

17 April 2014

EBA/SSM stress test: The macroeconomic adverse scenario

1. Design of the adverse scenario

The adverse macroeconomic scenario covers the horizon 2014-16. The aim of the exercise is to produce paths for macroeconomic and financial variables such as GDP growth, HICP inflation, unemployment, interest rates and stock prices in terms of deviations from a given baseline.¹ The note presents the outcome of the adverse scenario for some of the key macro-financial variables.

The proposed adverse scenario reflects the systemic risks that are currently assessed by the ESRB General Board as representing the most pertinent threats to banking sector stability: (i) an increase in global bond yields amplified by an abrupt reversal in risk assessment, especially towards emerging market economies (EMEs), and pockets of market liquidity; (ii) a further deterioration of credit quality in countries with feeble demand, with weak fundamentals and still vulnerable banking sectors; (iii) stalling policy reforms jeopardising confidence in the sustainability of public finances; and (iv) the lack of necessary bank balance sheet repair to maintain affordable market funding.²

In line with this ranking of risks, the scenario narrative takes as a starting point a rise in investor aversion to long-term fixed income securities which results in a generalised re-pricing of assets and related sell-offs. In particular, this causes US long-term interest rates to rise, setting in motion a global increase in long-term bond yields, a steepening of yield curves and an additional market tantrum in emerging markets. This affects particularly the group of countries identified as the 'Fragile Five' and other BRICS.³

These financial disturbances have further important real economy spillover effects, especially for emerging market economies (EMEs). The latter suffer from sizeable capital outflows, in a form which is similar to a 'Sudden Stop' episode, in which countries are excluded from international capital markets since they are perceived as too risky. Their internal demand then experiences a sudden fall. Overall, the negative effects, worldwide, of the financial turmoil on the real economy imply a marked deterioration of foreign demand for EU exports, putting significant downward pressure on GDP growth as a result.

The global financial shock also acts as a trigger for all three other, EU domestic, vulnerabilities. This leads in particular to a further weakening of EU real economic activity, re-differentiation of EU sovereign bond

¹ The baseline is provided by the European Commission.

² This risk broadly reflects potential doubts about the availability of public backstops to support banks' balance sheet repair after the comprehensive assessment results will be published.

³ The Fragile Five encompasses Brazil, India, Indonesia, South Africa and Turkey and thereby only partly coincides with the group of BRICS countries (Brazil, Russia, India, China and South Africa).



yields according to associated perceptions of sovereign risk, with associated funding difficulties for respective banking sectors.

Against this background, Table 1 provides an overview of the mapping of the four above-mentioned systemic risks with the financial and economic shocks that underlie the adverse macroeconomic scenario.

Table 1. Mapping of financial stability risks to financial and economic shocks	
Source of risk:	Financial and economic shocks:
<u>Increase in global bond yields</u> amplified by an abrupt reversal in risk assessment, including towards EMEs, and pockets of market liquidity	<ul style="list-style-type: none"> • Financial market shocks worldwide (sovereign bonds, corporate bonds, stock prices, etc.) • Demand shocks in EMEs • EU countries: foreign demand shocks via a decline in world trade • Currency depreciation and funding stress affecting Central and Eastern European economies
<u>Further deterioration of credit quality</u> in countries with feeble demand, with weak fundamentals and still vulnerable banking sectors	<ul style="list-style-type: none"> • EU country-specific aggregate demand shocks (via fixed capital formation and private consumption) • EU country-specific aggregate supply shocks (via shock on user cost of capital, nominal wages) • EU country-specific house price shocks
<u>Stalling policy reforms</u> jeopardising confidence in the sustainability of public finances	<ul style="list-style-type: none"> • EU country specific sovereign bond spread shocks
<u>Lack of necessary bank balance sheet repair</u> to maintain affordable market funding	<ul style="list-style-type: none"> • EU-wide shock to short-term interbank interest rates • EU country-specific shocks to borrowing costs for households and corporates (via shocks to household nominal wealth and user cost of capital)

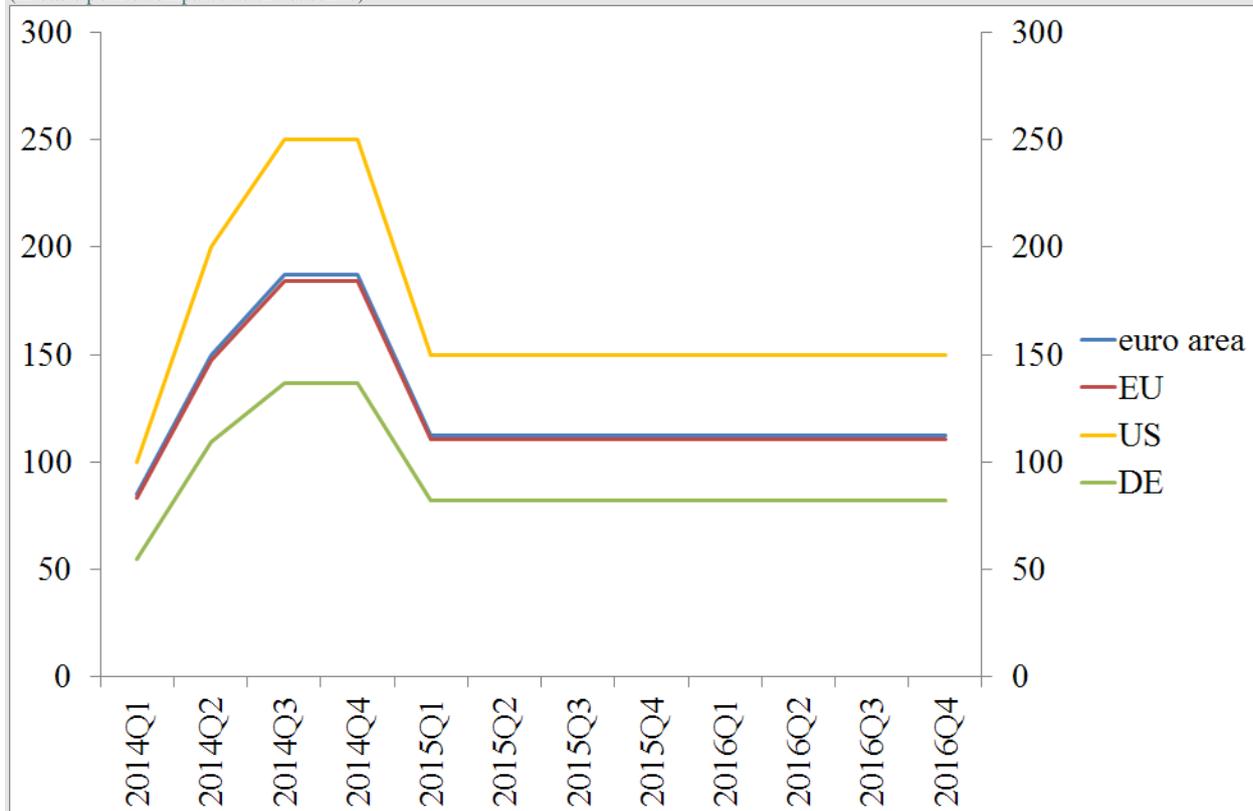
Turning to the specific calibration of these various shocks, the adverse scenario involves an increase in US long-term government bond yields. They are assumed to increase initially by 100 basis points compared to the baseline in 2014Q1, increasing gradually to 250 basis points compared to the baseline



by 2014Q4 before levelling off to 150 basis points above the baseline by 2015Q1, remaining at this level until end-2016 (see Chart 1).⁴

Chart 1. Government bond yield shocks in the US, EU, euro area and Germany

(in basis points compared to the baseline)



The rise in US long-term bond yields leads to a generalised upward shift in EU long-term interest rates. Moreover, reflecting differentiated fiscal situations and market perceptions, some re-opening of sovereign bond spreads across EU countries also takes place (see Table 2). Overall, the implied country-specific shocks to EU long-term interest rates capture first the spillover impact from the initial US bond yield shock to German long-term yields, and second the re-opening of spreads among EU sovereign bond yields.⁵ Both effects are set in line with past dependence structures between sovereign long-term government bond yields (over the post-OMT period August 2012-December 2013). As a result, the upward shocks to EU long-term bond yields at their peak in 2014Q4 range from 137 basis points in Germany to 380 basis points for Greece. At the end of 2016, the bond yield shocks range from 82 basis points in Germany to around 230 basis points in Greece. On average for the EU and the euro area, the shock is about 150 basis points over 2014 and around 110 basis points in 2015-16.

⁴ The deviation of US long-term bond yields from baseline considered in the EBA/SSM adverse scenario is broadly similar in magnitude and profile that was used in the adverse scenario of the November 2013 CCAR stress test conducted by the US Federal Reserve.

⁵ A nonparametric financial shock simulator approach has been employed whereby a given market segment is first set as the origin of the shock (e.g. the US bond yields). The nonparametric approach is meant to circumvent the assumption of normality and thereby guarantee that tail risks are not underestimated.



Table 2. Long-term EU government bond yield shocks

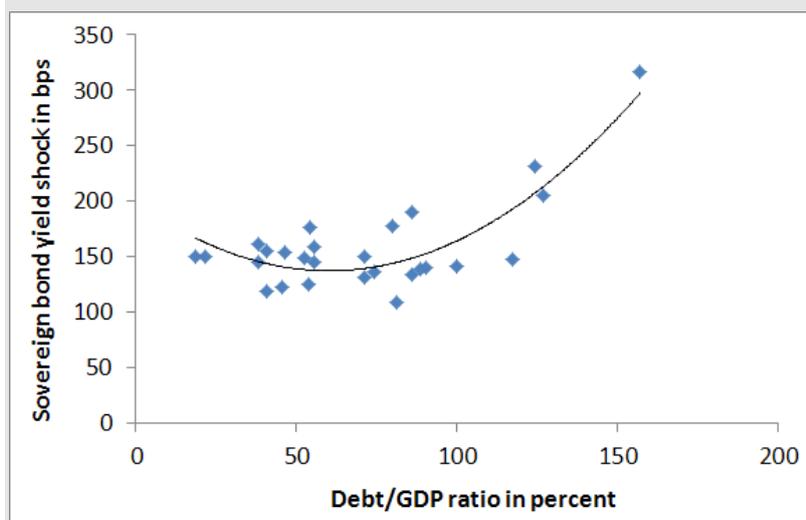
(shocks in basis point deviations from the baseline; simulation results based on a sample covering the period 3 August 2012-31 December 2013)

	Shocks in bps			Baseline in %				Adverse in %			Historical since 1-Jan-2000		
	2014	2015	2016	2013	2014	2015	2016	2014	2015	2016	Min	Max	pos b/w min and max 2014
Belgium	142	105	105	2.4	2.5	2.8	2.9	3.9	3.9	4.0	1.9	5.9	51%
Bulgaria	151	111	111	3.5	3.6	3.9	4.0	5.1	5.0	5.1	2.9	8.6	38%
Czech Republic	154	114	114	2.1	2.4	2.7	2.8	3.9	3.8	3.9	1.5	7.7	39%
Denmark	123	92	92	1.7	1.8	2.1	2.3	3.1	3.0	3.2	1.0	6.0	42%
Germany	109	82	82	1.6	1.8	2.1	2.2	2.9	2.9	3.0	1.2	5.6	38%
Croatia	159	117	117	4.7	5.1	5.4	5.5	6.7	6.6	6.7	4.3	8.2	63%
Ireland	148	109	109	3.8	3.4	3.7	3.8	4.9	4.8	4.9	3.2	14.6	15%
Greece	316	228	228	10.1	8.0	8.3	8.4	11.2	10.6	10.7	3.2	41.8	21%
Spain	191	139	139	4.6	3.8	4.1	4.2	5.7	5.5	5.6	3.0	7.6	58%
France	140	104	104	2.2	2.4	2.7	2.8	3.8	3.7	3.8	1.7	5.8	51%
Italy	205	149	149	4.3	3.9	4.1	4.3	5.9	5.6	5.8	3.2	7.4	65%
Cyprus	134	100	100	11.1	8.3	8.6	8.7	9.7	9.6	9.7	3.8	16.5	46%
Latvia	155	114	114	3.3	3.6	3.9	4.0	5.2	5.0	5.2	3.3	17.0	14%
Lithuania	119	89	89	3.8	3.4	3.7	3.9	4.6	4.6	4.7	2.0	15.1	20%
Luxembourg	150	110	110	1.7	1.9	2.1	2.3	3.4	3.3	3.4	1.3	5.8	46%
Hungary	177	130	130	5.9	6.1	6.5	6.6	7.9	7.8	7.9	5.0	12.7	38%
Malta	150	110	110	3.4	3.1	3.4	3.5	4.6	4.5	4.6	3.1	6.6	42%
Netherlands	132	98	98	2.0	2.0	2.3	2.4	3.3	3.3	3.4	1.5	5.8	43%
Austria	137	101	101	2.0	2.1	2.4	2.5	3.4	3.4	3.5	1.5	5.9	44%
Poland	145	107	107	4.0	4.6	4.8	4.9	6.1	5.9	5.9	3.1	14.0	27%
Portugal	231	168	168	6.3	5.1	5.4	5.5	7.4	7.1	7.2	3.1	17.2	31%
Romania	162	119	119	5.4	5.2	5.5	5.7	6.9	6.7	6.8	4.9	13.8	23%
Slovenia	177	130	130	5.8	4.8	5.1	5.2	6.5	6.4	6.5	3.5	9.6	50%
Slovakia	148	110	110	3.2	2.6	2.9	3.0	4.1	4.0	4.1	2.1	7.9	34%
Finland	126	94	94	1.9	1.9	2.2	2.3	3.2	3.1	3.2	1.4	5.8	41%
Sweden	145	107	107	2.1	2.3	2.6	2.7	3.8	3.7	3.7	1.1	6.0	54%
United Kingdom	139	103	103	2.0	2.8	3.2	3.3	4.2	4.2	4.3	1.4	5.9	63%
Euro area	152	112	112	2.9	2.8	3.1	3.2	4.3	4.2	4.3	2.0	7.4	43%
European Unio	150	110	110	2.8	2.9	3.2	3.3	4.4	4.3	4.4	2.0	7.4	44%

Note: The last column indicates the relative position of the adverse bond yield between the historical minimum and maximum since January 2000. The baseline bond yields are corresponding to annual averages of the respective years.

Chart 2 shows a scatter plot of the EU country-specific sovereign bond yield shocks (for the first year of the scenario horizon) against public debt-to-GDP ratios that prevailed at end-2012. Across countries, there is a broad correspondence between the level of public sector indebtedness and the severity of the shocks to bond yields resulting from the global financial shocks.

Chart 2. Government bond yield shocks versus public debt to GDP ratios



Note: The first year (2014) sovereign bond yield shocks are used for this scatter plot. Debt-to-GDP ratios refer to 2012 and have been retrieved from the European Commission statistical data warehouse (Ameco database).

The increase in long-term interest rates and the ensuing financial turmoil also give rise to tensions in the money market that entail rising funding costs for banks, altogether contributing to an assumed 80 basis points permanent increase of short-term interbank rates, whereas longer-term bank funding costs are assumed to follow more closely the pattern of government bond yields. More generally, the global re-pricing of asset prices has effects well beyond sovereign debt markets. This adjustment reflects both the protracted past under-pricing of risks as well as changes in perceptions concerning the underlying fundamentals. The re-pricing of risk affects in particular stock prices (see Table 3 for the cumulative deviations from baseline levels). These are set to decline by approximately 18-19% on average in the euro area and the EU as a whole. The corresponding EU country-specific shocks vary between -11% and -27%. The calibration obtained using NIGEM reflects past dependence structures of national equity prices – using as a conditioning factor the US long-term bond yield shock and the (model-based) endogenous responses of global asset prices to this shock. Chart 3 displays the equity price shock profiles over the 2014-16 stress test horizon for the US, the EU and the euro area.



Table 3. Equity price shocks

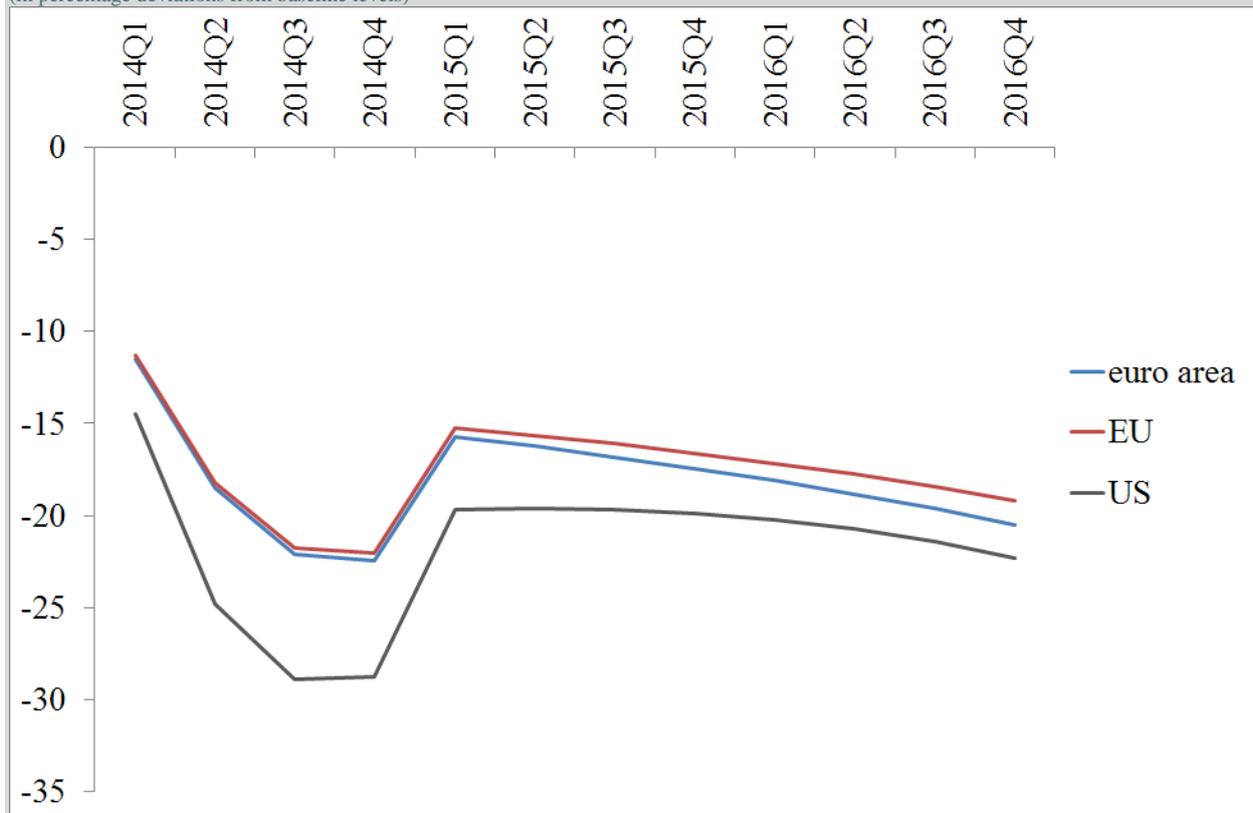
(in percentage deviations from baseline levels)

	2014	2015	2016
Belgium	-19.6	-19.5	-24.1
Bulgaria	-14.6	-13.0	-15.5
Czech Republic	-16.6	-13.0	-13.2
Denmark	-15.5	-12.7	-13.4
Germany	-14.6	-13.0	-15.5
Estonia	-14.6	-13.0	-15.5
Croatia	-14.6	-13.0	-15.5
Ireland	-17.1	-14.5	-16.0
Greece	-19.8	-20.6	-26.6
Spain	-23.4	-21.1	-24.9
France	-20.1	-16.7	-18.1
Italy	-20.3	-17.7	-20.4
Cyprus	-19.8	-20.6	-26.6
Latvia	-14.6	-13.0	-15.5
Lithuania	-14.6	-13.0	-15.5
Luxemburg	-18.2	-15.8	-18.0
Hungary	-13.1	-11.1	-12.7
Malta	-18.2	-15.8	-18.0
Netherlands	-20.4	-20.0	-23.9
Austria	-16.8	-13.5	-14.3
Poland	-11.9	-9.8	-10.8
Portugal	-17.3	-18.0	-23.1
Romania	-14.6	-13.0	-15.5
Slovenia	-14.6	-13.0	-15.5
Slovakia	-14.6	-13.0	-15.5
Finland	-18.4	-18.0	-21.7
Sweden	-18.8	-15.7	-17.5
United Kingdom	-19.1	-15.2	-15.9
Euro area	-18.3	-15.9	-18.1
European Union	-18.6	-16.6	-19.2



Chart 3. Equity price shocks in the US, the EU and the euro area

(in percentage deviations from baseline levels)



Furthermore, against the background of global financial tensions, in Europe, CEEs will also be subject to specific additional pressure. This would result in currency depreciations or funding stress. Specifically, Hungary and Poland are assumed to experience a 25% depreciation of their currency, while the Czech Republic, Croatia and Romania would face instead a 15% shock. The differentiated shock magnitude reflects past episodes, in particular the post-Lehman one.⁶

The foreign currency shocks are assumed to result in further downward shifts in activity (see Table 4). Such events would strongly affect the solvency and therefore spending behaviour of borrowers in those countries that are indebted in foreign currencies. These negative balance sheet and credit effects will dominate the less immediate positive impact on trade, via the traditional competitiveness channel.

⁶ In addition, Bulgaria is assumed to be subject to an overall increase of funding costs. The effect on Bulgarian GDP due to this funding shock is assumed to be a function of the share of private sector foreign currency lending to total lending in the country.



Table 4. Foreign currency shocks and implied GDP impact

(foreign currency shock in per cent depreciation against the euro; implied GDP impact in percentage deviations from baseline levels)

		Czech Republic	Croatia	Hungary	Poland	Romania
Currency depreciation		15%	15%	25%	25%	15%
Implied GDP impact	2014	0.00	-0.60	-0.20	-0.02	-0.70
	2015	0.00	-2.20	-0.80	-0.03	-1.30
	2016	0.00	-3.00	-1.20	-0.04	-1.90

Corporate bond spreads (both for financial and non-financial institutions) are also assumed to be affected by the financial stress, albeit to a moderate extent. Across the various rating buckets for which corporate bond yield index responses have been computed, the average shock amounts to 115 basis points. The size of the corporate bond spread shocks range between 60 basis points (AA/A-rated non-financials) and more than 250 (BBB-rated financials).

Euro swap rates are assumed to increase in response to the shocks to short-term interest rates and to the German and US benchmark yields.⁷ Depending on the maturity, the increase of euro swap rates compared to the baseline range from between 101 and 129 basis points in 2014, 82 and 100 basis points in 2015 and 72 and 95 basis points in 2016 (Table 5).

Table 5. Scenario paths for Euro Swap Rates

(annual average rates in per cent; adverse-baseline gaps in basis points)

		baseline in %				adverse in %			adverse-baseline gap in bps		
		2013	2014	2015	2016	2014	2015	2016	2014	2015	2016
Euro swap rates	1Y	0.4	0.4	0.6	0.7	1.4	1.4	1.4	101	82	72
	2Y	0.5	0.6	0.8	1.0	1.8	1.9	1.9	127	100	95
	3Y	0.7	0.8	1.1	1.2	2.1	2.1	2.1	129	99	92
	5Y	1.1	1.3	1.5	1.7	2.5	2.5	2.5	122	92	84
	7Y	1.5	1.7	2.0	2.1	2.9	2.9	2.9	120	92	87
	10Y	1.9	2.2	2.4	2.5	3.3	3.3	3.4	115	87	86

Source: Bloomberg, ECB, and ECB calculations.

Overall, the financial shocks have a sizeable negative impact on real economic activity worldwide, especially for EMEs that also suffer from capital outflows,⁸ with further negative implications expected on real activity in Europe via trade channels.⁹ The global financial market deterioration and re-assessment of risks also triggers confidence-driven adverse shocks to the EU domestic economy, especially in countries with weak fundamentals.

⁷ The euro swap rate paths were derived as a function of the most recent baseline and draft adverse macroeconomic scenario assumptions primarily to German benchmark long-term bond yields, US government bond yields, and short-term money market interest rates in the euro area and the US.

⁸ The calibration of demand shocks for the Fragile Five follows the empirical literature on the effects of Sudden-Stops episodes. On average A Fragile Five country sees its GDP level reduced by slightly more than 6% with respect to the end-of-horizon baseline. This order of magnitude is comparable to Mendoza (2010) estimates – i.e. 8%.

⁹ NiGEM was used to capture the trade spillovers from the rest of the world to the EU. Intra-EU trade channels are embedded in the Stress Test Elasticities, a multi-country, EU-wide simulation tool based on impulse response functions (from ESCB central bank models).



Specifically, the scenario involves country-specific shocks to confidence and domestic demand across the EU, leading to a slowdown in both fixed investment and private consumption in all EU countries. In addition, with persistently weaker than anticipated domestic economic activity, aggregate supply also contracts. The supply-side shocks are assumed to result from a cost-push shock which negatively affects total factor productivity (from increases in factor costs, namely nominal wages and the user cost of capital). All real-side EU shocks are calibrated on the basis of their respective time-series properties.

The sudden deterioration of the real and financial economic environment also destabilises real estate markets, especially those where prevailing prices are difficult to reconcile with the underlying fundamentals. Table 6 presents the residential property price shocks across the EU countries. The resulting shocks for the euro area and the EU amount to about -14% compared to the baseline at end-2016.¹⁰

Table 6. House price shocks

(percentage deviations from baseline levels)

	2014	2015	2016
Belgium	-10.9	-17.5	-17.5
Bulgaria	-5.9	-9.4	-9.4
Czech Republic	-6.3	-10.0	-10.0
Denmark	-9.4	-15.0	-15.0
Germany	-7.8	-12.5	-12.5
Estonia	-4.1	-6.6	-6.6
Croatia	-6.2	-9.9	-9.9
Ireland	-6.3	-10.0	-10.0
Greece	-2.6	-4.2	-4.2
Spain	-3.1	-5.0	-5.0
France	-10.5	-16.8	-16.8
Italy	-3.3	-5.2	-5.2
Cyprus	-4.0	-6.4	-6.4
Latvia	-6.3	-10.0	-10.0
Lithuania	-5.9	-9.5	-9.5
Luxemburg	-10.9	-17.5	-17.5
Hungary	-7.8	-12.5	-12.5
Malta	-6.3	-10.0	-10.0
Netherlands	-6.3	-10.0	-10.0
Austria	-6.3	-10.0	-10.0
Poland	-4.7	-7.5	-7.5
Portugal	-3.1	-5.0	-5.0
Romania	-5.9	-9.5	-9.5
Slovenia	-3.1	-5.0	-5.0
Slovakia	-6.0	-9.6	-9.6
Finland	-9.4	-15.0	-15.0
Sweden	-11.9	-19.1	-19.1
United Kingdom	-9.4	-15.0	-15.0
Euro area	-6.9	-11.0	-11.0
European Union	-8.7	-14.0	-14.0

Finally, in addition to the shock to short-term interest rates directly affecting banks' costs of funding in the interbank market, the adverse scenario also involves a more generic shock to EU banks' funding

¹⁰ These shocks are exogenous negative adjustments that therefore do not include the, further downward, second round effects of lower activity (or income) and of higher interest rates on housing prices. The overall picture for residential prices is reported in the subsequent section.



access. The shocks to banks' access to funding are assumed to capture both cyclical and more structural forces potentially constraining EU banks' funding decisions under the adverse scenario.¹¹ Hence, on top of the common shock to short-term interbank rates, the scenario incorporates country-specific funding vulnerabilities that are assumed to induce banks to tighten their credit standards on loans to the private sector thereby negatively impacting real economic activity.

The funding constraints are calibrated via country-specific shocks to the cost of corporate credit (via the user cost of capital) and to interest margins on loans to households (via the financial wealth of households).^{12,13} The corresponding country-specific shocks take into account a possible resumption of the fragmentation of funding markets as well as a renewed differentiation in credit conditions for the private sector across EU countries.¹⁴

The funding shock results in a reduction of EU and euro area aggregate real GDP of around -0.13% compared to the baseline level in 2016 (Table 7). This cumulative real GDP impact ranges from below -0.1% compared to the baseline (Belgium, Czech Republic, Denmark, Germany, France, Austria and Finland) to around -0.7% (Romania).

Oil and non-oil commodity prices and monetary policy are assumed to remain identical to their baseline levels.

¹¹ The cyclical factors constraining funding are rooted in concerns about insufficient balance sheet repair due to doubts about the public backstops available following the Comprehensive Assessment. Moreover, reflecting the still close interlinkages between banks and their sovereigns some banks' funding access may also be negatively affected by spillovers from the shocks to the domestic sovereign bond yields. In addition, the adverse scenario may amplify structural funding pressures that reflect banks' incentives (and regulatory changes) to reduce their reliance on short-term, volatile funding sources.

¹² Technically, the funding vulnerabilities of the national banking sectors were calibrated on the basis of historical volatility of wholesale funding roll-over rates and deposit flows over the past five years as well as accounting for country-specific loan-deposit ratio targets. Banks are assumed to respond to the funding shocks by tightening credit standards. A structural dynamic stochastic general equilibrium model was employed to translate the implications of tighter credit standards for investment and private consumption. In order to compute a full set of macroeconomic variables, a translation of the DSGE model output into shocks compatible with the Stress Test Elasticities (STE) platform was done by calibrating shocks to the user cost of capital and to household nominal wealth within the STE platform so as to replicate the resulting impact on gross fixed investment and on private consumption derived using the DSGE model

¹³ The funding shocks are calibrated at the banking group level for the around 80 largest EU banks. Then it is transmitted to the host countries when there are foreign subsidiaries. Consequently, the real economic implications of the funding shocks for some countries with predominantly foreign-owned banking sectors (e.g. many countries in Central and Eastern Europe) primarily reflect assumed funding stress at the parent bank level.

¹⁴ Given the static balance sheet assumption in the EBA methodology and the assumed constant monetary policy, central banks will continue to partially fund some of the banks under both the baseline and the adverse scenarios, although this is offset by the shock to funding costs that are differentiated by country reflecting also the sovereign spreads.



Table 7. Funding shock impact on real GDP growth

(percentage deviations from baseline levels)

	2014	2015	2016
Belgium	-0.02	-0.03	-0.05
Bulgaria	-0.11	-0.34	-0.53
Czech Republic	-0.01	-0.01	-0.02
Denmark	-0.01	-0.01	-0.02
Germany	-0.01	-0.03	-0.04
Estonia	-0.12	-0.25	-0.35
Croatia	-0.04	-0.09	-0.13
Ireland	-0.06	-0.13	-0.18
Greece	-0.13	-0.29	-0.39
Spain	-0.07	-0.15	-0.21
France	-0.01	-0.02	-0.02
Italy	-0.09	-0.20	-0.27
Cyprus	-0.10	-0.21	-0.29
Latvia	-0.12	-0.25	-0.35
Lithuania	-0.08	-0.18	-0.25
Luxembourg	-0.07	-0.15	-0.20
Hungary	-0.07	-0.14	-0.20
Malta	-0.04	-0.08	-0.11
Netherlands	-0.08	-0.16	-0.22
Austria	-0.02	-0.03	-0.05
Poland	-0.12	-0.26	-0.36
Portugal	-0.06	-0.13	-0.18
Romania	-0.22	-0.48	-0.66
Slovenia	-0.08	-0.18	-0.24
Slovakia	-0.09	-0.19	-0.27
Finland	-0.02	-0.04	-0.05
Sweden	-0.05	-0.11	-0.15
UK	-0.03	-0.07	-0.10
Euro area	-0.04	-0.09	-0.12
European Union	-0.04	-0.09	-0.13

2. Euro area and EU adverse scenario results

The estimated negative impact of the various financial and real shocks on economic activity worldwide is substantial. For most advanced economies, including Japan and the US, the scenario results in a negative response of GDP ranging between 5-6 per cent in cumulative terms compared to the baseline (see Table 8). In some of the more fragile EMEs, the adverse impact on GDP growth is even stronger, with a cumulative decline of up to 10 per cent (e.g. for India).



Table 8. Overall effects of the scenario for the rest of the world

(percentage deviations from baseline levels)

	GDP			CPI		
	2014	2015	2016	2014	2015	2016
Switzerland	-1.7	-4.9	-5.5	-0.9	-6.1	-12.6
Norway	-2.6	-5.5	-4.8	-0.4	-1.5	-3.0
US	-2.0	-4.9	-5.4	-0.4	-3.2	-7.7
Canada	-1.8	-4.8	-4.6	-0.1	-1.5	-5.2
Australia & New Zealand	-1.4	-3.9	-5.3	-0.1	-1.1	-2.9
Japan	-3.5	-6.0	-5.9	-0.1	-1.1	-2.8
Emerging Asia	-2.3	-5.8	-7.1	-0.7	-4.4	-9.1
Latin America	-2.8	-5.0	-4.4	-2.2	-11.4	-17.4
Russia	-3.2	-7.1	-7.8	-0.1	-0.8	-2.2
The rest of CIS	-3.2	-7.1	-7.8	-0.1	-0.8	-2.2
Other developing Europe	-3.2	-6.1	-5.7	-1.4	-10.9	-20.3
Hong Kong	-5.4	-9.0	-6.9	-0.8	-3.2	-5.7
China	-2.2	-5.5	-6.8	-0.4	-3.1	-6.5
India	-3.2	-8.3	-10.6	-0.2	-1.9	-4.9
The rest of emerging Asia	-1.9	-4.1	-4.6	-1.5	-8.9	-18.6
Mexico	-1.1	-3.3	-4.1	-1.0	-5.2	-10.1
Brazil	-5.0	-8.5	-6.9	-3.4	-16.3	-23.9
Chile	-0.2	-0.3	-0.3	-2.0	-12.0	-17.2
Peru	-0.2	-0.3	-0.3	-2.0	-12.0	-17.2
Rest of the world	-1.8	-4.3	-4.8	-0.8	-4.3	-8.1
	Foreign demand					
	2014	2015	2016			
Euro area	-4.9	-10.2	-10.5			
European Union	-5.5	-11.3	-11.7			

All in all, the deterioration of the global environment results in a adverse impact on foreign demand for EU exports amounting to -5.5% in 2014, -11.3% in 2015 and -11.7% in 2016 (all relative to baseline levels).

Combining the effects of the shocks to the international environment (through trade, external prices, and global asset prices channels) with the EU-specific shocks, the scenario leads overall to a deviation of EU GDP from its baseline level by -2.2% in 2014, by -5.6% in 2015, and -7.0% in 2016 (Table 9). The implied EU real GDP growth under the adverse is -0.7% in 2014, -1.5% in 2015 and +0.1% in 2016.

As regards EU HICP inflation (Table 10), annual inflation rates for the EU are below the baseline rates by 0.1 percentage points in 2014, by 1.0 percentage points in 2015 and by 1.7 percentage points in 2016. The implied adverse inflation rates amount to 1.1% in 2014, 0.6% in 2015 and 0.0% in 2016.

The adverse scenario also implies that the EU unemployment (Table 11) is higher than its baseline level, by 0.6 percentage points in 2014, by 1.9 percentage points in 2015 and by 2.9 percentage points in 2016. This translates in EU unemployment rates under the adverse of 11.3% in 2014, 12.3% in 2015 and 13.0% in 2016.

Supplementing the exogenous shocks to residential property prices with their endogenous response to other shocks, the adverse scenario results in an overall reduction, on average, of EU house prices of 21% compared to the baseline level in 2016 (Table 12). Across countries, the level impact ranges from around



-8% (Estonia) to -34% (Romania). This should be seen against mild increases in house prices for most countries under the baseline.

The scenario also incorporates projections of commercial property prices (CPP) that are consistent with the overall adverse scenario. Under the adverse scenario, the EU aggregate CPP growth rates equal -3.5% in 2014, -3.7% in 2015 and -1.2% in 2016 (see Table 13). This implies that the CPP level under the adverse stands about 15% below baseline levels in 2016. Across countries, the level impact ranges from around -4% (Austria) to around -27% (the UK).

Table 9. Baseline and adverse scenario paths for real GDP

(growth rates in per cent, deviations in percentage points)

	Baseline growth in %			Deviations in PP			Adverse growth in %			Level deviation 2016 in %
	2014	2015	2016	2014	2015	2016	2014	2015	2016	
Belgium	1.4	1.7	1.4	-1.6	-3.2	-1.4	-0.2	-1.5	0.0	-6.0
Bulgaria	1.7	2.0	2.7	-2.0	-3.8	-2.8	-0.3	-1.8	-0.2	-8.3
Czech Republic	1.8	2.2	1.5	-3.4	-5.1	-2.1	-1.6	-3.0	-0.6	-10.1
Denmark	1.7	1.8	2.3	-2.6	-3.8	-0.9	-0.9	-2.0	1.4	-7.1
Germany	1.8	2.0	1.8	-2.7	-3.8	-1.5	-0.9	-1.7	0.3	-7.6
Estonia	2.3	3.6	3.0	-4.6	-5.4	-1.0	-2.3	-1.8	2.0	-10.4
Croatia	0.5	1.2	1.0	-4.2	-6.9	-3.3	-3.8	-5.7	-2.3	-13.6
Ireland	1.8	2.9	2.4	-3.0	-3.6	-1.9	-1.3	-0.7	0.5	-8.1
Greece	0.6	2.9	3.7	-2.2	-3.6	-2.5	-1.6	-0.6	1.2	-7.9
Spain	1.0	1.7	2.2	-1.3	-2.7	-2.1	-0.3	-1.0	0.1	-5.9
France	1.0	1.7	2.3	-1.4	-2.8	-1.9	-0.4	-1.1	0.4	-6.0
Italy	0.6	1.2	1.3	-1.5	-2.8	-2.0	-0.9	-1.6	-0.7	-6.1
Cyprus	-4.8	0.9	1.9	-1.5	-1.4	-0.8	-6.3	-0.5	1.1	-3.7
Latvia	4.2	4.3	2.2	-5.5	-6.5	-1.7	-1.3	-2.2	0.5	-12.6
Lithuania	3.5	3.9	3.1	-3.8	-7.1	-3.5	-0.3	-3.2	-0.4	-13.3
Luxembourg	2.2	2.5	1.8	-2.6	-4.3	-2.3	-0.4	-1.8	-0.5	-8.7
Hungary	2.1	2.1	1.4	-2.0	-4.0	-2.3	0.1	-1.9	-0.9	-7.9
Malta	2.1	2.1	1.0	-2.4	-3.4	-1.2	-0.3	-1.3	-0.2	-6.7
Netherlands	1.0	1.3	1.7	-1.6	-2.8	-1.2	-0.5	-1.5	0.5	-5.4
Austria	1.5	1.8	1.7	-1.7	-3.4	-1.8	-0.2	-1.5	-0.1	-6.7
Poland	2.9	3.1	3.5	-2.7	-3.9	-1.4	0.2	-0.8	2.1	-7.6
Portugal	0.8	1.5	1.7	-1.5	-3.8	-2.8	-0.8	-2.3	-1.1	-7.8
Romania	2.3	2.5	2.3	-3.7	-4.2	-3.0	-1.4	-1.8	-0.7	-10.3
Slovenia	-0.1	1.3	1.2	-1.7	-2.7	-1.4	-1.8	-1.3	-0.2	-5.6
Slovakia	2.3	3.2	3.2	-3.2	-5.5	-1.1	-1.0	-2.4	2.1	-9.4
Finland	0.2	1.3	1.6	-3.0	-3.5	-0.8	-2.8	-2.2	0.8	-7.1
Sweden	2.5	3.3	2.5	-2.9	-5.2	-2.7	-0.4	-1.9	-0.3	-10.2
United Kingdom	2.5	2.4	1.6	-3.3	-3.7	-1.0	-0.8	-1.3	0.6	-7.6
Euro Area	1.2	1.8	1.7	-1.9	-3.2	-1.8	-0.7	-1.4	0.0	-6.6
European Union	1.5	2.0	1.8	-2.2	-3.4	-1.7	-0.7	-1.5	0.1	-7.0



Table 10. Baseline and adverse scenario paths for price inflation

(growth rates in per cent, deviations in percentage points)

	Baseline inflation in %			Deviations in PP			Adverse inflation in %			Price level deviation 2016 in %
	2014	2015	2016	2014	2015	2016	2014	2015	2016	
Belgium	0.9	1.4	1.5	-0.1	-1.3	-1.5	0.8	0.1	0.0	-2.8
Bulgaria	0.5	1.8	2.4	-0.3	-0.7	-0.5	0.2	1.1	1.8	-1.5
Czech Republic	1.0	1.8	2.2	-0.1	-1.8	-4.6	0.8	0.0	-2.4	-6.3
Denmark	1.5	1.7	1.8	0.0	-0.3	-0.7	1.5	1.5	1.0	-1.0
Germany	1.4	1.4	1.5	0.0	-0.4	-1.1	1.4	0.9	0.4	-1.5
Estonia	1.8	2.8	3.2	0.0	-0.4	-1.2	1.8	2.5	1.9	-1.6
Croatia	1.3	1.5	1.6	-0.1	-0.7	-1.8	1.3	0.8	-0.3	-2.5
Ireland	0.8	1.1	1.4	-0.1	-0.7	-1.1	0.7	0.4	0.3	-1.9
Greece	-0.6	0.2	1.1	-0.4	-1.1	-1.8	-1.0	-0.9	-0.7	-3.3
Spain	0.3	0.9	1.3	0.0	-0.5	-0.5	0.3	0.4	0.8	-1.0
France	1.2	1.2	1.3	0.0	-0.5	-1.6	1.1	0.7	-0.3	-2.2
Italy	0.9	1.3	1.8	0.0	-0.3	-1.2	0.9	1.0	0.6	-1.4
Cyprus	0.4	1.4	1.7	-0.1	-0.7	-0.8	0.4	0.8	1.0	-1.5
Latvia	1.9	2.1	1.8	-0.7	-2.6	-3.4	1.2	-0.5	-1.6	-6.4
Lithuania	1.1	1.9	2.5	-0.1	-0.2	-1.0	1.0	1.8	1.4	-1.2
Luxembourg	1.5	1.7	1.8	0.0	-0.2	-0.6	1.5	1.6	1.2	-0.7
Hungary	1.2	2.8	2.4	-0.1	-0.4	-1.2	1.1	2.4	1.2	-1.5
Malta	1.2	1.9	1.8	-0.2	-0.6	-1.3	1.0	1.3	0.5	-2.0
Netherlands	1.1	1.3	1.6	-0.2	-1.2	-1.0	0.9	0.1	0.6	-2.3
Austria	1.8	1.8	1.9	-0.4	-0.6	-0.7	1.4	1.3	1.2	-1.6
Poland	1.4	2.0	2.4	-0.4	-2.0	-2.5	0.9	0.0	-0.1	-4.7
Portugal	0.8	1.2	2.0	0.0	-1.1	-2.7	0.7	0.1	-0.7	-3.7
Romania	2.4	3.4	2.6	-0.4	-1.7	-3.3	2.0	1.7	-0.8	-5.2
Slovenia	0.8	1.3	1.6	-0.3	-1.2	-1.4	0.5	0.0	0.2	-2.8
Slovakia	0.7	1.6	1.4	-0.3	-2.3	-3.7	0.4	-0.7	-2.3	-6.1
Finland	1.7	1.6	1.7	-0.6	-2.6	-2.5	1.1	-1.0	-0.8	-5.6
Sweden	0.9	1.8	2.1	-1.1	-3.6	-4.6	-0.2	-1.8	-2.5	-8.8
United Kingdom	2.0	2.0	2.1	-0.3	-1.9	-3.3	1.7	0.1	-1.2	-5.3
Euro Area	1.0	1.3	1.5	-0.1	-0.6	-1.3	1.0	0.6	0.3	-1.9
European Union	1.2	1.5	1.7	-0.1	-1.0	-1.7	1.1	0.6	0.0	-2.8



Table II. Baseline and adverse scenario paths for the unemployment rate

(rates in per cent, deviations in percentage points)

	Baseline unemployment rate in %			Deviations in PP			Adverse unemployment rate in %		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Belgium	8.5	8.2	8.0	0.2	1.4	3.0	8.7	9.6	11.0
Bulgaria	12.7	12.1	12.0	0.2	1.0	1.8	12.9	13.2	13.8
Czech Republic	6.8	6.6	6.7	1.6	3.2	4.4	8.4	9.8	11.1
Denmark	6.9	6.7	6.5	0.8	3.0	4.5	7.7	9.7	11.0
Germany	5.2	5.1	5.2	0.2	0.9	1.8	5.4	6.0	7.0
Estonia	8.3	7.7	7.7	1.0	4.8	6.5	9.3	12.5	14.2
Croatia	17.6	17.2	17.7	0.9	3.3	5.5	18.5	20.5	23.2
Ireland	11.9	11.2	11.4	0.5	1.7	2.6	12.4	12.9	14.0
Greece	26.0	24.0	19.5	0.4	1.3	2.1	26.5	25.3	21.6
Spain	25.7	24.6	23.2	0.6	2.2	3.9	26.3	26.8	27.1
France	11.0	11.0	10.9	0.1	0.6	1.3	11.1	11.6	12.2
Italy	12.6	12.4	12.0	0.3	1.3	2.4	12.9	13.7	14.4
Cyprus	19.2	18.4	17.0	0.5	1.0	1.4	19.6	19.4	18.4
Latvia	10.5	9.2	10.7	1.8	5.0	7.1	12.3	14.2	17.8
Lithuania	10.4	9.6	9.8	0.9	3.7	5.3	11.3	13.3	15.1
Luxembourg	6.0	5.9	5.8	0.0	0.1	0.2	6.0	6.0	6.0
Hungary	9.6	9.3	9.6	0.2	1.2	2.1	9.8	10.6	11.7
Malta	6.4	6.4	6.4	0.2	0.9	1.4	6.7	7.3	7.8
Netherlands	7.4	7.2	6.8	0.1	1.4	2.8	7.5	8.5	9.6
Austria	4.8	4.7	4.7	0.2	0.8	1.4	5.0	5.5	6.1
Poland	10.3	10.1	9.1	0.9	3.3	4.8	11.2	13.4	13.9
Portugal	16.8	16.5	14.5	0.4	1.7	2.8	17.2	18.2	17.3
Romania	7.2	7.1	7.2	0.5	1.5	2.0	7.7	8.6	9.2
Slovenia	10.8	10.7	10.7	0.4	1.6	2.6	11.2	12.3	13.3
Slovakia	13.9	13.4	13.0	0.5	1.7	3.3	14.3	15.1	16.3
Finland	8.3	8.1	7.9	1.1	3.2	3.3	9.4	11.4	11.2
Sweden	7.7	7.3	7.2	0.9	3.5	5.4	8.6	10.8	12.6
United Kingdom	6.8	6.5	6.4	1.9	4.4	5.1	8.7	10.9	11.5
Euro Area	12.0	11.7	11.3	0.3	1.2	2.2	12.3	12.9	13.5
European Union	10.7	10.4	10.1	0.6	1.9	2.9	11.3	12.3	13.0



Table 12. Residential property price impact under baseline and adverse scenarios

(growth rates in per cent, deviations in percentage points)

	Baseline inflation in %			Deviations in PP			Adverse inflation in %			Price level deviation 2016 in %
	2014	2015	2016	2014	2015	2016	2014	2015	2016	
Belgium	-0.8	-0.1	0.9	-11.7	-10.3	-5.1	-12.5	-10.4	-4.2	-24.9
Bulgaria	2.5	5.9	7.4	-8.6	-9.5	-7.1	-6.2	-3.6	0.2	-22.2
Czech Republic	1.2	2.6	2.8	-7.5	-8.3	-5.8	-6.4	-5.6	-2.9	-19.7
Denmark	4.0	4.5	4.9	-14.5	-8.9	-2.6	-10.5	-4.4	2.4	-23.2
Germany	4.9	7.0	7.9	-9.4	-8.9	-5.6	-4.5	-1.8	2.3	-20.8
Estonia	8.2	9.4	8.9	-6.1	-2.6	0.0	2.2	6.8	9.0	-7.8
Croatia	-4.0	1.3	2.8	-7.4	-8.1	-4.6	-11.4	-6.7	-1.8	-18.9
Ireland	3.6	6.9	7.9	-7.1	-7.9	-6.5	-3.5	-0.9	1.4	-18.9
Greece	-7.7	-3.7	-1.2	-3.5	-6.2	-6.7	-11.1	-9.9	-7.9	-16.1
Spain	-4.3	0.3	3.6	-3.1	-3.3	-2.8	-7.4	-3.0	0.9	-8.9
France	-1.6	-1.0	0.5	-11.2	-11.5	-6.3	-12.8	-12.4	-5.9	-26.6
Italy	-3.4	-0.7	2.0	-4.6	-4.1	-5.3	-7.9	-4.7	-3.3	-13.4
Cyprus	-7.0	-5.2	-2.0	-4.9	-5.8	-5.0	-11.9	-11.0	-7.0	-15.6
Latvia	6.0	5.7	5.4	-7.6	-7.6	-5.2	-1.6	-1.8	0.3	-18.0
Lithuania	4.0	7.2	8.9	-7.4	-8.3	-5.9	-3.3	-1.1	2.9	-18.9
Luxembourg	6.8	8.3	8.5	-11.7	-8.0	0.0	-4.9	0.3	8.5	-17.5
Hungary	1.4	6.4	8.8	-7.3	-4.9	-1.0	-6.0	1.6	7.9	-12.3
Malta	2.1	2.4	2.2	-7.7	-8.6	-5.1	-5.6	-6.2	-2.9	-19.6
Netherlands	-2.1	2.1	5.0	-7.2	-8.0	-7.4	-9.3	-5.9	-2.4	-20.6
Austria	2.9	3.2	3.8	-7.1	-5.7	-1.5	-4.2	-2.5	2.3	-13.2
Poland	2.3	3.3	4.1	-5.7	-10.1	-12.9	-3.5	-6.7	-8.8	-25.4
Portugal	-5.6	-3.9	-1.3	-3.7	-3.6	-3.3	-9.3	-7.5	-4.6	-10.6
Romania	1.1	3.0	5.0	-13.2	-14.1	-12.2	-12.2	-11.1	-7.2	-33.7
Slovenia	-4.4	-2.3	-0.2	-4.4	-5.9	-5.6	-8.8	-8.1	-5.8	-15.4
Slovakia	0.9	2.4	4.0	-7.9	-8.7	-6.4	-7.0	-6.3	-2.4	-20.9
Finland	3.6	4.7	5.8	-12.4	-14.4	-6.2	-8.8	-9.7	-0.4	-28.5
Sweden	2.6	2.2	1.5	-13.7	-12.9	-6.4	-11.1	-10.7	-4.9	-29.1
United Kingdom	4.9	5.1	3.5	-12.4	-13.8	-7.8	-7.5	-8.8	-4.2	-29.2
Euro Area	-0.2	2.1	3.8	-7.8	-7.7	-5.3	-8.0	-5.7	-1.5	-19.2
European Union	0.9	2.7	3.8	-8.7	-8.8	-5.8	-7.9	-6.2	-2.1	-21.2



Table 13. Commercial property price impact under baseline and adverse scenarios

(growth rates in per cent, deviations in percentage points)

	Baseline inflation in %			Deviations in PP			Adverse inflation in %			Price level deviation 2016 in %
	2014	2015	2016	2014	2015	2016	2014	2015	2016	
Belgium	-1.6	-1.6	-1.5	-2.5	-3.1	-1.6	-4.1	-4.6	-3.1	-7.1
Bulgaria	1.5	3.1	3.6	-5.3	-5.1	-3.7	-3.8	-2.0	-0.1	-13.1
Czech Republic	-1.7	-1.4	-1.3	-2.3	-2.9	-2.0	-4.0	-4.3	-3.4	-7.2
Denmark	3.5	4.9	5.3	-15.2	-8.3	-2.8	-11.7	-3.4	2.5	-23.5
Germany	4.7	6.4	7.1	-4.8	-7.4	-6.1	-0.1	-1.0	1.0	-16.2
Estonia	3.2	5.3	5.5	-4.3	-4.2	-3.3	-1.1	1.0	2.2	-10.9
Croatia	-2.0	0.0	1.2	-4.7	-5.2	-3.3	-6.7	-5.2	-2.2	-12.7
Ireland	0.2	0.9	2.7	-4.6	-6.7	-5.1	-4.4	-5.8	-2.5	-15.4
Greece	-3.7	-0.8	0.6	-2.2	-3.7	-4.1	-5.9	-4.5	-3.5	-9.7
Spain	-1.4	0.3	1.7	-1.4	-2.6	-2.3	-2.8	-2.2	-0.6	-6.1
France	1.4	2.5	3.5	-3.0	-5.1	-4.1	-1.6	-2.6	-0.6	-11.5
Italy	-1.0	0.5	2.3	-2.8	-3.2	-3.9	-3.9	-2.7	-1.6	-9.5
Cyprus	-4.9	-3.5	-0.5	-3.0	-3.0	-2.5	-7.9	-6.5	-3.0	-8.5
Latvia	3.8	4.7	4.3	-6.5	-9.1	-4.9	-2.7	-4.4	-0.7	-18.5
Lithuania	3.5	4.1	4.7	-5.4	-6.7	-4.7	-1.9	-2.6	0.0	-15.2
Luxembourg	2.9	3.8	3.8	-6.6	-3.2	-0.1	-3.7	0.5	3.8	-9.4
Hungary	-0.3	2.3	3.5	-3.7	-3.5	-2.2	-4.0	-1.1	1.3	-9.0
Malta	-0.3	0.9	1.5	-4.5	-4.1	-1.9	-4.8	-3.3	-0.5	-10.2
Netherlands	-2.5	0.5	2.7	-4.6	-6.4	-5.5	-7.1	-5.9	-2.7	-15.6
Austria	0.6	0.7	0.7	-1.5	-1.5	-0.6	-1.0	-0.9	0.2	-3.6
Poland	1.9	3.9	2.9	-2.2	-9.0	-7.5	-0.4	-5.2	-4.7	-17.2
Portugal	-1.8	-1.0	0.1	-1.6	-1.8	-1.8	-3.4	-2.8	-1.7	-5.2
Romania	-0.9	1.1	3.0	-7.7	-6.4	-5.7	-8.6	-5.2	-2.7	-18.3
Slovenia	0.3	-0.7	1.6	-1.1	-3.6	-2.6	-0.8	-4.3	-1.0	-7.2
Slovakia	1.0	0.9	1.8	-5.0	-5.2	-4.1	-4.0	-4.3	-2.2	-13.5
Finland	1.7	2.1	2.5	-8.0	-7.1	-2.0	-6.2	-5.0	0.5	-15.9
Sweden	1.6	2.2	2.0	-9.2	-11.2	-6.1	-7.5	-9.0	-4.1	-23.8
United Kingdom	4.1	4.2	2.9	-11.7	-12.7	-6.1	-7.6	-8.5	-3.2	-26.7
Euro Area	1.0	2.5	3.6	-3.5	-5.0	-4.2	-2.4	-2.5	-0.6	-11.7
European Union	1.5	2.8	3.4	-5.1	-6.5	-4.6	-3.6	-3.7	-1.2	-14.7