

MACROECONOMIC ADVERSE SCENARIO FOR THE 2011 EU-WIDE STRESS-TEST: SPECIFICATION AND RESULTS

1. Design of the adverse scenario

This appendix describes the adverse global macroeconomic scenario to be used for the 2011 EU-wide stress test exercise. The scenario covers the horizon 2011-12, and the assumptions used and the main results are presented in terms of deviation of macroeconomic variables from a given baseline (as in previous occasions the latter will be based on the latest available EC forecasts, and in the case at hand, the Autumn 2010 vintage).

This adverse scenario is similar to those developed for EU-wide stress tests in 2009 and 2010. It is composed of three elements: a set of EU shocks – mostly tied to the persistence of the ongoing sovereign debt crisis, a global negative demand shock originating in the US and a USD depreciation vis-à-vis all currencies.

The first key component of the scenario is an assumed aggravation of the ongoing EU sovereign debt crisis as of early 2011, adversely affecting a number of asset prices and accounting to some extent for country-specific situations. Domestic demand components in the EU are also assumed to be directly affected by a negative sentiment shock (owing to increased uncertainty, deteriorated labour markets, unexpected firms' losses, worsened fiscal positions, insufficient consolidation, tighter credit, etc.). The shock is assumed to affect more euro area countries than those in the rest of the EU, given that the sovereign debt crisis is assumed to be more acute for the euro area.

In more detail first, country-specific bond yield shocks have been introduced for the EU member states, accounting for differentiated fiscal situations and market perceptions. In particular, yields on German 10-year bonds are assumed to remain at the baseline level, while, on average, euro area long-term interest rates go up by 75 basis points, and by 66 basis points in the EU. The shock has been distributed across countries proportionally to the recent volatility of sovereign credit default swap spreads.¹

¹ The overall long-term interest rate shock was calibrated to imply an increase in the average euro area interest rate (based on GDP country weights) by 75 basis points. The shock has been allocated to individual EU countries in proportion to the realized volatility

Second, stock prices were assumed to fall by 15% on average in euro area, leading to an average 14% shock for the EU as a whole. Country shocks were also calibrated according to the recent volatility of national stock market prices.²

Long-term government bond rates and stock prices are assumed to shift in the first quarter of 2011 and remain constant afterwards.

Third, house prices in most EU countries are assumed to be subject to permanent country-specific exogenous shocks, starting in early 2011 and levelling off at the end of the year. This exogenous reduction in house prices, differentiated across countries, relates mostly to the fall in confidence, partly country-specific, that comes with the assumed aggravation of the EU debt crisis. The shock also reflects in some cases fundamentals when signs of overvaluation can be observed.³

Fourth, it is assumed that, in line with the persisting EU sovereign debt crisis, there will be renewed tensions in European money markets, altogether contributing to an increase in short-term interest inter-bank rates by 125 basis points – similar to the magnitude envisaged in previous exercises.⁴

Finally, the impact of the above-mentioned shocks on domestic demand is supplemented with an exogenous negative shock, affecting both consumption and investment gradually. The magnitude of the shock, stronger for the euro area than for the rest of the EU, is common to countries that are in one of the two groups. In the euro area, the shock to consumption amounts to 1.4%; the analogous shock to investment to 4.5%, while for the rest of the EU the respective magnitudes are 0.8% and 2.5%. As the aggravation of the sovereign debt crisis affects relatively more the euro area, the shocks are moreover assumed to materialise faster in the euro area (from the first quarter of 2011 to the second of 2012) than in the rest of the EU that is affected with a six month lag.

Turning to the elements of the scenario that relate to non-EU developments, the scenario involves a worldwide negative demand shock and a USD depreciation. The shock commences in the US in the second quarter of 2011 – with a US-specific deterioration of confidence that triggers some expenditure restraint. The shock transmits to the non-EU rest of the world two quarters later. The assumed shock is similar to that underlying the previous exercise, and amounts to a negative shock to private consumption and investment. The shock is gradually introduced, culminating at 2.2% and 5.6% for these two expenditure components, respectively. In addition, a depreciation of the US dollar by close to 4% in nominal effective terms is

of daily changes in sovereign CDS spreads between the last trading day in October 2010 (29.10.2010) and the first trading day in December 2010 (1.12.2010). See Table 4 for country details.

² Historical stock market volatilities are calculated as standard deviations of daily returns between the last trading day in October 2010 (29.10.2010) and the first trading day in December 2010 (1.12.2010) using country MSCI indices. Owing to the unavailability of MSCI data for some countries, the volatilities for Cyprus and Malta are proxied with that for Italy resp. Luxembourg with Belgium, Slovakia with Slovenia, and both Lithuania and Latvia with Estonia. See Table 4 for country details.

³ In addition, in all EU countries, house prices react endogenously to other elements of the scenario that have an impact on the fundamentals driving house prices. See Table 5.

⁴ As compared to the baseline, there are no changes in monetary policy in any EU country

assumed, also occurring at the beginning of the horizon.⁵ Both oil and non-oil commodities are assumed to be unaffected by the global slowdown.⁶ Monetary policy is also assumed not to react to the shocks.

As done in previously conducted exercises, an early phasing in of the shocks has been implemented, with a view to effectively testing banking system resilience over the period 2011-12. Such an approach also takes into account the substantial lag observed between the occurrence of the macro-economic shock and its translation into increased defaults, losses and resulting pressures on banks' balance sheets.

2. Euro-area and EU adverse scenario results

The results for all EU countries combine the effects of the EU-specific shocks with the impacts of the alternative international environment through the trade and external price channels – i.e. changes in both world demand and competitors' export prices.

The **EU-specific shocks** have markedly stronger effects on GDP growth than on HICP inflation and weigh more on both variables in the latter part of the horizon. These shocks imply that real GDP growth in the EU would be reduced by 1.3 percentage points in 2011 and by 1.5 percentage points in 2012. HICP inflation would be lower by 0.1 percentage point in 2011 and by 0.5 percentage point in 2012, reflecting the impact of diminished activity on prices.⁷

The results for the **external environment** (see Table 2) imply a reduction of the rest of the world real GDP by some 1.5 percentage points in 2011 and 0.3 percentage points in 2012. As a result of lower world GDP, and consequently imports worldwide, EU exporters are also negatively affected. The initial negative impact of global developments on EU exports is close to 2 percentage points in both years on average. The total impact, after accounting for trade spillovers within the EU, amounts to close to 3 percentage points. Competitors' export prices (in euros) are also lower, largely owing to the sizeable USD depreciation, putting downward pressure on EU domestic prices. Overall, the impact of the changes in these external environment variables on the EU reduces GDP growth by about 0.8 percentage point in 2011 and by 0.5 percentage point in 2012, while EU HICP inflation is lower by some 0.5 percentage point in 2011 and by 0.7 percentage point in 2012.

Combining these two sources of shocks, the **overall effect of the scenario** is a reduction of both EU and euro area real GDP growth by around 2 percentage points in both 2011 and 2012 (Table 1). EU HICP

⁵ Over the horizon, bilateral exchange rates vis-à-vis the USD evolve according to standard behavioural relations across currencies – such as pegs.

⁶ As experienced after the crisis started, if anything, commodity prices in such a depressed global environment tend to decline, which would lead to a positive and sizeable upward shock to domestic demand in advanced countries, in particular in the EU, chiefly via the consumers' real income channel. In turn, when the dollar depreciates there may be some upward offsetting pressures on commodity prices generally denominated in USD. Such elements were not considered in this stress scenario,

⁷ For the overall results of the adverse scenario and the baseline, all variables reported for Ireland are consistent with the Prudential Capital Assessment Review (PCAR) II figures.

inflation would also be lower, albeit to a lesser degree, by 0.6 percentage point in 2011 and by 1.3 percentage points in 2012 (0.5 and 1.1 percentage points for the euro area respectively).

In terms of severity, these effects compare with shocks to the euro area GDP in the 2010 exercise of 0.9 and 2.0 percentage points respectively for the two years then covered by the scenario – the current scenario being then significantly more negative in the first year. Based on the ECB projection-error based ranges that are used for publication of the staff projections, the probability level of the overall shock to GDP for 2011 is slightly below 1% (against 7% beforehand) while it remains at about 4% for 2012. The implied shock to inflation has in turn a stronger probability for the two years, based on the same metric, with about 10 and 7% respectively for 2011 and 2012.⁸

In order to derive the resulting **alternative scenario path**, these amounts will be added to the baseline given by the Autumn 2010 EC forecast (see Table 3). This would lead to a fall in EU real GDP by 0.4% in 2011, with zero growth in 2012. In the euro area, real GDP growth would be negative, at -0.5% in 2011 and at -0.2% in 2012. Annual average HICP inflation would be in the EU at 1.5% in 2011 and 0.5% in 2012, with respectively for the two years, 1.3% and 0.6% in the euro area.

⁸ Across countries, the probability level would be country-specific and around the average for the euro area, implying that for some countries, the probability level would be stronger

Table 1: Overall effects of the scenario for the EU and the member countries – deviations from the baseline (yearly averages)⁹

	GDP growth		HICP inflation		Unemployment rate	
	<i>Percentage point deviations from the baseline</i>					
	2011	2012	2011	2012	2011	2012
Belgium	-1.8	-2.2	-0.7	-2.1	0.2	1.1
Bulgaria	-1.5	-2.3	-0.1	-0.2	0.1	0.9
Czech Republic	-2.6	-1.6	-0.4	-2.1	0.8	1.7
Denmark	-1.5	-2.1	-0.5	-0.5	0.9	2.5
Germany	-3.1	-1.5	-0.4	-1.0	0.1	0.6
Estonia	-2.6	-4.4	-0.8	-0.6	0.3	1.4
Ireland	-2.5	-1.6	-0.3	0.0	1.5	3.1
Greece	-1.0	-2.3	0.0	-0.6	0.2	1.1
Spain	-1.8	-2.8	-0.6	-1.6	1.1	3.2
France	-1.2	-1.6	-0.3	-0.7	0.1	0.6
Italy	-1.2	-2.4	-0.5	-1.1	0.3	1.0
Cyprus	-2.1	-1.6	-0.4	-0.8	0.3	1.2
Latvia	-1.7	-3.5	-0.5	-0.9	0.6	2.6
Lithuania	-2.0	-4.6	-0.3	-0.7	0.4	2.1
Luxemburg	-2.6	-2.4	-0.7	-0.3	0.0	0.1
Hungary	-0.9	-2.0	-0.8	-1.1	0.1	0.6
Malta	-5.1	-1.7	-1.3	-0.7	0.8	2.3
Netherlands	-2.2	-2.5	-1.0	-1.5	0.5	1.6
Austria	-2.4	-2.7	-0.7	-0.7	0.3	0.8
Poland	-0.9	-1.7	-0.3	-0.7	0.2	1.3
Portugal	-2.0	-3.5	-1.1	-1.6	0.5	1.8
Romania	-1.5	-1.7	-1.4	-2.6	0.1	0.4
Slovenia	-1.1	-1.6	-0.4	-0.3	0.5	1.1
Slovakia	-2.7	-2.7	-1.2	-2.3	0.2	0.9
Finland	-3.4	-1.7	-1.5	-3.1	0.5	0.9
Sweden	-2.9	-3.5	-1.2	-2.8	0.8	2.6
United Kingdom	-2.9	-1.6	-0.7	-2.2	1.1	2.8
Euro Area	-2.0	-2.0	-0.5	-1.1	0.3	1.2
Non Euro Area	-2.4	-1.9	-0.7	-1.9	0.9	2.3
European Union	-2.1	-2.0	-0.6	-1.3	0.5	1.4

⁹ Deviation of the unemployment rate from the baseline in the table has been calculated as a deviation corresponding with the ratio of the average change in unemployment to the average change in the GDP growth holding for other euro area countries. That figure replaced the original results which implied much stronger reaction of the unemployment rate to the adverse shocks in Finland. The averages in the bottom rows have been recalculated to account for changes to Finnish and Irish outcomes.

Table 2: Overall effects of the scenario for the rest of the world^{10 11}

	CPI inflation		GDP growth		Unemployment rate	
	<i>Percentage point deviations from the baseline levels</i>					
	2011	2012	2011	2012	2011	2012
Norway	-0.1	-0.5	-1.9	-0.8	0.1	0.5
Switzerland	-6.2	-7.8	-1.1	-1.0		
Russia	-0.8	-1.8	-2.0	-1.3		
US	-1.0	-3.3	-2.0	-0.4	2.2	0.8
Canada	1.1	-1.5	-1.9	-0.6	0.1	3.2
Japan	0.1	-0.3	-2.3	-0.8	0.2	0.5
China	-0.5	0.5	-1.0	-0.1		
South Korea	-3.0	-3.8	-2.1	-0.7		
Rest of Asia	-1.9	-3.5	-1.4	-0.1		
Australia	-0.8	-0.8	-1.7	-0.5	2.7	0.9
New Zealand	-4.4	-2.3	-1.5	-0.2		
Brazil	-0.1	0.7	-2.1	-0.1	0.4	-0.8
Mexico	0.3	0.5	-2.0	-0.5	0.9	1.1
Rest of Latin America	-1.6	-1.2	-2.0	-0.7	0.6	0.3
Non EU countries			-1.5	-0.3		

¹⁰ Developing Europe covers Albania, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey, along with Cyprus, Iceland, Luxembourg and Malta. East Asia represents Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Fiji, Indonesia, Kiribati, Laos, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tonga, Vanuatu, and Vietnam. Rest of Latin America pools Antigua and Barbuda, Argentina, The Bahamas, Barbados, Belize, Bolivia, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

¹¹ For countries for which CPI figures were not available consumption deflator inflation was used instead in the second column of a table.

Table 3: Adverse scenario for the EU and the member countries (yearly averages using the baseline by the Autumn EC forecast)¹²

	GDP growth		HICP inflation		Unemployment rate	
	2011	2012	2011	2012	2011	2012
Belgium	0.0	-0.2	1.2	-0.2	9.0	9.8
Bulgaria	1.1	1.5	3.1	2.9	9.2	8.9
Czech Republic	-0.3	1.5	1.7	0.1	7.8	8.4
Denmark	0.4	-0.3	1.6	1.5	7.2	8.3
Germany	-0.9	0.5	1.4	1.0	6.8	6.9
Estonia	1.8	-0.9	2.8	1.7	15.4	15.0
Ireland	-1.6	0.3	0.1	0.6	14.9	15.8
Greece	-4.0	-1.2	2.2	-0.1	15.2	16.3
Spain	-1.1	-1.1	0.9	-0.2	21.3	22.4
France	0.4	0.2	1.3	0.9	9.6	9.8
Italy	-0.1	-1.0	1.3	0.8	8.6	9.2
Cyprus	-0.6	0.6	2.9	1.7	6.9	7.1
Latvia	1.6	0.5	0.6	0.9	18.3	18.8
Lithuania	0.8	-1.4	2.0	2.1	17.3	17.2
Luxemburg	0.2	0.8	1.4	1.3	5.6	5.7
Hungary	1.9	1.2	3.1	2.6	11.1	10.9
Malta	-3.1	0.5	0.7	1.6	7.4	8.8
Netherlands	-0.7	-0.8	0.5	0.1	4.9	5.9
Austria	-0.7	-0.6	1.4	1.1	4.5	4.8
Poland	3.0	2.5	2.6	2.3	9.4	9.8
Portugal	-3.0	-2.7	1.2	-0.3	11.6	13.0
Romania	0.0	2.1	4.1	0.6	7.5	7.4
Slovenia	0.8	1.0	1.6	1.9	7.7	7.7
Slovakia	0.3	1.2	2.0	0.5	14.4	14.3
Finland	-0.5	0.6	0.6	-1.3	8.3	8.1
Sweden	0.4	-1.2	0.2	-0.9	8.8	10.1
United Kingdom	-0.7	0.9	1.9	-0.8	9.0	10.6
Euro Area	-0.5	-0.2	1.3	0.6	10.3	10.8
Non Euro Area	2.0	2.6	1.9	0.0	9.0	10.1
European Union	-0.4	0.0	1.5	0.5	10.0	10.5

¹² For all EU countries with the exception of Ireland, the adverse scenario is expressed in terms of deviations from the Autumn 2010 European Commission forecast. For Ireland, the deviations for the adverse scenario are relative to the PCARII baseline.

Table 4: Magnitude of shocks to government bond yields (expressed as deviations from the baseline levels in basis points) and stock prices (expressed as percentage deviation from the baseline levels)¹³

	Gov. bond yields	Stock prices
<i>Deviations from the baseline</i>		
	2011-2012	
Belgium	78.0	-14.2
Bulgaria	81.0	-8.1
Czech Republic	34.5	-10.0
Denmark	16.5	-7.4
Germany	0.0	-13.4
Estonia	39.0	-14.5
Ireland	258.0	-23.1
Greece	255.0	-21.5
Spain	165.0	-20.7
France	48.0	-14.0
Italy	136.5	-14.5
Cyprus	136.5	-14.5
Latvia	55.5	-14.5
Lithuania	64.5	-14.5
Luxemburg	78.0	-14.2
Hungary	114.0	-22.6
Malta	136.5	-14.5
Netherlands	22.5	-13.0
Austria	24.0	-16.6
Poland	67.5	-10.9
Portugal	246.0	-11.7
Romania	91.5	-11.7
Slovenia	39.0	-6.2
Slovakia	33.0	-6.2
Finland	10.5	-14.7
Sweden	6.0	-12.3
United Kingdom	28.5	-12.8
Euro Area	75.0	-15.0
Non Euro Area	36.4	-12.2
European Union	65.8	-14.3

¹³ Bond yields and stock prices shocks materialise fully in the first quarter of the adverse scenario. The two-year average (provided in the table), the yearly averages and the cumulative shocks are in such a case all equal.

Table 5: Overall effects on house prices in the EU and member countries – deviations from the baseline (yearly averages)¹⁴

House prices

Percentage point deviations from the baseline

	2011	2012
Belgium	-5.7	-14.0
Bulgaria	-6.6	-13.9
Czech Republic	-7.5	-18.1
Denmark	-5.7	-10.9
Germany	1.5	-1.2
Estonia	-11.3	-25.2
Ireland	-4.0	-8.4
Greece	-7.2	-15.7
Spain	-7.0	-15.0
France	-4.2	-17.6
Italy	-1.9	-7.2
Cyprus	-5.0	-14.7
Latvia	-7.5	-18.3
Lithuania	-7.6	-18.6
Luxemburg	-2.3	-9.2
Hungary	-6.1	-12.1
Malta	-6.3	-23.8
Netherlands	-5.0	-11.5
Austria	-0.9	-2.8
Poland	-7.1	-19.1
Portugal	-2.9	-11.3
Romania	-7.7	-18.8
Slovenia	-3.8	-11.7
Slovakia	-4.7	-13.3
Finland	-8.9	-16.0
Sweden	-7.4	-18.1
United Kingdom	-7.7	-18.1
Euro Area	-2.7	-9.7
Non Euro Area	-7.4	-17.4
European Union	-3.8	-11.6

¹⁴ Results are reported for each year in terms of deviations from the baseline average price level.