding guarantees as well as liquidity provided by governments, and (iv) liquidity support measures introduced by central banks.

61. The exercise takes directly into consideration only the capital support measures and asset guarantees received by the institutions in the sample by 1 July 2010. As of 1 July 2010:

    - 34 banks in the sample benefited from capital increases with a total injected capital amounting to 169.6 bn €, making approximately 14% of the total Tier 1 own funds of the banks in the sample.

    - 20 banks in the sample benefited from asset guarantees.

62. The analysis suggests that the overwhelming majority of the government support measures agreed between banks and governments has a useful life extending beyond the horizon of the exercise.

5. Aggregate outcome of the exercise

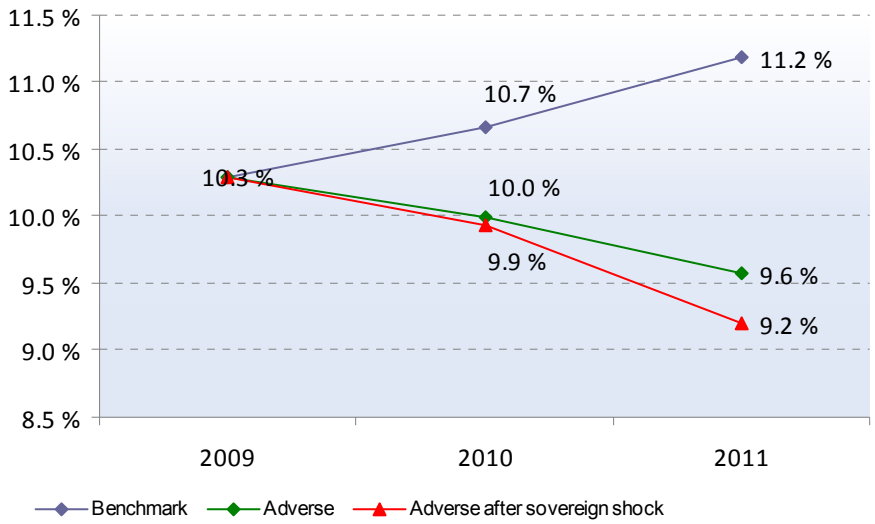
5.1 Evolution and dispersion of capital ratios

63. The evolution of the aggregate Tier 1 capital ratio reflects the impact of the macro-economic scenarios on regulatory capital charges for credit, market and operational risk, as well as the impact of an additional sovereign shock in the adverse scenario.

64. Chart 2 below represents the evolution of the aggregate Tier 1 capital ratio (the weighted average of the sample of 91 banks) both under the benchmark and adverse scenarios compared to the actual capital ratio at the end of 2009. As can be seen from the chart, under the benchmark scenario, the aggregate Tier 1 capital ratio grows significantly over the time horizon of the exercise, largely due to the increased level of pre-impairment income leading to capital generation through retained earnings.

65. Under the adverse scenario before the sovereign shock, the aggregate Tier 1 capital ratio decreases from 10.3% in 2009 to 9.6% by 2011. The additional shock on sovereign risk puts a further downward pressure on the aggregate Tier 1 capital ratio moving it further down to 9.2% by the end of 2011.

Chart 2. Evolution of the aggregate Tier 1 capital ratio



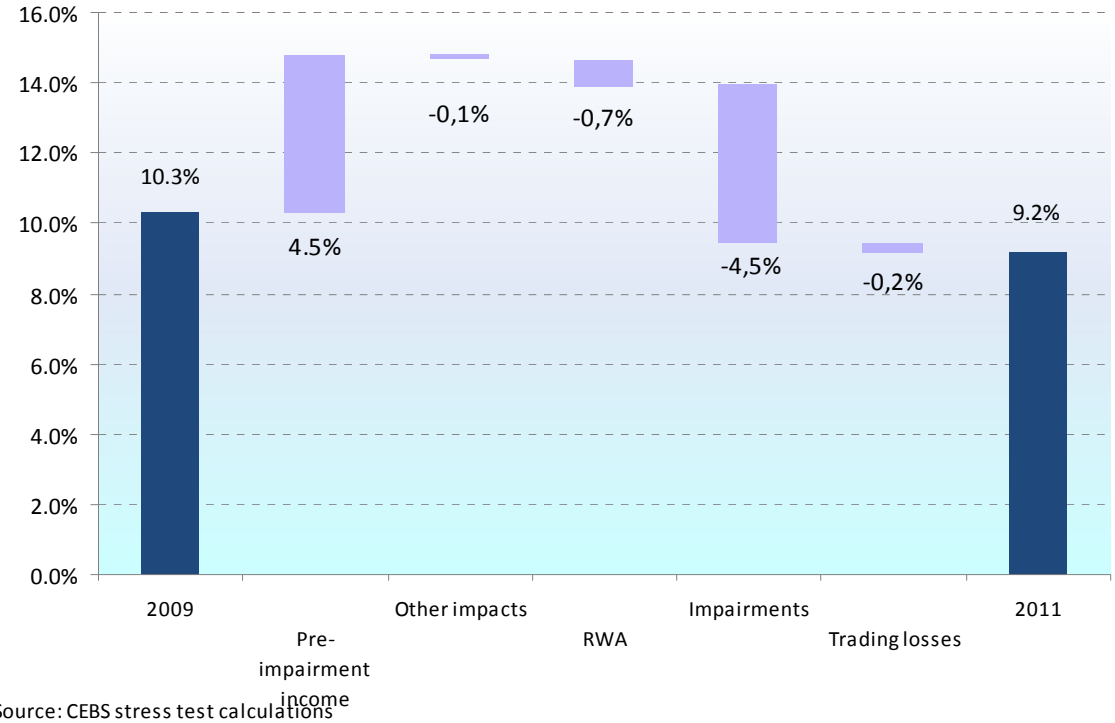
Source: Stress test calculations

66. It should be noted that a fraction of the aggregate Tier 1 capital ratio is attributable to continued reliance of some of the institutions in the sample on government support, which attributes to approximately 1.2 percentage point of the aggregate Tier 1 capital ratio. The effect of the government support on various institutions subject to the support measures is quite different and varies between 0.1 to 11.1 percentage points of the respective individual Tier 1 capital ratios.

67. As previously mentioned, the nature and features of the overwhelming majority of government support schemes, especially capital instruments counted as regulatory capital, suggest that government support will be in place beyond the time horizon of the exercise. Provided institutions in the sample do meet the conditions set for receiving such support, it can be assumed that government paid in capital cannot be simply withdrawn. Another factor to keep in mind is that it is likely that a potential exit from government support would not translate into "evaporation" of the solvency of the institutions: for instance, as was already observed for some of the banks in the sample, in case of repayment, it is likely that the capital subscribed by government will be replaced by capital influx from private investors.

68. Looking at the decomposition of the effect of different component on the Tier 1 capital ratio under the adverse scenario (see Chart 3), one can see that the aggregate ratio is driven up by the pre-impairment income leading to the increase of ratio by 4.5 percentage point, offset by the same proportion by impairment charges associated with the impact of the adverse scenario after sovereign shock. The trading losses have a marginal impact on the composition of the aggregate Tier 1 capital ratio, driving it down by 0.2 percentage points including the impact of 24.0 bn € stemming from the application of an haircut on European sovereign debt holdings in the trading book (see Section 4.1.1).

Chart 3. Contribution of different components to aggregate Tier 1 ratio under adverse scenario, after sovereign shock



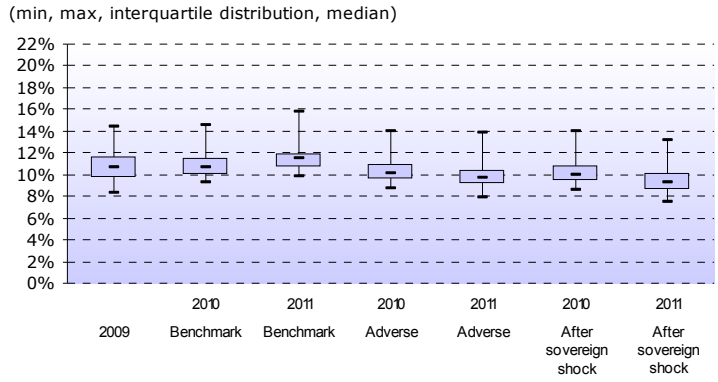
Source: CEBS stress test calculations

69. The following group of charts provides information on the dispersion of individual Tier 1 capital ratios differentiating between 26 major cross-border

banking groups (Chart 4) and the remaining 65 banks from the sample (Chart 5). All dispersions are presented calculated for the benchmark and, adverse scenario before and after the sovereign shock component and presented by means of minimum, maximum, interquartile distribution and median values.

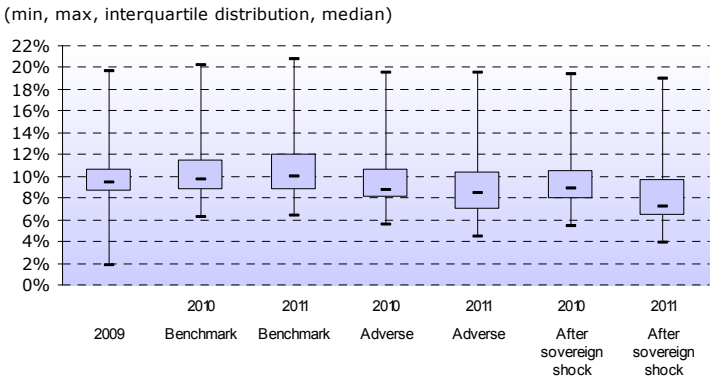
70. As expected, generally the Tier 1 capital ratios for the major cross-border banks are more compactly distributed compared to the smaller banks, and all of the 26 major cross-border banks would stay above the 6% Tier 1 capital ratio set as a benchmark threshold for the purposes of this exercise, with a lowest being of 7.4% after the impact of the adverse scenario including the sovereign shock.

Chart 4. Evolution of aggregate Tier 1 capital ratio for 26 major cross-border banking groups



Source: Stress test calculations

Chart 5. Evolution of aggregate Tier 1 capital ratio for 65 smaller banks



Source: Stress test calculations

71. Under the benchmark scenario none of the smaller banks would see their Tier 1 capital ratios fall below 6% (it should be noted that a number of banks in the sample have been subject to restructuring and mergers in the first half of 2010, which explains significantly lower capital ratios in 2009 compared to 2010 and 2011).

72. The adverse scenario before and after the sovereign shock is seen having significant impact on the individual Tier 1 ratios pushing the interquartile distribution lower and leading to some banks starting to fall below the 6% threshold. Thus under the adverse scenario before sovereign shock one bank would see in 2010 its Tier 1 capital ratio below the 6% threshold, reaching 5.5%, whereas by 2011 already 5 banks would fall below the threshold with the lowest Tier 1 capital ratio being 4.5%, below the threshold but still above the CRD minimum of 4.0% for the Tier 1 capital ratio.

73. The further sovereign shock drives the distribution lower with some minor widening towards the lower end and bringing the number of institutions failing to meet the 6% threshold in 2011 to 7 with the lowest Tier 1 capital

ratio falling to 3.9%, which would be below the regulatory minimum were this extreme situation to materialise.

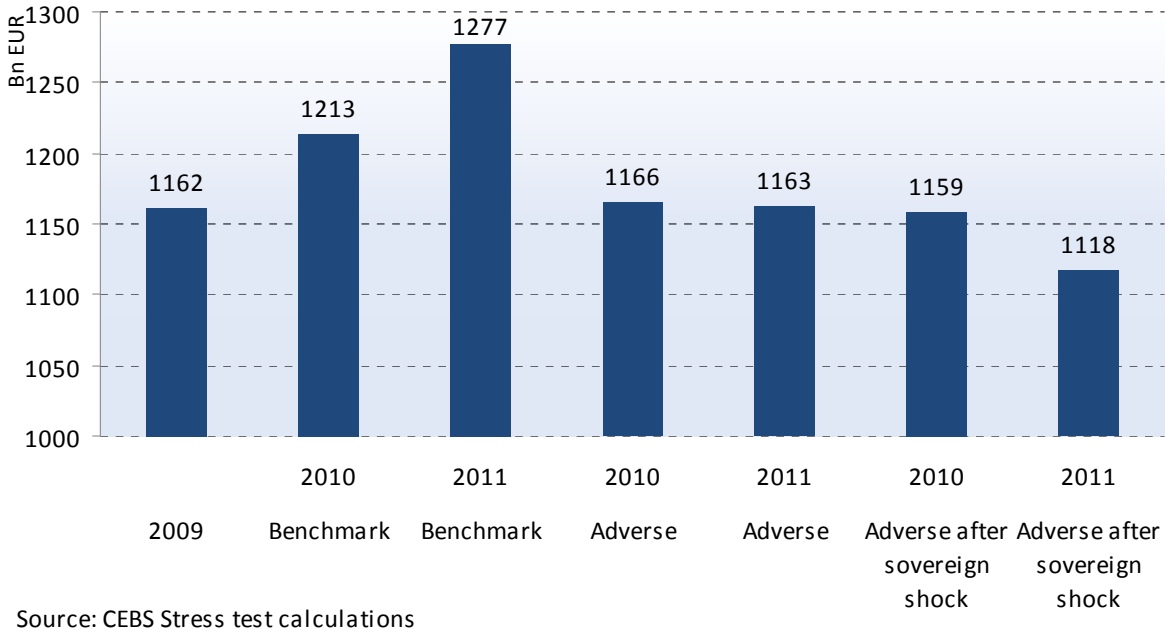
74. Overall, the results can be considered rather reassuring for the banks in the sample. At the same time, for some of the banks these results are partially due to the continuing reliance on government support for a number of banks.

5.2 Evolution of the main components of the aggregate Tier 1 capital ratio

75. The movements in the aggregate Tier 1 capital ratio discussed above are explained by the different impacts of the macro-economic scenarios, on the components of the ratio, as well as by methodological assumptions used in the exercise.

76. Chart 6 depicts the evolution of the aggregate Tier 1 own funds (i.e. the numerator of the Tier 1 capital ratio) in the exercise, compared to the actual amount of capital in 2009. As can be seen from the chart, the aggregate amount of capital increases under the benchmark scenario, supported by positive net results of the banks in the sample, whereas under the adverse scenario, the aggregate amount of Tier 1 own funds remains almost constant at the level of 2009, and as a result of the sovereign shock component falls to its lowest level in the exercise at 1 118bn €.

Chart 6. Evolution of aggregate Tier 1 own funds



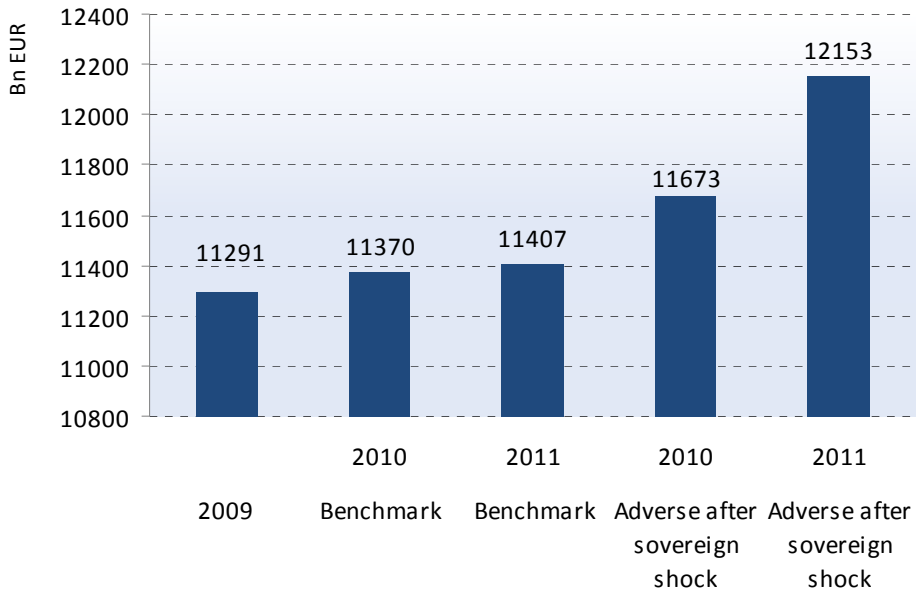
Source: CEBS Stress test calculations

77. As mentioned above, the aggregate Tier 1 own funds do incorporate a significant amount government support (169.6 bn €), which remains constant through the time horizon of the exercise.

78. Looking at the banks failing to meet the exercise threshold of 6% Tier 1 capital adequacy as a results of the macro-economic and sovereign shock, 7 banks have an overall shortfall of 3.4 bn €, compared to the 388.4.6 bn € of surplus capital (above the 6% threshold) for the entire sample of 91 banks.

79. The other component of the Tier 1 ratio – risk weighted assets (RWA –the denominator of the capital adequacy ratio-), does show rather significant evolutions, especially in the adverse scenario. Under the benchmark scenario, the RWA remain relatively stable compared to 2009 with an annual increase of 0.7% in 2010 and 0.3% in 2011. However, under the adverse scenario, the total RWA of the 91 banks in the sample increase significantly by 7.6% in 2011 compared to 2009 (see Chart 7).

Chart 7. Evolution of aggregate Risk Weighted Assets



Source: CEBS Stress test calculations

80. The increase of RWA is despite the fact that the exercise assumed a "zero growth" assumption for the different exposures in the exercise, and also recognises all deleveraging programmes formally accepted or announced by 1 July 2010, including restructuring plans agreed between a number of banks and the EU Commission under the State Aid review procedures. Both of these factors had a reducing impact on the total amount of RWA.

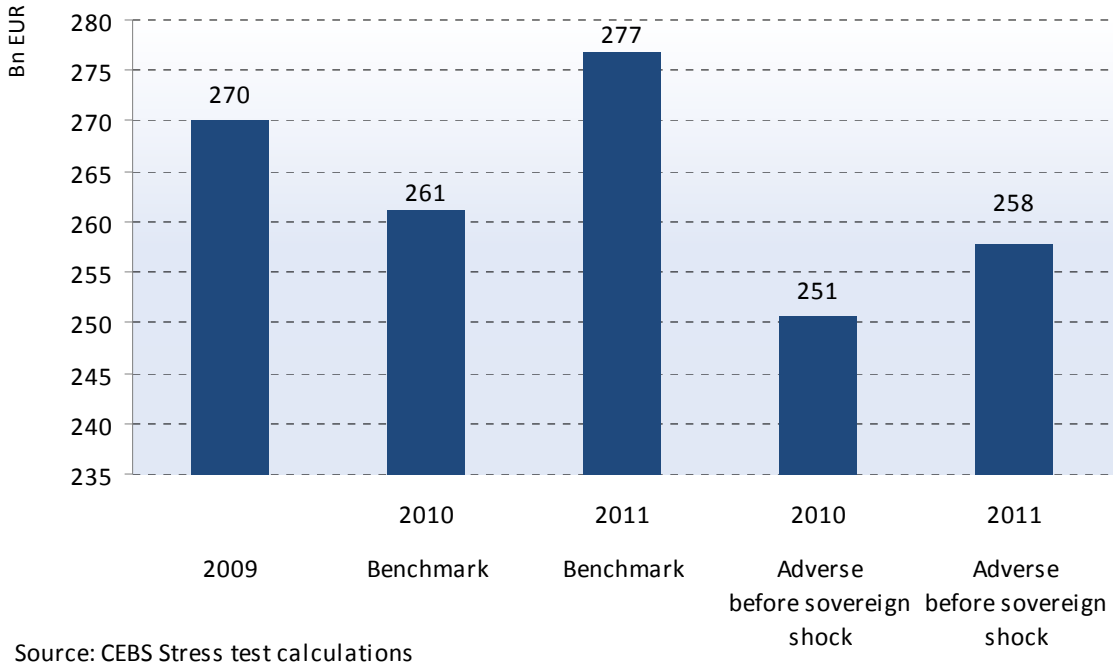
81. As a matter of fact, this increase in RWA is almost fully attributable to "mechanical" effects, i.e. changes of RWA for credit portfolios subject to the calculation of the regulatory capital using internal ratings based (IRB) approaches (i.e. increase in expected losses), as well as to the methodology retained for the stress of securitisation exposures. As a result, the evolutions of RWA observed both under the benchmark and adverse scenario, including the sovereign shock, should be interpreted with caution and cannot be directly interpreted as the potential lending capacity of the institutions and lending trends in general.

82. It should be noted that the impact of the sovereign shock component is rather limited on the size of the risk weighted assets as it major part is attributed to impairments estimated in the banking book and valuation losses in the trading book.

5.3 Evolution of financial results and total losses from the stress

83. Chart 8 provides an overview of the level of aggregate pre-impairment income (operating income less operating costs) of the banks in the sample. Consistent with the macro-economic scenario, under the benchmark scenario pre-impairment income reduces in 2010 and returns in 2011 to a slightly higher level than in 2009, reaching 277 bn €. Under the adverse scenario, banks in the sample see their pre-impairment income decreasing by 7.0% in 2010 compared to 2009 and rising to a level of 258 bn € at the end of 2011, which is 4.4% lower compared to level of 2009 .

Chart 8. Evolution of aggregate pre-impairment income



Source: CEBS Stress test calculations

84. It should be noted that operating profits assumptions incorporated in the exercise were challenged by the respective national supervisory authorities. Following the experience of the 2009 exercise, supervisory authorities are usually confident that operating profits estimated for the different banks are consistent with both the environment in which the banks operate, and with past and recent trends.

85. Notably, the aggregate stability of net interest income, and net fees and commissions leading to somewhat positive outlook regarding the evolution

of pre-impairment income, could be explained by the following factors, among others:

- The fact that the macro scenarios assumed differentiated shocks across countries. Therefore, depending on the geographic distribution of banks businesses, the P&L is diversely impacted, especially for business lines outside the EU area covered by the macro-economic scenarios, effectively meaning that banks and/or supervisors were able to use their own assumptions regarding the outlooks for such geographies;

- The fact that the assumption of an increase and a flattening of the yield curve may have immediate positive effects on earnings, especially for institutions operating in a variable rate environment for their retail business, which allows passing on to customers most of the increases in interest rates;

- The "zero growth" assumption built in the exercise, which may run contrary to deleveraging intentions expressed by banks.

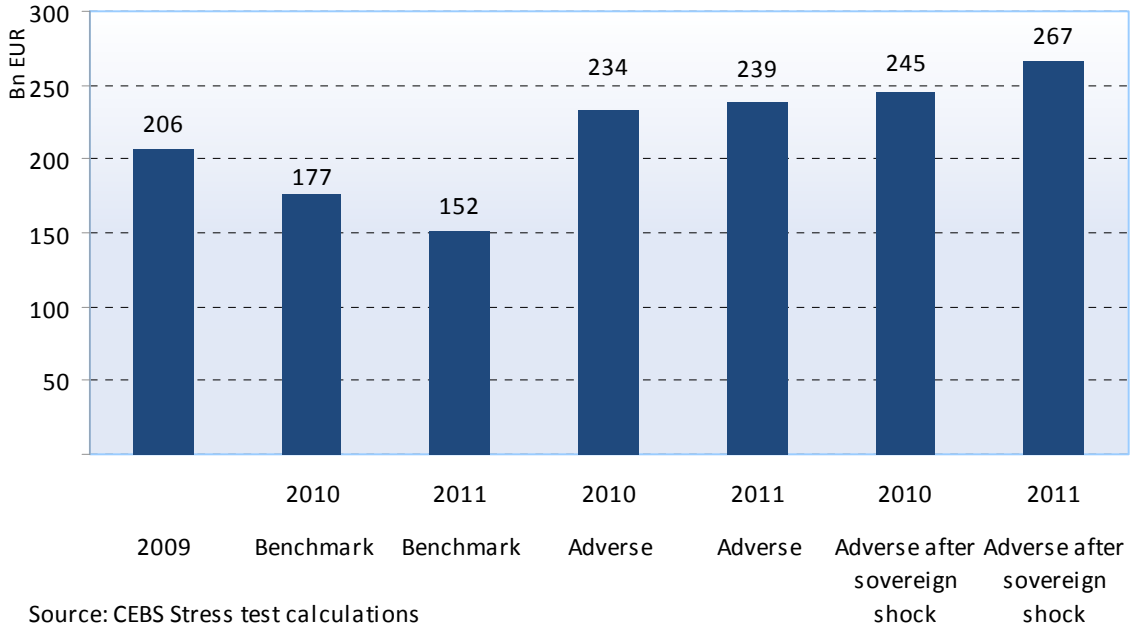
86. In that respect, Section 6 of the report provides information in terms of backtesting of the outcomes of the stress test calculations against the realised figures, as well as an assessment of current trends, based on the banks in the sample that published detailed results for the first quarter of 2010.

87. As regards the major cross-border banks, CEBS will continue to monitor the evolution of banks P&L, also attributed to massive deleveraging programmes conducted by the banks over the last years and rising uncertainty of the sovereign debt market outlook, in the context of its regular micro-prudential assessments of risks and vulnerabilities facing the EU banking sector.

88. Focusing on the aggregate level of impairments (see Chart 9), one can see a decrease of impairment charges under the benchmark scenario compared to the level of 2009, which is consistent with the assumption of a mild recovery.

89. Under the adverse scenario, on the contrary, following the assumed deterioration of the operating environment, the impairment charges rise under the adverse scenario before sovereign shock to a total of 472.8 bn € over 2 years (2010 and 2011). Taking into account a further impact of the sovereign shock on impairments in the banking book (38.9 bn €), total impairments reach a total of 511.8 bn € over 2 years.

Chart 9. Evolution of aggregate impairment charges, including AFS equity and excluding trading losses



Source: CEBS Stress test calculations

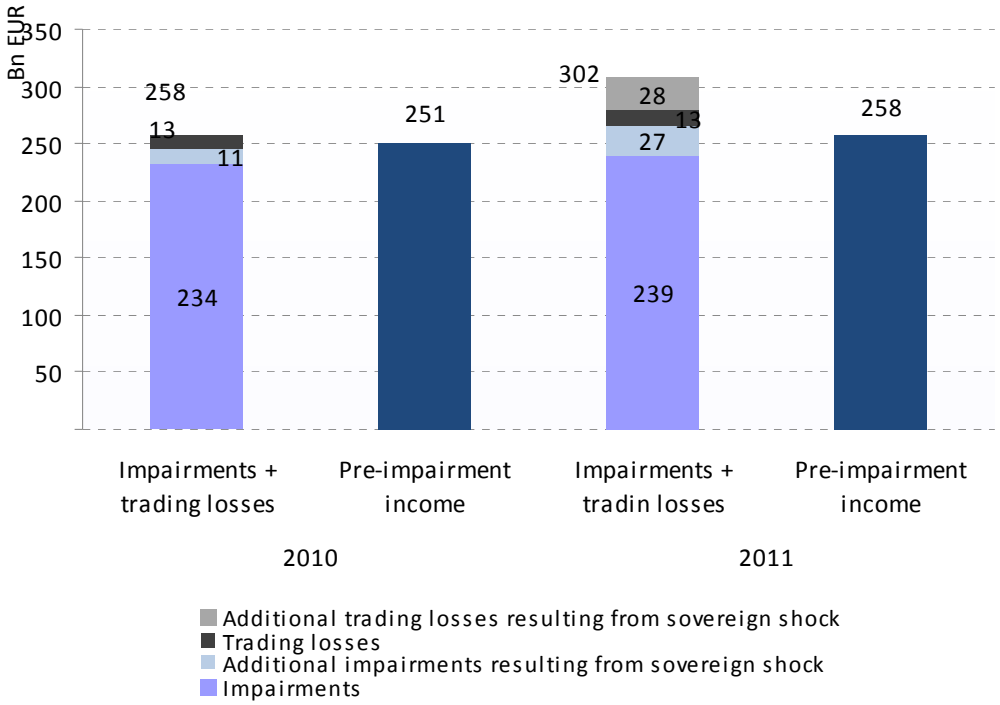
90. The impact of the trading losses before sovereign shock can be considered as limited, on aggregate leading to 25.9 bn € under the adverse scenario before sovereign shock. The application of haircuts to the sovereign exposures in the trading book (28.2 bn €) leads to further aggregate losses under the adverse scenario, with a total of 54.1 bn € losses in the trading book over two years under the adverse scenario after sovereign shock.

5.4 Total loss estimates from the stress and observed loss rates

91. This section provides a summary of total loss estimates coming from the application of macro-economic scenarios, including sovereign shock, as opposed to the level of pre-impairment income generated by the sample of institutions in the macro-economic environment set by the scenarios. The discussion is further supported by the analysis of the evolution of loss rates.

92. As can be seen from Chart 10, as a result of the adverse scenario including the sovereign shock, total estimated losses of 91 banks in 2010 would reach 258.0 bn € as opposed to 250.3 bn € of pre-impairment income estimated under this scenario for 2010. In 2011, total losses would reach 307.8 bn € compared to 257.7 bn € of pre-impairment income. Over the two-year time horizon, total cumulative losses from the stress test would reach 565.9 bn €

Chart 10. Contribution of different components to aggregate Tier 1 ratio under adverse scenario, including sovereign shock



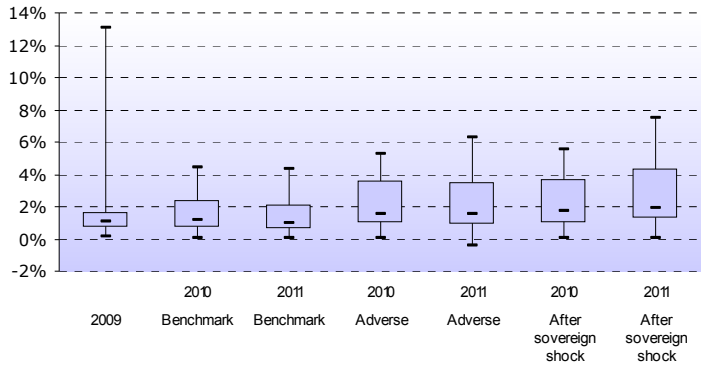
Source: CEBS stress test calculations

93. In order to better understand the impact of the stress scenarios one needs to assess the loss rates representing the share of impairment losses to total corporate and retail exposures in available-for-sale, held-to-maturity and loans and receivables portfolios.

94. Chart 12 below presents the distribution of loss rates in corporate portfolios under the benchmark and adverse scenarios, compared to the actual loss rates of 2009 and Chart 13 provides the same information for the retail portfolios.

Chart 11. Distribution of corporate loss rates

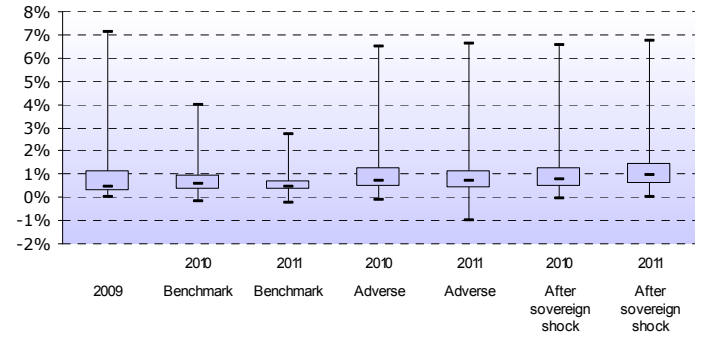
(min, max, interquartile distribution, median)



Source: Stress test calculations

Chart 12. Distribution of retail loss rates

(min, max, interquartile distribution, median)



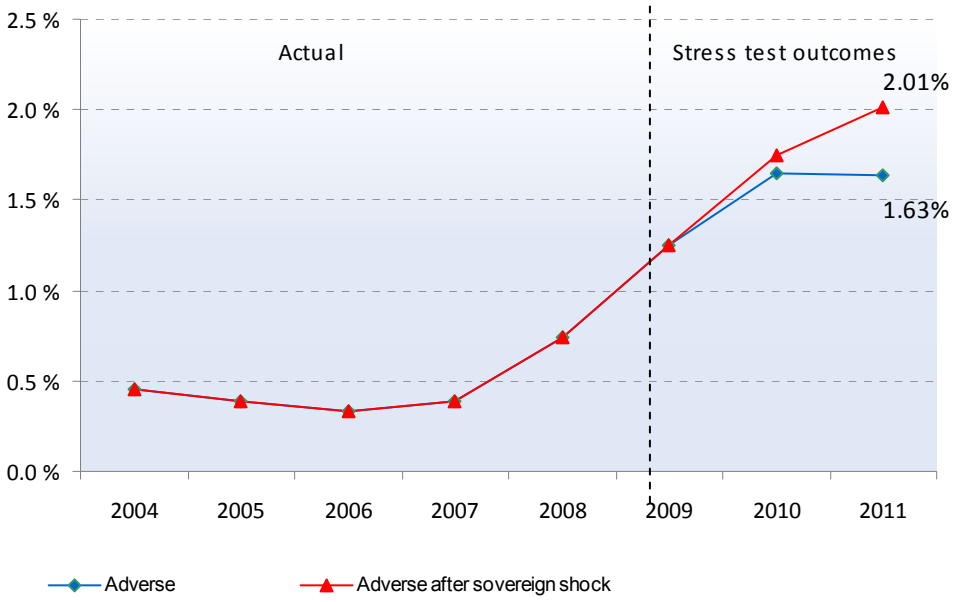
Source: Stress test calculations

95. As can be noted from the chart the distribution of corporate loss rates significantly widens under the adverse and post sovereign shock scenarios compared to the original level of 2009.

96. As regards the loss rates on retail exposures as expected, on average they are lower compared to the corporate related losses with a mean loss rate varying between 0.8% in 2009 and 1.3% in 2011 after the sovereign shock add-on.

97. Chart 13 presents the evolution of the aggregate loss rates computed for the adverse scenario, putting them into the historical perspective, The Chart demonstrate the severity of the exercise, when the 2010 and 2011 estimates are compared with the situation as of end 2009, where the GDP growth was largely negative (-4.2%).

Chart 13. Evolution of historical average loss rates compared to loss rates observed in the stress test



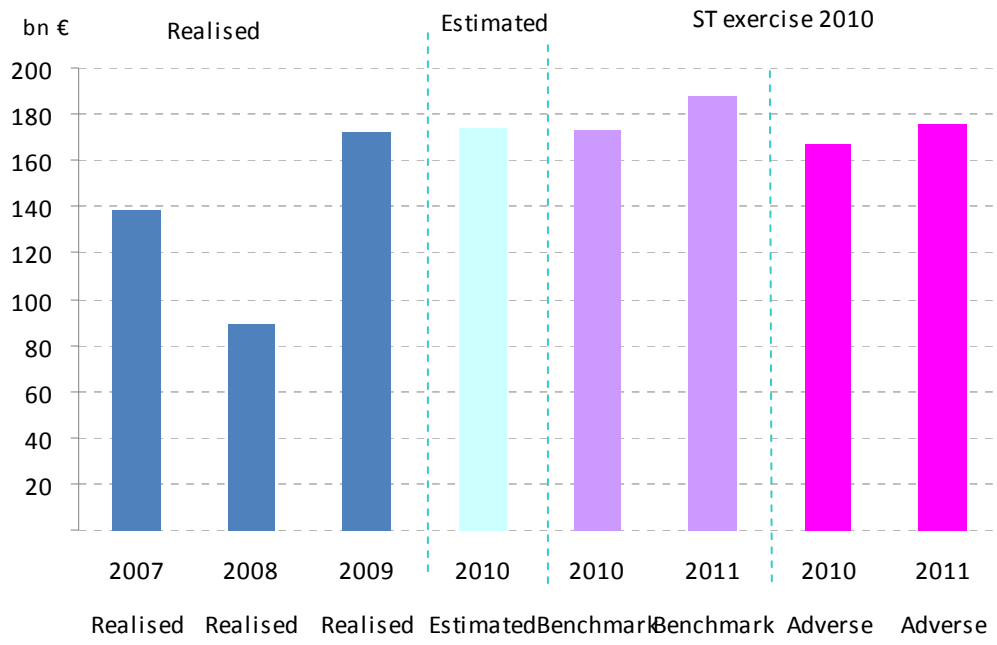
Source: Public disclosures up to 2009, 2010-2011 Stress test calculations

6. Comparison of key financial indicators with realised figures

98. In this section CEBS provides comparisons between the results of the stress test with realised figures observed in 2007-2009 and estimation for 2010 based on the published results for the first quarter 2010. The comparison is provided for a sub-sample of 50 banks, for which quarterly financial information is available in the public domain.

99. As regards pre-impairment income (see Chart 15), the realised figure in 2009 was at the same level as the annualised trend for 2010 (based on Q1 2010 data), as well as the result of the benchmark scenario for 2010.

Chart 14. Comparison of pre-impairment income

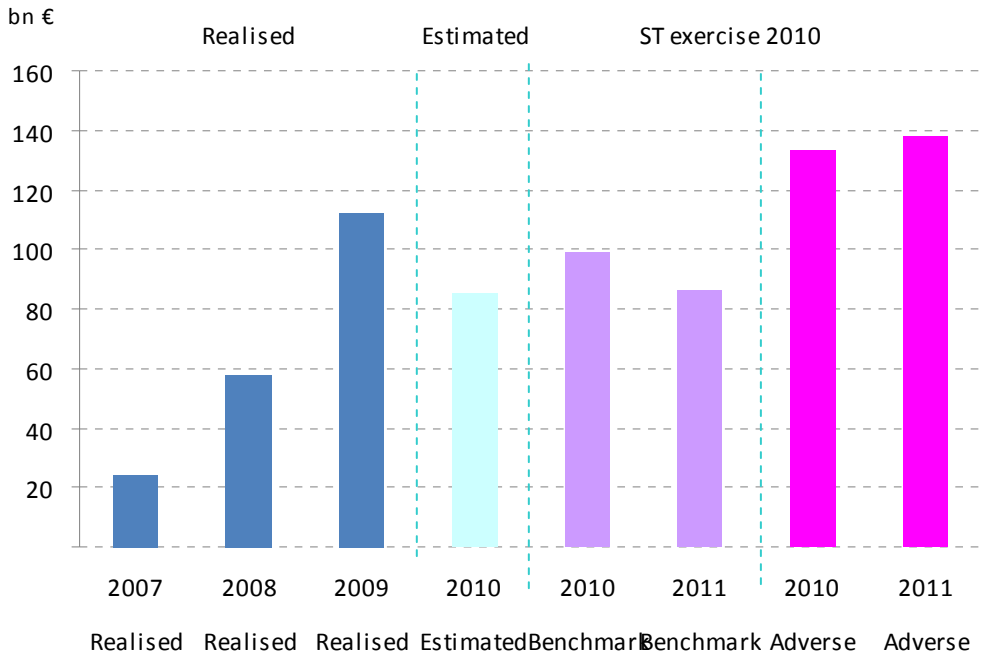


Source: Stress test calculations. Sample of 50 banks,

100. The level of pre-impairment income under the adverse scenarios stays very close to the realised figures for 2009, which suggests the relative resilience of banks' income to shocks (see the developments in paragraph 85).

101. Looking at the comparison of impairment charges made for the same sub-sample of 50 banks (see Chart 16) one can see that after a peak reached in 2009, the trend of impairment charges, based on first quarter figures, tends to drop in 2010. The impairment charges estimated under the benchmark scenario for 2010 remain higher than the realised trend observed for 2010. Impairment charges under the adverse scenario are higher than the peak observed in 2009.

Chart 15. Comparison of impairment charges, including sovereign shocks



Source: Stress test calculations. Sample of 50 banks.

102. These charts suggest no immediate concern on the aggregate level of impairment and profit assumptions embedded in the results of the exercise. However, given its tasks and responsibilities, CEBS will continue monitoring the developments for the sub-set of major cross-border banking groups in that respect, as part of its regular micro-prudential risk assessment.

7. General follow-up actions

103. The 2010 EU-wide stress test exercise coordinated by CEBS and conducted in cooperation with the ECB, the EU commission and the national supervisory authorities of 20 Member States is the second coordinated stress test exercise in Europe, involving a sample of 91 major cross-border banking groups and domestic credit institutions covering at least 50% of total assets in every EU Member State, on a consolidated basis.

104. There are significant differences in the size, complexity and risk profiles of the institutions in the sample, as well as in the extent of their reliance on government support measures. Against this background, the aggregate results cannot be necessarily directly extrapolated to the individual conditions of institutions in the sample, nor to the general financial conditions of all banks operating in Europe.

105. CEBS supports, in particular, the greater transparency of this exercise, given the specific market circumstances under which banks currently operate. We therefore welcome the publication of banks' individual results, particularly their respective capital positions and loss estimates under an adverse scenario, as well as detailed information on banks' exposures to

EU/EEA central and local government debt. Such disclosures ensure transparency regarding conditions in the EU banking sector.

106. Based on the results of the EU-wide stress testing exercise, 7 institutions would fall bellow the threshold of 6% of the Tier 1 capital adequacy ratio under the adverse scenario including sovereign shock. The 6% threshold has been set up exclusively for the purpose of this exercise.

107. With respect to the situation of individual institutions that fail to meet the threshold for this stress test exercise, the competent national authorities are in close contact with the bank in question to assess the results of the test and their implications, in particular any potential need for recapitalization.

108. The banks are expected to propose a plan to address the weaknesses that have been revealed by the stress test. The plan will have to be implemented within a given period of time, in agreement with the supervisory authority.

109. More information on the individual outcomes and follow-up actions, where necessary, is provided by banks and/or national supervisory authorities participating in the exercise.

110. CEBS regards this exercise as a very positive development and a move towards greater convergence of supervisory stress testing practices. Part of the mandate of CEBS is to undertake on a periodic basis these EU-wide stress testing exercises. CEBS will continue with testing the resilience of the EU banking sector by means of periodic EU wide and thematic risk assessments. It will also continue its work on improving convergence in supervisory practices across Europe by addressing the topics both from a policy and practical perspective.

111. It should be noted that CEBS has recently issued draft Guidelines on stress testing[10] and risk assessment[11], which aim at further enhancing the convergence of supervisory approaches in both areas.

[10] CEBS Guidelines on stress testing currently available as consultation paper (http://www.c-ebs.org/documents/Publications/Consultation-papers/2009/CP32/CP32.aspx), final text will be published later in August 2010.

[11] Guidelines for the joint assessment of the elements covered by the supervisory review and evaluation process and the joint decision regarding the capital adequacy of cross border groups (CP39) currently available as a consultation paper (see: http://www.c-ebs.org/documents/Publications/Consultation-papers/2010/CP39/CP39.aspx) and will be finalised toward the end of 2010.

Annex 1. List of banks covered by the 2010 EU-wide stress test exercise

Country	Name of the institution
Austria	ERSTE GROUP BANK AG
	RAIFFEISEN ZENTRALBANK OESTERRREICH AG (RZB)
Belgium	KBC BANK NV
	DEXIA
Cyprus	MARFIN POPULAR BANK PUBLIC CO LTD
	BANK OF CYPRUS PUBLIC CO LTD
Denmark	DANSKE BANK
	JYSKE BANK
	SYDBANK
Finland	OP-POHJOLA GROUP
France	BNP PARIBAS
	CREDIT AGRICOLE GROUP
	BPCE GROUP
	SOCIETE GENERALE
Germany	DEUTSCHE BANK AG
	COMMERZBANK AG
	HYPO REAL ESTATE HOLDING AG
	LANDESBANK BADEN-WÜRTTEMBERG
	BAYERISCHE LANDESBANK
	DZ BANK AG DT. ZENTRAL-GENOSSENSCHAFTSBANK
	NORDDEUTSCHE LANDESBANK -GZ-
	DEUTSCHE POSTBANK AG
	WESTLB AG
	HSH NORDBANK AG
	LANDESBANK HESSEN-THÜRINGEN GZ
	LANDESBANK BERLIN AG
	DEKABANK DEUTSCHE GIROZENTRALE
	WGZ BANK AG WESTDT. GENO. ZENTRALBK
Greece	NATIONAL BANK OF GREECE
	EFG EUROBANK ERGASIAS S.A.
	ALPHA BANK
	PIRAEUS BANK GROUP
	AGRICULTURAL BANK OF GREECE S.A. (ATEbank)
	TT HELLENIC POSTBANK S.A.
Hungary	OTP BANK NYRT.
	FHB JELZÁLOGBANK NYILVÁNOSAN MŰKÖDŐ RT
Ireland	BANK OF IRELAND
	ALLIED IRISH BANKS PLC
Italy	UNICREDIT
	INTESA SANPAOLO
	MONTE DEI PASCHI DI SIENA
	BANCO POPOLARE - S.C.
	UNIONE DI BANCHE ITALIANE SCPA (UBI BANCA)
Luxembourg	BANQUE ET CAISSE D'EPARGNE DE L'ETAT
	BANQUE RAIFFEISEN
Malta	BANK OF VALLETTA (BOV)

Country	Name of the institution
Netherlands	ING Bank
	RABOBANK GROUP
	ABN/ FORTIS BANK NEDERLAND (HOLDING) N.V
	SNS BANK
Poland	POWSZECHNA KASA OSZCZĘDNOŚCI BANK POLSKI S.A. (PKO BANK POLSKI)
Portugal	CAIXA GERAL DE DEPÓSITOS
	BANCO COMERCIAL PORTUGUÊS BANCO COMERCIAL PORTUGUÊS S.A. (BCP OR MILLENNIUM BCP)
	ESPÍRITO SANTO FINANCIAL GROUP S.A. (ESFG)
	BANCO BPI
Slovenia	NOVA LJUBLJANSKA BANKA (NLB)
Spain	GRUPO SANTANDER
	GRUPO BBVA
	JUPITER: CAJA DE AHORROS Y MONTE DE PIEDAD DE MADRID (CAJA MADRID); CAJA DE AHORROS DE VALENCIA, CASTELLÓN Y ALICANTE (BANCAJA); CAIXA DÉSTALVIS LAIETANA; CAJA INSULAR DE AHORROS DE CANARIAS; CAJA DE AHORROS Y MONTE DE PIEDAD DE AVILA; CAJA DE AHORROS Y MONTE DE PIEDAD DE SEGOVIA; CAJA DE AHORROS DE LA RIOJA.
	CAIXA: CAJA DE AHORROS Y PENSIONES DE BARCELONA (LA CAIXA); CAIXA DÉSTALVIS DE GIRONA.
	BASE: CAJA DE AHORROS DEL MEDITERRÁNEO (CAM); CAJA DE AHORROS DE ASTURIAS; CAJA DE AHORROS DE SANTANDER Y CANTABRIA; CAJA DE AHORROS Y MONTE DE PIEDAD DE EXTREMADURA.
	BANCO POPULAR ESPAÑOL, S.A.
	BANCO DE SABADELL, S.A.
	DIADA: CAIXA DÉSTALVIS DE CATALUNYA; CAIXA DÉSTALVIS DE TARRAGONA: CAIXA DÉSTALVIS DE MANRESA.
	BREOGAN: CAJA DE AHORROS DE GALICIA; CAIXA DE AFORROS DE VIGO, OURENSE E PONTEVEDRA (CAIXANOVA).
	MARE NOSTRUM: CAJA DE AHORROS DE MURCIA; CAIXA DÉSTALVIS DEL PENEDES; CAJA DE AHORROS Y MONTE DE PIEDAD DE LAS BALEARES (SA NOSTRA); CAJA GENERAL DE AHORROS DE GRANADA.
	BANKINTER, S.A.
	ESPIGA: CAJA DE AHORROS DE SALAMANCA Y SORIA (CAJA DUERO); CAJA DE ESPAÑA DE INVERSIONES CAJA DE AHORROS Y MONTE DE PIEDAD (CAJA ESPAÑA).
	BANCA CIVICA: CAJA DE AHORROS Y M.P. DE NAVARRA, CAJA DE AHORROS MUNICIPAL DE BURGOS Y CAJA GENERAL DE AHORROS DE CANARIAS.
	CAJA DE AHORROS Y MONTE DE PIEDAD DE ZARAGOZA, ARAGON Y RIOJA (IBERCAJA).
	M.P. Y C.A. DE RONDA, CADIZ, ALMERIA, MALAGA, ANTEQUERA Y JAEN (UNICAJA)
	BANCO PASTOR, S.A.
	CAJA SOL: MONTE DE PIEDAD Y CAJA DE AHORROS SAN FERNANDO DE

Country	Name of the institution
	HUELVA, JEREZ Y SEVILLA (CAJA SOL); CAJA DE AHORRO PROVINCIAL DE GUADALAJARA.
	BILBAO BIZKAIA KUTXA,AURREZKI KUTXA ETA BAHITETXEA
	UNNIM: CAIXA DÉSTALVIS DE SABADELL; CAIXA DÉSTALVIS DE TERRASSA; CAIXA DÉSTALVIS COMARCAL DE MANLLEU.
	CAJA DE AHORROS Y MONTE DE PIEDAD DE GIPUZKOA Y SAN SEBASTIAN (KUTXA).
	CAJA3: CAJA DE AHORROS Y MONTE DE PIEDAD DEL CÍRCULO CATÓLICO DE OBREOS DE BURGOS (CAJA CÍRCULO); MONTE DE PIEDAD Y CAJA GENERAL DE AHORROS DE BADAJOZ; CAJA DE AHORROS DE LA INMACULADA DE ARAGÓN.
	CAJA DE AHORROS Y MONTE DE PIEDAD DE CORDOBA (CAJASUR).
	BANCA MARCH, S.A.
	BANCO GUIPUZCOANO, S.A.
	CAJA DE AHORROS DE VITORIA Y ALAVA (CAJA VITAL KUTXA).
	CAJA DE AHORROS Y MONTE DE PIEDAD DE ONTINYENT.
	COLONYA - CAIXA D'ESTALVIS DE POLLENSA.
Sweden	NORDEA BANK
	SKANDINAVISKA ENSKILDA BANKEN AB (SEB)
	SVENSKA HANDELSBANKEN
	SWEDBANK
UK	ROYAL BANK OF SCOTLAND (RBS)
	HSBC HOLDINGS PLC
	BARCLAYS
	LLOYDS BANKING GROUP

Annex 2. ECB Technical note on the macro-economic scenarios and reference risk parameters

SEC/GenC/X/10/77.final.R - SEC/GovC/X/10/289.final.R

23 July 2010

TECHNICAL NOTE ON THE MACROECONOMIC SCENARIOS AND REFERENCE RISK PARAMETERS

INTRODUCTION

This note presents the main technical features of the stress test exercise that has been conducted by the CEBS and national supervisory authorities, in cooperation with the ECB. ECB staff provided the macroeconomic scenarios (benchmark and adverse) and the corresponding key micro parameters (probabilities of default (PDs), loss given default (LGDs), and haircuts for holdings of government bonds in the trading book). The changes in these parameters under the adverse scenario represent a substantial stress for the European banks.

The "benchmark" scenario is on average not very far from currently available forecasts, while the "adverse" one, taking stock of prevailing tail risks – especially related to the sovereign debt situation – is in turn substantially below these forecasts.

In addition, the severity of the stress arises from the combination of the increase in the haircuts and especially from the increase in the PDs and LGDs under the adverse scenario. The reference haircuts were computed from changes in the prices of 5-year sovereign bonds. The impact of the increase in the haircuts on government debt in the trading book is mitigated by the fact that banks' holdings of government securities are primarily in the banking book, and the average maturity of these securities is only around 5 years. On the other hand, the increase in PDs and LGDs affects all portfolios in the

banking book and is substantial. For instance, comparing the end-2009 values with those under the adverse scenario in 2011, PDs of corporate assets double or triple in some countries, while for the euro area they increase by over 61%, on average.

1. The Macroeconomic Scenarios

For the purpose of conducting the stress-test exercise, two macroeconomic scenarios, covering the period 2010-11, were developed: a "benchmark" scenario (see Table 1), and an "adverse" scenario (see Table 2), taking stock of prevailing tail risks, especially related to the sovereign debt situation. The adverse scenario GDP, cumulated over 2010-11, is close to three percentage points lower than the benchmark one for the European Union (EU) and for the euro area as a whole.

The benchmark scenario is mainly based on European Commission (EC) forecast numbers that were available when work on the CEBS exercise began in March 2010, i.e., the Autumn 2009 European Economic Forecast (November 2009) and the EC Interim Forecast (February 2010). This was complemented with more up-to-date information on country forecasts in cases of significant changes. Assumptions for market interest rates as well as for exchange rates were set in line with the methods employed by the EC to construct their forecast.

In this scenario, the slow recovery initiated in 2010 is expected to gain further momentum, with e.g. GDP growth for the euro area reaching 1.5% in 2011 after 0.7% in 2010 – largely in response to the ongoing world trade pick-up. At the same time, unemployment remains high – even increasing in a number of countries, owing to the lagged effects of the past activity slowdown. Consumer price inflation is assumed to be contained and stable overall, as the upswing occurs in economies where the degree of slack is substantial. There are however a number of countries where inflation declines or increases significantly – reflecting their cyclical positions or fiscal policy measures.

The scenario involves somewhat more contained dynamics in 2010, while by contrast it appears generally on the upside for 2011. On balance over the two years, differences with currently available forecasts are limited.

The adverse scenario[12] has two main features, a global confidence shock, that affects demand worldwide, and an EU-specific shock to the yield-curve, originating from a postulated aggravation of the sovereign debt crisis. The latter impact is differentiated across countries, taking into account their respective situation.

[12] In all tables in this note, the adverse scenario includes the sovereign risk.

The global confidence shock occurs in a context of downgraded employment and profit expectations worldwide. It affects both private investment and consumption, through a lasting downward shock to these variables, cumulating overall to some 2 percentage points of GDP points over the horizon, concentrated over the second half of 2010 and the first quarter of 2011. The EU is directly affected by this confidence shock and by the effect on exports of the implied lower world demand.

In addition, related to prevailing sovereign debt risks, a common upward shift in the yield curve was applied for each country in the EU (reaching 125 basis points for the three-month rates and 75 basis points for the 10-year rates at end-2011), supplemented with country-specific upward shocks to long-term government bond yields (overall amounting to 70 basis points at end-2011 for the euro area). The rise in short-term rates reflects an assumption of tensions in the interbank market – as was seen during earlier financial turmoil episodes. The country-specific bond yield shock in turn accounts for differentiated fiscal situations and related market perceptions.

Accordingly, the distribution of the country-specific upward shock to long-term interest rates across countries reflects two elements. First, a widening of spreads in line with market developments since the beginning of May 2010. Second, an additional widening of spreads reflecting an average additional increase of 30 basis points. Its impact on each country's long-term bond yields was determined in proportion to the volatility of 10-year sovereign bond spreads that was observed between December 2009 and June 2010. Taken together, the country-specific shock implies an additional average increase of 70 basis points (see Table 3). To underline the importance of the combined shocks affecting interest rates, it is worthwhile to mention that, for example, they result in 2011 in 10-year government bond yields of 4.7% for Germany and 14.7% for Greece (see Table 7).

The macroeconomic effects of these assumptions were calibrated using econometric models, also taking into account trade spillovers across EU countries. GDP growth is particularly affected in the adverse scenario, and is lower than in the benchmark scenario for all countries, on average by about one percentage point in 2010 and by close to two percentage points in 2011. The unemployment rate is higher, especially in 2011 (e.g. by 0.6 percentage point in the euro area), while inflation is significantly lower in 2011 (e.g. by 0.4 percentage point for the euro area). The adverse scenario generally appears to be substantially below available forecasts and projections, thereby corresponding to the materialisation of downside risks to economic growth prospects.

Table 1: Macroeconomic scenarios – benchmark scenarios

2010 - Benchmark	GDP at constant prices	Unemployment	Short-term interest rates	Long-term interest rates	Nominal USD exchange rate	CPI
Austria	1.1	6.0	1.2	4.0	0.7	1.3
Belgium	0.6	9.9	1.2	4.0	0.7	1.3
Cyprus	0.1	6.6	1.2	4.7	0.7	3.1
Finland	0.9	10.2	1.2	3.5	0.7	1.6
France	1.2	10.2	1.2	3.8	0.7	1.2
Germany	1.2	9.2	1.2	3.5	0.7	0.7
Greece	-4.1	11.7	1.2	6.8	0.7	1.4
Ireland	-1.4	14.0	1.2	5.1	0.7	-0.6
Italy	0.7	8.7	1.2	4.4	0.7	1.7
Luxembourg	1.1	7.3	1.2	3.8	0.7	1.8
Malta	0.7	7.4	1.2	4.5	0.7	2.0
Netherlands	0.9	5.4	1.2	3.8	0.7	0.8
Portugal	0.5	11.1	1.2	4.7	0.7	1.3
Slovakia	1.9	12.8	1.2	4.1	0.7	1.9
Slovenia	1.3	8.3	1.2	3.9	0.7	1.7
Spain	-0.6	20.0	1.2	4.4	0.7	1.1
Euro area	**0.7**	**10.7**	**1.2**	**3.5**	**0.7**	**1.1**
Bulgaria	0.4	8.8		6.9	1.4	2.4
Czech R.	1.4	8.1		4.7	18.7	1.4
Denmark	1.5	5.8	2.1	3.8	5.0	1.5
Estonia	1.0	16.0		12.1	11.5	1.3
Hungary	0.9	11.8		8.4	196.5	4.9
Latvia	-3.3	20.4		12.7	0.5	-3.4
Lithuania	0.5	17.1		12.1	2.5	0.4
Poland	2.9	10.4	4.8	6.3	2.9	1.6
Romania	-0.7	8.1		9.4	3.0	4.3
Sweden	1.4	10.2	1.4	3.6	7.0	1.7
UK	0.6	8.7	1.5	4.3	0.6	2.4
Rest of the EU	**1.0**	**9.2**				**2.3**

2011 - Benchmark	GDP at constant prices	Unemployment	Short-term interest rates	Long-term interest rates	Nominal USD exchange rate	CPI
Austria	1.5	5.7	2.1	4.3	0.7	1.6
Belgium	1.5	10.3	2.1	4.4	0.7	1.5
Cyprus	1.3	6.7	2.1	5.1	0.7	2.5
Finland	1.6	9.9	2.1	3.9	0.7	1.5
France	1.5	10.0	2.1	4.1	0.7	1.4
Germany	1.7	9.3	2.1	3.8	0.7	1.0
Greece	-2.6	14.1	2.1	7.1	0.7	2.1
Ireland	2.6	13.2	2.1	5.4	0.7	1.0
Italy	1.4	8.7	2.1	4.7	0.7	2.0
Luxembourg	1.8	7.7	2.1	4.2	0.7	1.7
Malta	1.6	7.3	2.1	4.9	0.7	2.2
Netherlands	1.6	6.0	2.1	4.1	0.7	1.2
Portugal	0.2	11.9	2.1	5.1	0.7	1.4
Slovakia	2.6	12.6	2.1	4.6	0.7	2.5
Slovenia	2.0	8.5	2.1	4.4	0.7	2.0
Spain	1.0	20.5	2.1	4.7	0.7	2.0
Euro area	**1.5**	**10.9**	**2.1**	**3.8**	**0.7**	**1.5**
Bulgaria	4.0	8.0		6.9	1.5	2.5
Czech R.	1.8	8.5		4.4	18.8	1.8
Denmark	1.8	5.6	2.9	4.1	5.0	1.8
Estonia	4.0	14.5		12.1	11.6	1.1
Hungary	3.2	11.9		6.2	197.2	3.0
Latvia	3.9	18.2		12.7	0.5	0.2
Lithuania	3.1	15.9		12.1	2.6	1.7
Poland	2.4	11.5	5.7	6.3	2.9	1.7
Romania	3.6	8.8		9.4	3.1	2.4
Sweden	2.1	10.1	2.8	3.9	7.0	1.7
UK	1.9	8.0	3.0	4.7	0.6	1.6
Rest of the EU	**2.2**	**8.9**				**1.7**

Source: ECB calculations.
Note: GDP at constant prices (annual percent change (y-o-y)), Unemployment (as % of the labour force at year-end), Short-term interest rate (Short term interest rates (3M) at year-end - Euribor or Libor depending on the country), Long term interest rates (Long term interest rates (10Y) at year-end - Treasuries), Nominal USD exchange rate (Level of nominal USD exchange rate to the respective currency at year-end), CPI (% change from previous year (y-o-y)).

Table 2: Macroeconomic scenarios – adverse scenario, including sovereign risk

2010 - Adverse	GDP at constant prices	Unemployment	Short-term interest rates	Long-term interest rates	Nominal USD exchange rate	CPI
Austria	-0.1	6.1	2.1	4.5	0.7	1.5
Belgium	-0.3	9.9	2.1	4.8	0.7	1.2
Cyprus	-0.7	6.7	2.1	5.4	0.7	3.1
Finland	-0.1	10.4	2.1	4.0	0.7	1.3
France	0.7	10.2	2.1	4.3	0.7	1.2
Germany	0.2	9.2	2.1	4.0	0.7	0.7
Greece	-4.6	11.8	2.1	11.8	0.7	1.4
Ireland	-2.1	14.1	2.1	6.7	0.7	-0.6
Italy	-0.3	8.8	2.1	5.4	0.7	1.7
Luxembourg	-0.1	7.3	2.1	4.6	0.7	1.8
Malta	-0.8	7.6	2.1	5.1	0.7	1.8
Netherlands	0.0	5.5	2.1	4.3	0.7	0.8
Portugal	-0.3	11.3	2.1	7.0	0.7	1.3
Slovakia	0.8	12.9	2.1	4.5	0.7	1.8
Slovenia	0.7	8.5	2.1	4.4	0.7	1.8
Spain	-1.4	20.3	2.1	5.8	0.7	1.0
Euro area	**-0.2**	**10.8**	**2.1**	**4.4**	**0.7**	**1.1**
Bulgaria	-0.7	9.2		8.0	1.4	2.0
Czech R.	0.9	8.6		5.8	18.7	0.9
Denmark	0.8	6.0	3.0	4.4	5.0	1.2
Estonia	-0.1	16.4		13.2	11.5	0.9
Hungary	-0.2	12.6		9.5	196.5	4.8
Latvia	-4.2	20.7		13.8	0.5	-3.9
Lithuania	-0.9	17.6		13.2	2.5	-0.2
Poland	2.1	10.7	5.7	7.4	2.9	2.5
Romania	-1.8	8.5		10.5	3.0	3.9
Sweden	0.9	10.2	2.4	4.3	7.0	1.3
UK	-0.2	9.1	2.4	5.0	0.6	2.4
Rest of the EU	**0.2**	**9.6**				**2.3**

2011 - Adverse	GDP at constant prices	Unemployment	Short-term interest rates	Long-term interest rates	Nominal USD exchange rate	CPI
Austria	-1.2	6.1	3.3	5.3	0.7	1.0
Belgium	-0.6	11.1	3.3	5.6	0.7	0.6
Cyprus	-0.1	7.3	3.3	6.3	0.7	2.1
Finland	-0.6	11.4	3.3	4.9	0.7	0.1
France	-0.1	10.5	3.3	5.1	0.7	1.0
Germany	-0.6	9.7	3.3	4.7	0.7	0.6
Greece	-4.3	14.8	3.3	14.7	0.7	2.1
Ireland	1.0	13.7	3.3	7.8	0.7	0.7
Italy	-0.3	9.3	3.3	6.3	0.7	1.7
Luxembourg	-0.8	7.7	3.3	5.5	0.7	1.4
Malta	-1.2	8.2	3.3	6.0	0.7	1.6
Netherlands	-1.0	7.0	3.3	5.1	0.7	1.0
Portugal	-2.3	12.8	3.3	8.5	0.7	0.9
Slovakia	-0.6	13.2	3.3	5.4	0.7	1.4
Slovenia	0.6	9.1	3.3	5.3	0.7	1.9
Spain	-1.2	21.6	3.3	6.8	0.7	1.2
Euro area	**-0.6**	**11.5**	**3.3**	**5.3**	**0.7**	**1.1**
Bulgaria	2.8	8.4		8.0	1.5	0.5
Czech R.	0.6	9.6		5.8	18.8	0.9
Denmark	0.2	6.3	4.1	5.1	5.0	1.2
Estonia	3.0	14.8		13.2	11.6	-1.0
Hungary	1.6	13.2		9.5	197.2	2.5
Latvia	2.5	18.8		13.8	0.5	-3.6
Lithuania	2.4	16.3		13.2	2.6	-2.3
Poland	0.5	12.2	7.0	7.6	2.9	2.3
Romania	2.1	9.2		10.5	3.1	1.2
Sweden	0.9	10.3	4.1	4.9	7.0	1.2
UK	0.1	8.8	4.2	5.7	0.6	0.6
Rest of the EU	**0.5**	**9.6**				**0.9**

Source: ECB calculations.

Note: GDP at constant prices (annual percent change (y-o-y)), Unemployment (as % of the labour force at year-end), Short-term interest rate (Short term interest rates (3M) at year-end - Euribor or Libor depending on the country), Long term interest rates (Long term interest rates (10Y) at year-end - Treasuries), Nominal USD exchange rate (Level of nominal USD exchange rate to the respective currency at year-end), CPI (% change from previous year (y-o-y)).

Table 3: Contribution of the sovereign risk shock to the five-year bond yields in the euro area under the adverse scenario

	Five-year yields			
Country	Benchmark 2011	Adverse 2011	Common upward shift of the yield curves	Country-specific sovereign risk shock
Austria	3.03	4.04	75	25
Belgium	3.23	4.47	75	49
Cyprus	4.07	5.29	75	47
Finland	3.16	4.16	75	25
France	2.94	3.92	75	24
Germany	2.74	3.49	75	0
Greece	6.28	13.87	75	685
Ireland	3.28	5.62	75	158
Italy	3.19	4.80	75	86
Luxembourg	3.23	4.53	75	55
Malta	4.01	5.07	75	31
The Netherlands	2.87	3.82	75	20
Portugal	3.96	7.40	75	268
Slovakia	3.55	4.41	75	10
Spain	3.61	5.78	75	142
Slovenia	3.84	4.80	75	21
Euro area average	**3.15**	**4.60**	**75**	**70**

Source: ECB calculations.
Note: Contributions are expressed in basis points. Due to insufficient data on bond yields of Cyprus, Luxembourg, Malta, Slovakia and Slovenia, a uniform additional widening of 30 basis points was imposed for these five countries.

2. Probabilities of Default and Loss given Default

Estimates of probabilities of default (PD)[13] and loss given default (LGD)[14] parameters were computed at the country level for five main portfolios (financial institutions, sovereign, corporate, consumer credit and retail real estate). For all countries in the exercise, these parameters were computed for both the benchmark and adverse scenarios for 2010 to 2011.[15]

To calculate the PDs and LGDs conditional on the different scenarios, sector-specific regression models[16] were used to link PDs and LGDs with macroeconomic variables. These models provide

[13] The PD describes the likelihood that a loan will not be repaid and that it will fall into default. To calculate the PD for each loan category the credit history of the counterparty as well as the nature of the investment is taken into account. All PD figures in the EU-wide stress test are constructed for non-defaulted exposures.

[14] The LGD is the amount of funds that is lost by a bank or other financial institution when a borrower defaults on a loan.

[15] In particular, PDs and LGDs increase as a result of the sovereign shock included in the adverse scenario, with the only exception of the sovereign portfolio in the banking book, for consistency with the assumption of no government default.

[16] The regression models take account of dynamic interaction between the variables that drive PDs and LGDs. The variables considered in the models were GDP, unemployment, long-term interest rates and sectoral PD and LGD covering the period from 1991 until end-2009.

estimates of sector-specific elasticities of PDs and LGDs with respect to changes in macroeconomic variables – conditional on shocks to the system. In the models, three propagation channels for the shocks were identified: the demand channel; the supply channel and the long-term borrowing costs channel. To obtain country-specific PD and LGD parameters for 2010 and 2011 under the benchmark scenario, these elasticities were multiplied by the projected changes in macroeconomic variables for each country using the PD and LGD levels that were observed at end-2009 as a starting point. Similarly, to obtain PDs and LGDs under the adverse scenario in 2010 and 2011, the differences between the macroeconomic variables in the benchmark and adverse scenarios for each year were multiplied with the elasticities implied by the sector-specific regression models. For the purposes of using these parameters for stress-testing the balance sheets of individual financial institutions, national supervisory authorities were encouraged to use as a starting point their own PD and LGD levels for 2009 and to apply the changes of these parameters in 2010 and 2011 with respect to their values in the benchmark scenario in the respective year according to the outcomes of the ECB models. For some of the largest banks for which a full bottom-up exercise was conducted, together with supervisory authorities, supervisors could decide to allow these banks to feed the common macroeconomic scenarios into the banks' own internal models for the computation of PDs and LGDs.

Regarding the data entered into the ECB models for PDs and LGDs, country-level financial sector PDs were approximated using the Moody's EDFs (expected default frequency) extracted from the Moody's KMV database.[17] Sovereign PDs were derived from CDS spreads. Retail real estate PDs, consumer credit PDs and corporate sector PDs were obtained from the ECB Monetary and Financial Institutions (MFI) database on write-offs, while LGDs were extracted from Moody's LossCalc database assuming a constant PD over time.[18]

To illustrate the severity of the adverse scenario, Chart 1 plots the ranges of changes across all countries in the PDs between the adverse scenario and the end-2009 values over 2010 and 2011, for the four private-sector portfolios sectors considered in the credit risk part of the exercise, and Table 4 shows the corresponding figures for 2011. Chart 2 shows the results of the same exercise as Chart 1, now for the LGD parameters. As seen in both charts, the PDs and LGDs increase substantially across sectors and countries under the adverse scenario compared to end-2009 in both 2010 and 2011. In this regard, it is important to note that the stresses on long-term interest rates that result from the sovereign shock feed through to higher PD and LGD levels.

3. Sovereign bond haircuts

[17] For details see "www.moodyskmv.com".

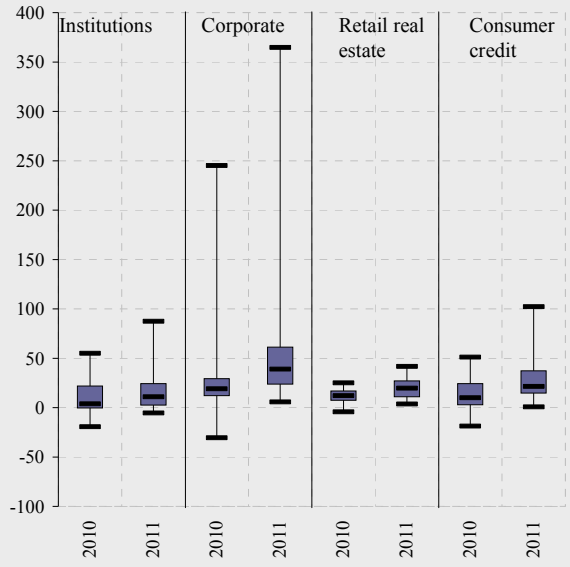
[18] PD and LGD levels for 2009 were calibrated on the basis of results from data collections from national authorities, various surveys conducted by the CEBS and the ECB, and market information.

The increase in bond yields affects the valuation of holdings of government debt in the banks' trading books,[19] and in the exercise its impact is not offset by changes in the valuation of derivative positions (credit derivatives, interest rate swaps, etc.) that are used to hedge the sovereign bond exposures.

For the purposes of estimating valuation haircuts, it was agreed among participating supervisors that a five-year maturity was representative of the approximate duration of sovereign bond holdings held by banks in the EU. Hence, the haircuts for sovereign bonds are computed in two steps, first by estimating

Chart 1: Changes in PDs across sectors - dispersions across countries under the adverse scenario compared to 2009

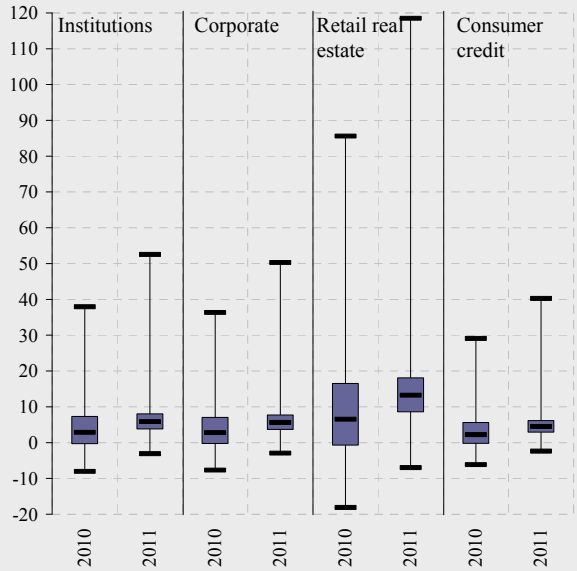
(%, maximum, minimum, interquartile range, median)



Source: ECB calculations.
Note: Box-Whisker plots show the interquartile range of the distribution within the blue box, which includes the median denoted by the black bar. The upper and lower black bars at the extremes illustrate the maximum and the minimum of the distribution.

Chart 2: Changes in LGDs across sectors - dispersions across countries under the adverse scenario compared to 2009

(%, maximum, minimum, interquartile range, median)



Source: ECB calculations.
Note: Box-Whisker plots show the interquartile range of the distribution within the blue box, which includes the median denoted by the black bar. The upper and lower black bars at the extremes illustrate the maximum and the minimum of the distribution.

[19] Since no sovereign defaults are considered in the exercise, there is no impact on holdings of sovereign bonds which are held to maturity in the banking book.

Table 4: Changes in PDs in 2011 across sectors under the adverse scenario, compared to 2009

(%)

	Institutions	Corporate	Retail real estate	Consumer credit
Austria	10.8	47.4	21.9	24.9
Belgium	68.6	112.4	32.0	55.4
Cyprus	14.8	69.4	14.5	34.8
Finland	10.8	46.8	29.2	18.4
France	11.3	31.4	13.0	21.4
Germany	22.6	57.5	36.2	32.1
Greece	45.0	364.8	26.5	74.2
Ireland	-0.5	21.7	3.6	4.9
Italy	10.0	41.6	11.2	21.4
Luxembourg	11.0	71.6	21.8	34.6
Malta	11.9	54.9	18.5	36.0
Netherlands	66.1	88.5	39.0	46.9
Portugal	31.0	147.0	30.3	102.3
Slovenia	0.7	23.9	24.9	4.2
Slovakia	-1.8	7.7	8.0	0.8
Spain	29.4	113.1	17.1	56.3
Euro area	**8.5**	**61.3**	**20.8**	**25.8**
Bulgaria	14.3	12.9	8.5	15.2
Czech Republic	87.4	61.2	41.6	66.7
Denmark	1.9	26.7	5.6	14.7
Estonia	-5.4	5.8	4.5	8.6
Hungary	36.2	35.3	21.5	40.8
Latvia	-1.0	13.1	9.7	15.9
Lithuania	9.5	6.9	12.6	10.8
Poland	58.9	56.0	39.7	62.3
Romania	16.9	19.8	14.9	23.4
Sweden	2.6	32.4	14.5	12.3
UK	0.9	22.6	6.2	13.9
Rest of the EU	**1.6**	**25.0**	**5.5**	**13.7**

Source: ECB calculations.

five-year bond yields, consistent with the assumptions for ten-year yields and then, in a second step, translating these five-year yields into their corresponding sovereign bond prices.

a. Transformation of ten-year yields to five-year yields

The transformation uses the ten-year yields prevailing in the benchmark and adverse scenarios together with the five-year yields that were assumed to prevail in the market at the end of 2009. The changes in five-year bond yields from 2009 to 2010 and to 2011 were set equal to the changes (in basis points) in the ten-year yields. This method was applied for all countries, apart from Germany, which acts as the reference sovereign issuer with the lowest yield in the euro area.[20] The exceptions are the euro area countries where the bond markets are not liquid or where this method would lead to a significant compression of sovereign bond yield spreads vis-à-vis German bonds. For those countries (Cyprus, Malta, Slovakia, and Slovenia) it was assumed that the sovereign bond yield spreads over the German yields would remain constant in the benchmark scenario.

In the adverse scenario, the five-year yields are constructed from the values in the benchmark scenario using the same procedure as followed for the ten-year yields, taking into account both the yield curve flattening and the sovereign risk components. Again Germany, being the reference issuer, is assumed to be unaffected by the elevated sovereign risk.

b. Haircuts on sovereign debt

The haircuts were computed from changes in the prices of five-year sovereign bonds under both scenarios. The parameters that are essential for the pricing of sovereign bonds (coupons, coupon frequencies, coupon and maturity dates) were collected from Bloomberg. In order to eliminate potential distortions which may arise when the bonds that are currently the most actively traded have been issued with very high or very low coupons,[21] all bonds for which market quotes were available on Bloomberg for each country that had a remaining maturity of 4.5 to 6.5 years were priced and the weighted average change in their prices was used to construct the haircut. The weights in the average are based on the outstanding amount of the bonds.

In the pricing of sovereign bonds the discounted cash-flow method was used, in which the yields to maturity under the relevant scenario are used to construct the discount factors. This method takes into account the actual maturity dates, coupon dates and coupon frequencies for the individual bonds.

The haircuts are applied to the market value of bonds at the end of 2009, separately for each year. Therefore, a bond which was worth 100 at the end of 2009 and which has a haircut of 4% in 2010 and

[20] For the computation of haircuts, the country-specific sovereign risk takes Germany as the reference, so that the German yields and haircuts under the adverse scenario are not affected by the elevated sovereign risk (see Table 3).

[21] For example, a bond used in the exercise may have an original maturity of 30 years (i.e. issued in 1985) and a remaining maturity of 5 years. The coupons on such a bond can be out of line with the prevailing yields, thereby distorting the comparisons between the sensitivities of bond prices to changes in the yields.

6% in 2011 should be valued at 96 at the end of 2010 and at 94 at the end of 2010. The haircuts used in the exercise (Table 5) are the future values of the outstanding sovereign bonds. The exercise is supposed to provide the values of the bonds to be booked in the end-2010 and end-2011 accounts. This implies that a 5-year bond, representative of the average maturity of this portfolio by banks, has a duration of only 3 years at the end of 2011, when accounts are closed.

Table 5: Five-year bonds yields and haircuts used in the exercise

	Bond yields					Haircuts			
		Benchmark		Adverse		Benchmark		Adverse	
Country	end-2009	2010	2011	2010	2011	2010	2011	2010	2011
Austria	2.69	2.72	3.03	3.29	4.04	1.0%	2.8%	3.1%	5.6%
Belgium	2.79	2.92	3.23	3.66	4.47	1.4%	3.1%	4.3%	6.9%
Cyprus	3.75	3.58	4.07	4.30	5.29	0.3%	3.2%	3.0%	6.7%
Finland	2.62	2.35	3.16	2.91	4.16	0.0%	3.3%	1.9%	6.1%
France	2.48	2.63	2.94	3.18	3.92	1.5%	3.0%	3.7%	6.0%
Germany	2.42	2.25	2.74	2.81	3.49	0.1%	2.5%	2.3%	4.7%
Greece	4.96	5.97	6.28	11.03	13.87	3.9%	4.3%	20.1%	23.1%
Ireland	2.91	2.97	3.28	4.50	5.62	1.6%	4.2%	8.6%	12.8%
Italy	2.80	2.89	3.19	3.90	4.80	1.2%	2.9%	4.9%	7.4%
Luxembourg	2.79	2.92	3.23	3.72	4.53	1.4%	3.1%	4.3%	6.9%
Malta	3.69	3.52	4.01	4.13	5.07	0.7%	3.6%	2.9%	6.4%
The Netherlands	2.46	2.57	2.87	3.08	3.82	1.1%	2.5%	3.0%	5.2%
Portugal	3.08	3.53	3.96	5.83	7.40	2.3%	3.7%	11.1%	14.1%
Slovakia	3.24	3.07	3.55	3.46	4.41	0.1%	2.4%	1.6%	5.0%
Spain	2.96	3.31	3.61	4.74	5.78	1.3%	4.1%	6.7%	12.0%
Slovenia	3.52	3.35	3.84	3.84	4.80	0.0%	1.1%	1.4%	4.2%
Czech Republic	3.29	3.19	2.87	4.35	4.22	0.0%	2.7%	4.6%	11.4%
Denmark	2.80	2.63	3.12	3.63	4.29	0.0%	1.4%	2.1%	5.2%
Poland	5.96	6.56	6.78	7.72	8.13	2.6%	6.1%	6.4%	12.3%
Sweden	2.41	2.64	2.92	3.32	3.97	1.3%	2.3%	5.0%	6.7%
United Kingdom	2.81	3.67	4.02	4.34	5.07	5.0%	6.9%	7.7%	10.2%
Other non-euro area EU countries						1.3%	4.4%	5.5%	11.8%
EU average						1.3%	3.3%	5.2%	8.5%

Source: ECB calculations.
Note: As discussed in the note, future value haircuts, relative to the market value of the bonds on 31 December 2009, are used in the exercise and are listed in this table.

The haircuts can be decomposed to reflect the three main contributing factors: the overall rise in long-term interest rates foreseen in the benchmark macroeconomic scenario, the common upward shift of the yield curves, and the country-specific sovereign risk shock (Table 6). The decomposition illustrates that for some non-euro area countries, the higher haircuts are driven primarily by the expected increase in long-term interest rates, with the impact of the sovereign risk shock playing a lesser role.

For the purposes of illustration and comparison with the haircuts on five-year bonds, the same calculations were carried out for ten-year bonds (Table 7). The yields used to calculate the haircuts on ten-year bonds are the yields provided as part of the macroeconomic scenario that, where appropriate, include a sovereign risk component. The haircuts on the ten-year bonds are generally higher than the corresponding haircuts on the five-year bonds due to the higher duration. Taking Austria as an example, the haircut on the five-year bonds under the adverse scenario is 5.6%. The corresponding haircut on ten-year bonds is 9.5%. For Greece, the respective figures are 23.1% and 42.2%.

Table 6: Decomposition of the five-year adverse scenario haircuts

Country	Benchmark macroeconomic scenario	Common upward shift of the yield curves	Country-specific sovereign risk shock
Austria	2.8%	2.1%	0.7%
Belgium	3.1%	2.3%	1.5%
Cyprus	3.2%	2.2%	1.4%
Finland	3.3%	2.1%	0.7%
France	3.0%	2.4%	0.7%
Germany	2.5%	2.2%	0.0%
Greece	4.3%	2.1%	16.8%
Ireland	4.2%	2.9%	5.8%
Italy	2.9%	2.1%	2.4%
Luxembourg	3.1%	2.3%	1.5%
Malta	3.6%	2.0%	0.8%
The Netherlands	2.5%	2.1%	0.5%
Portugal	3.7%	2.4%	7.9%
Slovakia	2.4%	2.2%	0.3%
Spain	4.1%	2.4%	5.5%
Slovenia	1.1%	2.4%	0.7%
Czech Republic	2.7%	2.5%	6.2%
Denmark	1.4%	2.4%	1.4%
Poland	6.1%	2.6%	3.5%
Sweden	2.3%	3.0%	1.4%
United Kingdom	6.9%	2.4%	0.9%
Other non-euro area EU countries	4.4%	2.6%	4.8%

Source: ECB calculations.
Note: the decomposition illustrates the impact of the three factors that influence the haircuts on the sovereign bonds under the adverse scenario in 2011. These factors are: the macroeconomic outlook in the benchmark scenario, the upward shift of the bond yields by 75 basis points that is common to all countries, and the country-specific sovereign risk shock (see Section 1 for further details). The rows sum to the total 2011 haircut for each country's bonds under the adverse scenario.

Table 7: An Example: Yields and future value haircuts on ten-year bonds

	Bond yields					Haircuts			
		Benchmark		Adverse		Benchmark		Adverse	
Country	end-2009	2010	2011	2010	2011	2010	2011	2010	2011
Austria	3.94	3.97	4.28	4.54	5.29	0.3%	2.6%	4.7%	9.5%
Belgium	3.91	4.05	4.36	4.79	5.59	1.1%	3.2%	6.7%	11.5%
Cyprus	4.60	4.66	5.08	5.37	6.30	2.6%	5.2%	7.5%	12.4%
Finland	3.73	3.46	3.88	4.02	4.89	0.0%	0.6%	1.9%	7.2%
France	3.65	3.81	4.11	4.35	5.09	1.2%	3.7%	5.4%	10.4%
Germany	3.27	3.50	3.80	3.97	4.72	1.6%	3.5%	5.2%	9.4%
Greece	5.77	6.79	7.09	11.84	14.69	7.1%	8.8%	33.3%	42.2%
Ireland	5.06	5.12	5.43	6.65	7.76	0.5%	2.7%	11.0%	16.6%
Italy	4.29	4.37	4.68	5.39	6.29	0.4%	2.3%	7.7%	12.3%
Luxembourg	3.91	3.80	4.23	4.60	5.53	0.0%	1.4%	4.9%	9.7%
Malta	4.54	4.49	4.92	5.10	5.98	0.2%	3.8%	4.5%	10.3%
The Netherlands	3.71	3.81	4.12	4.32	5.07	0.9%	3.0%	4.6%	9.0%
Portugal	4.20	4.66	5.08	6.96	8.52	3.7%	6.5%	19.4%	26.6%
Slovakia	4.72	4.14	4.57	4.54	5.42	0.0%	0.0%	0.0%	3.9%
Spain	4.03	4.38	4.68	5.81	6.85	4.6%	8.3%	14.6%	21.7%
Slovenia	4.37	3.93	4.36	4.42	5.32	0.0%	0.0%	0.4%	5.8%
Czech Republic	4.80	4.70	4.39	5.84	5.84	0.0%	0.0%	7.4%	12.2%
Denmark	3.62	3.77	4.05	4.45	5.10	1.5%	3.7%	6.3%	10.2%
Poland	6.22	6.82	7.05	7.42	7.65	3.9%	4.7%	7.8%	13.1%
Sweden	3.35	3.58	3.85	4.25	4.90	3.0%	6.0%	8.2%	13.2%
United Kingdom	3.45	4.32	4.66	4.99	5.71	7.3%	9.9%	11.9%	16.2%
Other non-euro area EU countries						1.9%	2.4%	7.6%	12.6%
EU average						1.9%	3.8%	8.3%	13.5%

Source: ECB calculations.
Note: these haircuts were not used in the stress test exercise and are presented only for the sake of comparison.

Annex 3. Evolution of property prices assumed in the exercise

	UK		Germany		France		Netherlands		Spain		Italy		Belgium		Sweden		Austria		Denmark	
Benchmark Scenario	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Commercial Property Prices, % change from previous year (y-o-y)	0.0%	0.0%	0.0%	0.0%	-4.5%	-2.5%	0.0%	0.0%	-20.0%	-15.0%	-0.7%	0.3%	-3.0%	-3.0%	0.0%	-2.5%	2.0%	2.7%	0.2%	2.0%
Residential Property Prices, % change from previous year (y-o-y)	2.0%	1.0%	0.0%	0.0%	-4.5%	-2.5%	0.0%	0.0%	-3.8%	-5.2%	-0.7%	0.3%	-3.0%	-3.0%	5.0%	0.0%	2.0%	2.7%	0.2%	2.0%
Adverse Scenario	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Commercial Property Prices, % change from previous year (y-o-y)	-10.0%	-10.0%	-10.0%	-10.0%	-4.5%	-4.5%	-10.0%	-10.0%	-35.0%	-30.0%	-1.6%	-2.0%	-10.0%	-10.0%	-12.5%	-15.0%	2.0%	2.7%	-7.0%	-1.6%
Residential Property Prices, % change from previous year (y-o-y)	-10.0%	-10.0%	-10.0%	-10.0%	-4.5%	-4.5%	-10.0%	-10.0%	-8.8%	-15.2%	-1.6%	-2.0%	-10.0%	-10.0%	-7.5%	-12.5%	2.0%	2.7%	-7.0%	-1.6%

	Greece		Ireland		Cyprus		Luxembourg		Malta		Portugal		Slovenia		Finland		Hungary		Poland	
Benchmark Scenario	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Commercial Property Prices, % change from previous year (y-o-y)	-3.0%	0.0%	-14.0%	-6.0%	-2.0%	2.0%	n.a.	n.a.	1.6%	2.5%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	-5%	0%	0.0%	0.0%
Residential Property Prices, % change from previous year (y-o-y)	-3.0%	0.0%	-13.0%	-2.5%	-2.0%	2.0%	n.a.	n.a.	1.6%	2.5%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	-10%	-3%	0.0%	0.0%
Adverse Scenario	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Commercial Property Prices, % change from previous year (y-o-y)	-5.0%	-2.0%	-17.0%	-8.0%	-4%	0%	n.a.	n.a.	-2.0%	-2.0%	-5.0%	-5.0%	n.a.	n.a.	-10.0%	-10.0%	-8%	-5%	0.0%	0.0%
Residential Property Prices, % change from previous year (y-o-y)	-5.0%	-2.0%	-17.0%	-5.0%	-4%	0%	n.a.	n.a.	-2.0%	-2.0%	-5.0%	-5.0%	n.a.	n.a.	-5.0%	-5.0%	-13%	-8%	0.0%	0.0%

Notes:
Estimates of the annual changes of the property prices are provided by the national supervisory authorities participating in the exercise and are outside the scope of the macro-economic scenarios. It should be noted that at the current time in Europe there is no consistent reference set of property price data, which can be used for central modelling.

Annex 4. Backtesting of key variables of the macro-economic scenarios

		Realised 2008	Realised 2009	Realised Q1 2010	ST 2009 Benchmark 2009	ST 2009 Adverse 2009	ST 2009 Benchmark 2010	ST 2010 Benchmark 2010	ST 2009 Adverse 2010	ST 2010 Adverse 2010	ST 2010 Benchmark 2011	ST 2010 Adverse 2011
UK	GDP	-0.1	-4.9	0.3	-3.8	-5.0	0.1	0.6	-2.9	-0.2	1.9	0.1
	unemployment	5.6	7.6	7.9	8.2	8.6	9.4	8.7	10.6	9.1	8.0	8.8
DE	GDP	1.3	-4.9	0.2	-5.4	-6.8	0.3	1.2	-3.1	0.2	1.7	-0.6
	unemployment	7.3	7.5	7.3	8.6	8.6	10.4	9.2	11.1	8.2	9.3	9.7
FR	GDP	0.2	-2.6	0.1	-3.0	-3.8	-0.2	1.2	-1.7	0.7	1.5	-0.1
	unemployment	7.8	9.5	9.9	9.6	9.6	10.7	10.2	11.3	10.2	10.0	10.5
NL	GDP	2.0	-4.0	0.3	-3.5	-5.1	-0.4	0.9	-3.3	0.0	1.6	-1.0
	unemployment	2.8	3.4	4.2	3.9	4.2	6.2	5.4	7.8	5.5	6.0	7.0
ES	GDP	0.9	-3.6	0.1	-3.2	-4.2	-1.0	-0.6	-3.9	-1.4	1.0	-1.2
	unemployment	11.3	18.0	19.5	17.3	17.7	20.5	20.0	22.4	20.3	20.5	21.6
IT	GDP	-1.3	-5.0	0.4	-4.4	-5.7	0.1	0.7	-1.7	-0.3	1.4	-0.3
	unemployment	6.7	7.8	8.7	8.8	8.9	9.4	8.7	10.2	8.8	8.7	9.3
BE	GDP	1.0	-3.0	0.1	-3.5	-4.8	-0.2	0.6	-3.3	-0.3	1.5	-0.6
	unemployment	7.0	7.9	8.5	8.5	8.6	10.3	9.9	11.4	9.9	10.3	11.1
SE	GDP	-0.4	-5.1	1.4	-4.0	-4.7	0.8	1.4	-1.7	0.9	2.1	0.9
	unemployment	6.2	8.3	8.6	8.4	8.6	10.4	10.2	11.0	10.2	10.1	10.3
AT	GDP	2.2	-3.9	-0.1	-4.0	-5.5	-0.1	1.1	-2.8	-0.1	1.5	-1.2
	unemployment	3.8	4.8	4.2	6.0	6.1	7.1	6.0	7.7	6.1	5.7	6.1
DK	GDP	-0.9	-4.9	0.5	n.a.	n.a.	n.a.	1.5	n.a.	0.8	1.8	0.2
	unemployment	3.3	6.0	7.1	n.a.	n.a.	n.a.	5.8	n.a.	6.0	5.6	6.3
EL	GDP	2.0	-2.0	-1.0	n.a.	n.a.	n.a.	-4.1	n.a.	-4.6	-2.6	-4.3
	unemployment	7.7	9.5	11.0	n.a.	n.a.	n.a.	11.7	n.a.	11.8	14.1	14.8
IE	GDP	-3.0	-7.1	2.7	n.a.	n.a.	n.a.	-1.4	n.a.	-2.1	2.6	1.0
	unemployment	6.3	11.9	12.8	n.a.	n.a.	n.a.	14.0	n.a.	14.1	13.2	13.7
CY	GDP	3.6	-1.7	0.1	n.a.	n.a.	n.a.	0.1	n.a.	-0.7	1.3	-0.1
	unemployment	3.6	5.3	6.8	n.a.	n.a.	n.a.	6.6	n.a.	6.7	6.7	7.3
LU	GDP	0.0	-4.1	n.a.	n.a.	n.a.	n.a.	1.1	n.a.	-0.1	1.8	-0.8
	unemployment	4.9	5.2	5.2	n.a.	n.a.	n.a.	7.3	n.a.	7.3	7.7	7.7
MT	GDP	1.7	-1.5	0.8	n.a.	n.a.	n.a.	0.7	n.a.	-0.8	1.6	-1.2
	unemployment	5.9	6.9	6.9	n.a.	n.a.	n.a.	7.4	n.a.	7.6	7.3	8.2
PT	GDP	0.0	-2.6	1.1	n.a.	n.a.	n.a.	0.5	n.a.	-0.3	0.2	-2.3
	unemployment	7.7	9.6	10.6	n.a.	n.a.	n.a.	11.1	n.a.	11.3	11.9	12.8
SI	GDP	3.5	-7.8	-0.5	n.a.	n.a.	n.a.	1.3	n.a.	0.7	2.0	0.6
	unemployment	4.4	5.9	6.4	n.a.	n.a.	n.a.	8.3	n.a.	8.5	8.5	9.1
SK	GDP	6.2	-4.7	0.8	n.a.	n.a.	n.a.	1.9	n.a.	0.8	2.6	-0.6
	unemployment	9.5	12.0	14.7	n.a.	n.a.	n.a.	12.8	n.a.	12.9	12.6	13.2
FI	GDP	0.9	-8.0	-0.4	n.a.	n.a.	n.a.	0.9	n.a.	-0.1	1.6	-0.6
	unemployment	6.4	8.2	9.0	n.a.	n.a.	n.a.	10.2	n.a.	10.4	9.9	11.4
BG	GDP	6.0	-5.0	n.a.	n.a.	n.a.	n.a.	0.4	n.a.	-0.7	4.0	2.8
	unemployment	5.6	6.8	9.5	n.a.	n.a.	n.a.	8.8	n.a.	9.2	8.0	8.4
CZ	GDP	2.5	-4.1	0.5	n.a.	n.a.	n.a.	1.4	n.a.	0.9	1.8	0.6
	unemployment	4.4	6.7	7.9	n.a.	n.a.	n.a.	8.1	n.a.	8.6	8.5	9.6
EE	GDP	-3.6	-14.1	-2.0	n.a.	n.a.	n.a.	1.0	n.a.	-0.1	4.0	3.0
	unemployment	5.5	13.8	19.0	n.a.	n.a.	n.a.	16.0	n.a.	16.4	14.5	14.8
HU	GDP	0.6	-6.3	0.9	n.a.	n.a.	n.a.	0.9	n.a.	-0.2	3.2	1.6
	unemployment	7.8	10.0	11.2	n.a.	n.a.	n.a.	11.8	n.a.	12.6	11.9	13.2
LT	GDP	2.8	-14.8	-3.9	n.a.	n.a.	n.a.	0.5	n.a.	-0.9	3.1	2.4
	unemployment	5.8	13.7	17.4	n.a.	n.a.	n.a.	17.1	n.a.	17.6	15.9	16.3
LV	GDP	-4.2	-18.0	0.3	n.a.	n.a.	n.a.	-3.3	n.a.	-4.2	3.9	2.5
	unemployment	7.5	17.1	20.0	n.a.	n.a.	n.a.	20.4	n.a.	20.7	18.2	18.8
PL	GDP	5.0	1.7	0.5	n.a.	n.a.	n.a.	2.9	n.a.	2.1	2.4	0.5
	unemployment	7.1	8.2	9.9	n.a.	n.a.	n.a.	10.4	n.a.	10.7	11.5	12.2
RO	GDP	7.3	-7.1	-0.3	n.a.	n.a.	n.a.	-0.7	n.a.	-1.8	3.6	2.1
	unemployment	5.8	6.9	7.4	n.a.	n.a.	n.a.	8.1	n.a.	8.5	8.8	9.2
NO	GDP	1.8	-1.6	-0.1	n.a.	n.a.	n.a.	1.6	n.a.	1.2	2.1	0.9
	unemployment	2.5	3.1	3.5	n.a.	n.a.	n.a.	4.3	n.a.	4.3	4.1	4.3
Euro area	GDP	0.6	-4.1	0.2	-4.0	-5.2	-0.1	0.7	-2.7	-0.2	1.5	-0.6
	unemployment	7.5	9.4	10.0	9.9	10.0	11.5	10.7	12.5	10.8	10.9	11.5
Rest of EEA	GDP	n.a.	n.a.	n.a.	-3.6	-4.9	0.1	1.0	-2.9	0.0	2.8	1.0
	unemployment	n.a.	n.a.	n.a	7.3	7.9	8.8	9.6	10.2	10.0	9.3	10.1
US	GDP	0.4	-2.4	0.7	-2.9	-3.7	0.9	2.2	-0.3	1.5	2.0	0.6
	unemployment	5.8	9.3	9.7	8.9	9.2	10.2	10.0	11.2	10.2	10.2	11.1
Rest of the world	GDP	n.a.	n.a.	n.a.	0.2	-0.7	3.2	4.4	1.8	3.6	4.8	3.5
	unemployment	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.2	n.a.	10.5	10.2	11.5

Notes:
GDP for realised in real GDV growth y-o-y, realised unemployment is % of unemployed as of total labour force
GDP for realised Q1 2010 is expressed in percentage change compared with Q4 2010
Source: Eurostat data for realised, stress test scenarios

Annex 5. Set of parameters for the market risk component of the exercise

	Parameter	Unit	Baseline	Adverse	Comments
Interest Rates	USD 3M	bp	100	200	Swap curve. For each currency, yield curve to be interpolated linearly up to 10Y, constant at the level of the 10Y from that point on
	USD 2Y	bp	90	170	
	USD 10Y	bp	50	50	
	EUR 3M	bp	100	200	
	EUR 2Y	bp	90	170	
	EUR 10Y	bp	50	50	
	UK 3M	bp	100	200	
	UK 2Y	bp	90	170	
	UK 10Y	bp	50	50	
	US Volatility	%	30	60	percentage change of the reference point (ex: 20% + 30% of 20% = 26%)
	EUR Volatility	%	30	60	
	UK Volatility	%	30	60	
	Spread swap / governments	bp	20	40	parallel move along the curve
Fx	EUR/USD	%	-10	-20	
	JPY/USD	%	-10	-20	
	GBP/USD	%	-10	-20	
	EUR/USD Volatility	%	30	60	
	JPY/USD Volatility	%	30	60	
	GBP/USD Volatility	%	30	60	
	Gold/USD	%	-7	-15	
Equity	Eurostoxx50	%	-10	-20	
	US (S&P500)	%	-10	-20	
	Japan (NIKKEI)	%	-10	-20	
	Emerging	%	-10	-20	
	Eurostoxx50 Volatility	%	20	40	
	US (S&P500) Volatility	%	25	50	
	Japan (NIKKEI) Volatility	%	35	70	
	Emerging Volatility	%	25	50	
	Dividends Europe	%	-10	-20	
	Dividends US	%	-10	-20	
	Dividends Japan	%	-10	-20	
	Dividends Emerging	%	-10	-20	
Hegde Funds		%	-10	-20	
Mutual Funds		%	-5	-10	
Commodities	Brent	%	-15	-30	
	Brent Volatility	%	15	30	
	Other commodities	%	-5	-10	
	Other commodities Volatility	%	30	60	
Credit	Itraxx / CDX IG	%	20	40	= % change in the spread
	Itraxx / CDX HY	%	20	40	
	Itraxx Levx/ LCDX	%	20	40	
	ABX AAA (2006 and 2007 series)	%	40	80	= % change in the spread
	ABX lower than AAA (2006 and 2007 series)	%	30	60	
	ABX AAA (other series)	%	30	60	
	ABX lower than AAA (other series)	%	30	60	
	CMBX AAA (all the series)	%	40	80	
	CMBX lower than AAA (all the series)	%	30	60	
	CMBS AAA (Europe)	%	30	60	= % change in the spread
	CMBS lower than AAA (Europe)	%	30	60	
	RMBS AAA (Europe)	%	30	60	
	RMBS lower than AAA (Europe)	%	20	40	
Market Liquidity	Bid-ask spread	%	100	200	Applies to each relevant bid-ask spread for a relevant transaction

Notes:
Reference points for all changes in parameters: 31 December 2009