

# Adverse scenario for the European Securities and Markets Authority's 2021 EU-wide central counterparty stress test

## Introduction

In accordance with its mandate, the European Securities and Markets Authority (ESMA), in cooperation with the European Systemic Risk Board (ESRB), initiates and coordinates EU-wide stress tests to assess the resilience of central counterparties (CCPs) in the face of adverse market developments. ESMA plans to conduct its fourth stress test for CCPs in 2021 and has asked the ESRB to provide the adverse market scenario for that exercise.

The European Central Bank (ECB), in close cooperation with the ESRB and ESMA, has developed the relevant narrative and calibrated the adverse scenario set out in this document<sup>1</sup>, [which has been approved by the ESRB's General Board and submitted to ESMA].

The shock profiles that are presented in this document should be interpreted as one-off, instantaneous and temporary shifts in asset prices relative to their end-2020 levels which last for at least two consecutive business days. A methodological note presents the tool developed by ECB staff which was used to calibrate those financial shocks.<sup>2</sup>

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<sup>1</sup> The scenario presented in this document is not a forecast. It should not be interpreted as depicting the ESRB's expectations regarding (i) future economic and financial developments or (ii) unintended consequences of future monetary policy decisions. It constitutes a severe, yet plausible, scenario that could arise if a risk environment such as the one explained in the note were to materialise.

<sup>2</sup> See the methodological note describing the Financial Shock Simulator:  
[https://www.esrb.europa.eu/mppa/stress/shared/pdf/esrb.stress\\_test190403\\_technical\\_note\\_EIOPA\\_insurance-4fb409600b.en.pdf?fad046baaf28f167b817d46ddf4486fc](https://www.esrb.europa.eu/mppa/stress/shared/pdf/esrb.stress_test190403_technical_note_EIOPA_insurance-4fb409600b.en.pdf?fad046baaf28f167b817d46ddf4486fc)

## Systemic risks and vulnerabilities addressed by the scenario

The scenario reflects the ESRB's assessment of the prevailing sources of systemic risk to the EU's financial system:

1. widespread defaults in the private sector as a result of a deep global recession;
2. difficult macroeconomic environments for banks, insurers and pension schemes;
3. instability and pockets of illiquidity in financial markets;
4. re-emergence of sovereign financing risk and debt sustainability concerns.

The market stress scenario set out in this document reflects the triggering of one or more of the sources of systemic risk to the EU's financial system that have been identified by the ESRB. These risks could materialise simultaneously and reinforce each other. The results are derived using a methodology that takes account of the joint empirical distribution of historical observations for risk factors that ESMA deems relevant to CCPs in order to produce a coherent market risk scenario.

The coronavirus (COVID-19) pandemic has shaped the EU's financial and macroeconomic environment since March 2020. The unprecedented shock that was inflicted by COVID-19 in 2020, both at EU level and worldwide, initially led to a sudden halt in economic activity and a sharp deterioration in short-term economic prospects, with material consequences for the financial sector. A comparison between the adverse scenario for ESMA's 2021 CCP exercise and the 2020 market turmoil is not straightforward: the former does not merely mimic the latter; it also encompasses a broader set of macro-financial shocks. Overall, however, looking at some of the most relevant asset classes (e.g. equity and commodity prices), the severity of the adverse scenario can be regarded as being comparable to that seen in March 2020.

## Narrative for the scenario

This section describes the way in which the sources of systemic risk identified by the ESRB translate into instantaneous shocks following triggers in various market segments.

In this adverse scenario, ongoing concerns about the evolution of the COVID-19 pandemic and its economic ramifications trigger adverse confidence effects worldwide and prolong the unprecedented economic contraction. The worsening of economic prospects is reflected in a global decline in risk-free rates (from what is already a historically low level). Countries' fiscal positions weaken, as do corporate sector balance sheets. Despite the low risk-free interest rates, concerns about the sustainability of public and private debt resurface, leading to a sharp increase in credit risk premia and a widening of credit spreads worldwide. Countries with large spreads are particularly affected, whereas countries with few debt sustainability concerns experience somewhat more muted increases in sovereign spreads. As a result, the dispersion of sovereign bond yields across the EU increases. The reassessment of market participants' expectations amid declining corporate earnings results in

abrupt and sizeable adjustments to financial asset valuations. Widespread downsizing of firms and rating downgrades trigger large-scale fire sales in the non-banking sector. Market volatility spikes, the correlation of asset returns increases, and borrowing costs surge on the back of expectations that non-financial corporations will default. Similarly, the global fallout in terms of economic activity and the sharp increase in non-financial corporate bond yields weigh on global investment and global demand for raw materials, causing an abrupt repricing of commodities. The risk of idiosyncratic failures by financial institutions intensifies, reflecting the deterioration of the macro-financial environment, with potentially severe consequences for the financial system as a whole.

The scenario has been obtained by choosing the mean response for each conditioned variable in an adverse scenario where the triggering variables are stressed over a two or five-day horizon depending on the asset class. The sample chosen for the calibration spans the period from January 2005<sup>3</sup> to December 2020.

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<sup>3</sup> The model uses daily data, and the majority of time series have sufficient data as of 2004.

## Calibration of the scenario

Table 1: Shock scenarios – LIBOR interest rate swap (horizon = five business days)

Shocks to LIBOR interest rate swaps Absolute changes (basis points)									
Geographic Area	Country	Description	1M	3M	1Y	2Y	5Y	10Y	30Y
EU	<b>Euro area</b>	Interest rate swap on EUR (euro)	-23	-24	-26	-32	-35	-38	-40
EU	<b>Czech Republic</b>	Interest rate swap on CZK (Czech koruna)	-28	-28	-30	-33	-34	-34	-34
EU	<b>Denmark</b>	Interest rate swap on DKK (Danish krone)	-23	-24	-27	-37	-36	-44	-46
EU	<b>Hungary</b>	Interest rate swap on HUF (Hungarian forint)	-52	-54	-59	-67	-49	-50	-50
EU	<b>Poland</b>	Interest rate swap on PLN (Polish zloty)	-34	-34	-35	-37	-38	-34	-33
EU	<b>Sweden</b>	Interest rate swap on SEK (Swedish krona)	-31	-32	-35	-35	-35	-37	-38
Rest of Europe	<b>United Kingdom</b>	Interest rate swap on GBP (British pound)	-49	-48	-44	-39	-39	-42	-43
Rest of Europe	<b>Norway</b>	Interest rate swap on NOK (Norwegian krone)	-51	-53	-58	-45	-38	-35	-34
Rest of Europe	<b>Switzerland</b>	Interest rate swap on CHF (Swiss franc)	-31	-32	-35	-47	-46	-39	-34
North America	<b>Canada</b>	Interest rate swap on CAD (Canadian dollar)	-38	-39	-42	-44	-45	-45	-45
North America	<b>United States</b>	Interest rate swap on USD (US dollar)	-49	-49	-51	-54	-62	-63	-69
Australia and Pacific	<b>Australia</b>	Interest rate swap on AUD (Australian dollar)	-47	-48	-49	-50	-57	-54	-54
Australia and Pacific	<b>New Zealand</b>	Interest rate swap on NZD (New Zealand dollar)	-52	-52	-52	-47	-51	-47	-67
South and Central America	<b>Mexico</b>	Interest rate swap on MXN (Mexican peso)	-66	-65	-67	-68	-68	-69	-69
Asia	<b>China</b>	Interest rate swap on CNY (Chinese renminbi)	-39	-39	-40	-45	-50	-59	-61
Asia	<b>Hong Kong</b>	Interest rate swap on HKD (Hong Kong dollar)	-40	-40	-42	-42	-41	-40	-39
Asia	<b>India</b>	Interest rate swap on INR (Indian rupee)	-90	-90	-89	-88	-84	-79	-77
Asia	<b>Japan</b>	Interest rate swap on JPY (Japanese yen)	-10	-10	-10	-11	-21	-18	-18
Asia	<b>South Korea</b>	Interest rate swap on KRW (South Korean won)	-46	-47	-49	-38	-29	-29	-29
Asia	<b>Singapore</b>	Interest rate swap on SGD (Singapore dollar)	-32	-33	-34	-36	-38	-32	-31
Africa	<b>South Africa</b>	Interest rate swap on ZAR (South African rand)	-37	-41	-50	-63	-58	-58	-58

Table 2: Shock scenarios – OIS interest rate swap rates (horizon = five business days)

Shocks to OIS interest rate swaps Absolute changes (basis points)									
Geographic Area	Country	Description	1M	3M	1Y	2Y	5Y	10Y	30Y
EU	<b>Euro area</b>	Interest rate swap on EUR (euro)	-33	-35	-37	-42	-45	-49	-51
EU	<b>Denmark</b>	Interest rate swap on DKK (Danish krone)	-34	-36	-42				
EU	<b>Sweden</b>	Interest rate swap on SEK (Swedish krona)	-43	-43	-47				
Rest of Europe	<b>United Kingdom</b>	Interest rate swap on GBP (British pound)	-45	-48	-54	-64	-64	-53	-50
Rest of Europe	<b>Switzerland</b>	Interest rate swap on CHF (Swiss franc)	-41	-41	-44	-47	-47	-44	-42
North America	<b>Canada</b>	Interest rate swap on CAD (Canadian dollar)	-46	-48	-52	-51	-50		
North America	<b>United States</b>	Interest rate swap on USD (US dollar)	-55	-61	-62	-63	-65	-68	-71
Australia and Pacific	<b>Australia</b>	Interest rate swap on AUD (Australian dollar)	-51	-56	-71				
Australia and Pacific	<b>New Zealand</b>	Interest rate swap on NZD (New Zealand dollar)	-56	-58	-63				
South and Central America	<b>Colombia</b>	Interest rate swap on COP (Colombian peso)	-43	-47	-50	-62	-74	-83	-87
South and Central America	<b>Mexico</b>	Interest rate swap on MXN (Mexican peso)	-71	-71	-72	-73	-77	-80	-92
Asia	<b>India</b>	Interest rate swap on INR (Indian rupee)	-98	-98	-100	-102	-105	-109	-114
Asia	<b>Japan</b>	Interest rate swap on JPY (Japanese yen)	-14	-14	-14	-13	-20	-20	-23
Asia	<b>South Korea</b>	Interest rate swap on KRW (South Korean won)	-42	-44	-45	-49	-57	-61	-68

Table 3: Shock scenarios – Government bond yields (horizon = two business days)

Shocks to government bond yields Absolute changes (basis points)							
Geographic Area	Country Abbreviation	Country	1Y	2Y	5Y	10Y	30Y
EU	AT	Austria	8	9	12	16	17
EU	BE	Belgium	9	13	25	46	50
EU	BG	Bulgaria	34	35	40	48	49
EU	HR	Croatia	79	81	86	94	96
EU	CY	Cyprus	61	63	69	81	83
EU	CZ	Czech Republic	28	33	48	74	79
EU	DK	Denmark	4	6	12	21	23
EU	FI	Finland	3	4	9	16	18
EU	FR	France	2	4	8	15	17
EU	DE	Germany	1	2	5	9	10
EU	GR	Greece	53	61	85	124	132
EU	HU	Hungary	12	20	46	88	97
EU	IE	Ireland	9	11	20	33	36
EU	IT	Italy	35	39	50	69	73
EU	LV	Latvia	26	31	49	78	84
EU	LT	Lithuania	33	37	49	69	73
EU	LU	Luxembourg	2	3	7	13	15
EU	MT	Malta	32	37	55	83	89
EU	NL	Netherlands	6	7	10	14	15
EU	PL	Poland	17	23	42	73	80
EU	PT	Portugal	40	47	70	108	116
EU	RO	Romania	21	25	39	61	66
EU	SK	Slovakia	9	11	16	26	28
EU	SI	Slovenia	23	25	29	37	39
EU	ES	Spain	29	33	44	64	68
EU	SE	Sweden	0	2	7	15	16
EA	EA	Euro area (weighted averages)	13	15	21	33	35
EU	EU	European Union (weighted averages)	13	15	23	35	38
Other advanced economies	UK	United Kingdom	8	13	28	52	57
Other advanced economies	CH	Switzerland	2	4	9	17	18
Other advanced economies	NO	Norway	1	2	6	13	14
Other advanced economies	US	United States	10	13	20	32	34
Other advanced economies	JP	Japan	6	7	9	12	13
Other advanced economies	AU	Australia	9	11	15	22	23
Other advanced economies	CA	Canada	10	12	19	31	33

Table 4: Shock scenarios – Exchange rates (horizon = two business days)

FX shocks Relative changes (%)		
Geographic Area	Description	Shock
EU	EURCZK represents 1 EUR per x CZK (Czech koruna)	5.5
EU	EURDKK represents 1 EUR per x DKK (Danish krone)	0.2
EU	EURHRK represents 1 EUR per x HRK (Croatian kuna)	2.0
EU	EURHUF represents 1 EUR per x HUF (Hungarian forint)	8.1
EU	EURPLN represents 1 EUR per x PLN (Polish zloty)	6.7
EU	EURRON represents 1 EUR per x RON (Romanian leu )	13.0
EU	EURSEK represents 1 EUR per x SEK (Swedish krona)	4.1
Rest of Europe	EURNOK represents 1 EUR per x NOK (Norwegian krone)	2.6
Rest of Europe	EURGBP represents 1 EUR per x GBP (British pound)	7.1
Rest of Europe	EURCHF represents 1 EUR per x CHF (Swiss franc)	-3.6
Rest of Europe	EURRUB represents 1 EUR per x RUB (Russian rouble)	24.4
Rest of Europe	EURUAH represents 1 EUR per x UAH (Ukrainian hryvnia)	19.4
North America	EURCAD represents 1 EUR per x CAD (Canadian dollar)	3.1
North America	EURUSD represents 1 EUR per x USD (US dollar)	3.4
Australia and Pacific	EURAUD represents 1 EUR per x AUD (Australian dollar)	4.6
Australia and Pacific	EURNZD represents 1 EUR per x NZD (New Zealand dollar)	3.4
South and Central America	EURARS represents 1 EUR per x ARS (Argentine peso)	16.2
South and Central America	EURBRL represents 1 EUR per x BRL (Brazilian real)	9.9
South and Central America	EURCLP represents 1 EUR per x CLP (Chilean peso)	7.5
South and Central America	EURCOP represents 1 EUR per x COP (Colombian peso)	11.1
South and Central America	EURMXN represents 1 EUR per x MXN (Mexican peso)	8.6
South and Central America	EURPEN represents 1 EUR per x PEN (Peruvian sol)	4.1
Asia	EURCNY represents 1 EUR per x CNY (Chinese renminbi)	3.6
Asia	EURHKD represents 1 EUR per x HKD (Hong Kong dollar)	3.4
Asia	EURIDR represents 1 EUR per x IDR (Indonesian rupiah)	8.4
Asia	EURILS represents 1 EUR per x ILS (Israeli new shekel)	5.6
Asia	EURINR represents 1 EUR per x INR (Indian rupee)	4.6
Asia	EURJPY represents 1 EUR per x JPY (Japanese yen)	2.9
Asia	EURKRW represents 1 EUR per x KRW (South Korean won)	11.3
Asia	EURMYR represents 1 EUR per x MYR (Malaysian ringgit)	5.0
Asia	EURPHP represents 1 EUR per x PHP (Philippine piso)	4.1
Asia	EURSGD represents 1 EUR per x SGD (Singapore dollar)	2.4
Asia	EURTHB represents 1 EUR per x THB (Thai baht)	6.0
Asia	EURTWD represents 1 EUR per x TWD (new Taiwan dollar)	4.1
Africa	EURDZD represents 1 EUR per x DZD (Algerian dinar)	4.5
Africa	EUREGP represents 1 EUR per x EGP (Egyptian pound)	11.5
Africa	EURMAD represents 1 EUR per x MAD (Moroccan dirham)	3.5
Africa	EURZAR represents 1 EUR per x ZAR (South African rand)	10.2

Shocks to FX implied volatilities Absolute changes (volatility points x 100)		
Geographic Area	Description	Shock
EU	EUR per x CZK (Czech koruna): EURCZKV1M Curncy	6
EU	EUR per x HUF (Hungarian forint): EURHUFV1M Curncy	13
EU	EUR per x PLN (Polish zloty): EURPLNV1M Curncy	8
EU	EUR per x SEK (Swedish krona): EURSEKV1M Curncy	6
Rest of Europe	EUR per x GBP (British pound): EURGBP1M Curncy	6
North America	EUR per x USD (US dollar): EURUSDV1M Curncy	5
Asia	EUR per x JPY (Japanese yen): EURJPYV1M Curncy	11
Asia	EUR per x CNY (Chinese renminbi): USDCNYV1M Curncy	8



Table 5: Shock scenarios – Domestic stock indices (horizon = two business days)

Shocks to equity prices Percentage changes				
Geographic Area	Country Abbreviation	Country	Index name	Shock
EU	AT	Austria	Austrian Traded Index	-16
EU	BE	Belgium	Belgian BEL 20 Index	-15
EU	BG	Bulgaria	Bulgarian Stock Exchange SOFIX Index	-13
EU	CY	Cyprus	Cyprus Stock Exchange General Index	-19
EU	HR	Croatia	Zagreb Stock Exchange CROBEX Index	-12
EU	CZ	Czech Republic	Prague Stock Exchange Index	-16
EU	DK	Denmark	OMX Copenhagen	-14
EU	EE	Estonia	Nordic Exchange OMX Tallinn (OMXT) Index	-11
EU	FI	Finland	Nordic Exchange OMX Helsinki Price Index	-12
EU	FR	France	French CAC 40 Index	-14
EU	DE	Germany	DAX 30 Performance Index	-14
EU	GR	Greece	Athens Stock Exchange Main General Index	-16
EU	HU	Hungary	Budapest Stock Exchange BUX Index	-14
EU	IE	Ireland	Irish Stock Exchange ISEQ Overall Index	-15
EU	IT	Italy	FTSE Milan Stock Exchange MIB	-19
EU	LV	Latvia	Nordic Exchange OMX Riga (OMXR) Index	-16
EU	LT	Lithuania	Nordic Exchange OMX Vilnius General Index	-11
EU	LU	Luxembourg	Luxembourg Stock Exchange LuxX Index	-13
EU	MT	Malta	Malta Stock Exchange Index	-6
EU	NL	Netherlands	Amsterdam Exchange (AEX) Index	-14
EU	PL	Poland	Warsaw Stock Exchange General Index	-14
EU	PT	Portugal	Portuguese PSI-20 Index	-12
EU	RO	Romania	Romanian BET 10 Index	-15
EU	SK	Slovakia	Bratislava Stock Exchange SAX Index	-16
EU	SI	Slovenia	Slovenian Blue Chip Index (SBI TOP)	-11
EU	ES	Spain	Spanish IBEX 35 Index	-16
EU	SE	Sweden	Nordic Exchange OMX Stockholm Options Marknad Value Index	-12
EA	EA	Euro area (weighted averages)	From domestic shocks	-15
EU	EU	European Union (weighted averages)	From domestic shocks	-15
Europe	UK	United Kingdom	Financial Times Stock Exchange (FTSE) 100 Index	-20
Europe	NO	Norway	Oslo Exchange All Share Index	-14
Europe	EUX50BB	Europe (Eurostoxx)	Eurostoxx 50	-16
Europe	CH	Switzerland	Swiss Market Index	-13
North America	US_DJ	United States	Dow Jones Composite Index	-14
North America	US_S&P500	United States	Standard and Poors 500 Index	-14
North America	US_NASDAQ	United States	NASDAQ Composite Index	-15
Other advanced economies	OA	Other advanced economies	MSCI World Index Future	-14
South America	BR	Brazil	MSCI Brazil Index Future	-14
Asia	IN	India	BSE SENSEX	-8
Asia	ASIAMSCIAC	Asia ex Japan	MSCI AC Asia ex Japan Index Future	-8
Asia	ASIAMSCPACA	Asia Pacific ex Japan	MSCI Pacific ex Japan Index Future	-7
Emerging markets	EME	Emerging markets	MSCI Emerging Markets Index Future	-10

Shocks to implied volatility				absolute
changes (volatility points X100)				
Geographic Area	Country	Country	Index name	Shock
Europe	EUX50BB	Europe (Eurostoxx)	Eurostoxx 50	30
EU	FR	France	France CAC 40 Index	26
EU	DE	Germany	DAX 30 Performance Index	32
EU	UK	United Kingdom	Financial Times Stock Exchange (FTSE) 100 Index	25

## Definitions

**HISTPUT** RK075 - Hist. Put Implied Volatility (HIST\_PUT\_IMP\_VOL)  
 Implied volatility of At the money put at the 1st listed expiry date that is at least 20 business days out from today, based on the Listed Implied Volatility Engine (LIVE) calculator.

Table 6: Shock scenarios – Sectoral stock indices (horizon = two business days)

Shocks to STOXX index components Percentage changes		
Index name	Sector	Shock
Eurostoxx 600	<b>HEADLINE INDEX</b>	-15
STOXX Europe 600 Consumer Goods Industry	<b>Consumer goods</b>	-12
STOXX Europe 600 Basic Materials Industry	<b>Basic materials</b>	-17
STOXX Europe 600 Utilities Industry	<b>Utilities</b>	-18
STOXX Europe 600 Consumer Services Industry	<b>Consumer services</b>	-13
STOXX Europe 600 Industrials Industry	<b>Industrials</b>	-16
STOXX Europe 600 Health Care Industry	<b>Health</b>	2
STOXX Europe 600 Banks Supersector	<b>Banks</b>	-19
STOXX Europe 600 Insurance Supersector	<b>Insurance</b>	-18
STOXX Europe 600 Financial Services Supersector	<b>Financial</b>	-19
STOXX Europe 600 Real Estate Supersector	<b>Real Estate</b>	-14
STOXX Europe 600 Oil & Gas Supersector	<b>Oil</b>	-23
STOXX Europe 600 Telecommunications Supersector	<b>Telecommunications</b>	-14
STOXX Europe 600 Technology Supersector	<b>Technology</b>	-12

Shocks to historical volatilities of STOXX index components (volatility points x 100)		
Index name	Sector	Shock
Eurostoxx 600	<b>HEADLINE INDEX</b>	30
STOXX Europe 600 Industrial Goods and Services	<b>Industrial Goods and Services</b>	42
STOXX Europe 600 Utilities Industry	<b>Utilities</b>	20
STOXX Europe 600 Construction and Materials	<b>Construction and materials</b>	31
STOXX Europe 600 Health Care Industry	<b>Health</b>	34
STOXX Europe 600 Banks Supersector	<b>Banks</b>	30
STOXX Europe 600 Insurance Supersector	<b>Insurance</b>	32
STOXX Europe 600 Financial Services Supersector	<b>Financial</b>	26
STOXX Europe 600 Real Estate Supersector	<b>Real Estate</b>	22
STOXX Europe 600 Oil & Gas Supersector	<b>Oil</b>	36
STOXX Europe 600 Telecommunications Supersector	<b>Telecommunications</b>	19
STOXX Europe 600 Technology Supersector	<b>Technology</b>	13

Table 7: Shock scenarios – Commodities (horizon = two business days)

			Future 1m (%)	Future 6m (%)	Future 9m (%)	Future 12m (%)	Implied volatility, Future 1m (volatility points x 100)		
Metals	Silver		-22	-22	-22	-16	46		
	Gold		-12	-12	-12	-12	29		
	Palladium		-20						
	Steel	JBO		-21					
		JBP		-11					
	RBT		-18						
Industrial	Coal		-25						
	EU Emission Allowance		-30					88	
	Iron Ore		-27						
Alimentary	Cocoa		-10					24	
	Coffee	Arabica		-12					27
		Robusta		-12					
	Corn		-17					29	
	Soy		-14					41	
	Sugar		-14					22	
	Wheat		-13					35	

	Spot (%)	3m rolling forward (%)	15m rolling forward (%)	27m rolling forward (%)	63m rolling forward (%)
Aluminium	-10	-9	-9	-8	-9
Copper	-14	-14	-13	-14	-14
Nickel	-15	-15	-14	-13	-13
Lead	-14	-14	-13	-13	-13
Tin	-14	-14	-17		
Zinc	-15	-14	-14	-14	-11

		Future 1m (%)	Future 2m (%)	Future 3m (%)	Future 4m (%)	Future 5m (%)	Future 6m (%)	Future 9m (%)	Future 12m (%)	Implied volatility, Future 1m (volatility points x 100)
Crude Oil	Brent	-30	-27	-25	-24	-23	-22	-20	-18	69
	WTI	-27	-27	-26	-25	-24	-24	-21	-19	74

	Index (%)
Baltic exchange - Dry	-17
Baltic exchange - Clean Tanker	-12
Baltic exchange - Dirty Tanker	-9

		1st Future (%)	2nd Future (%)	3rd Future (%)	4th Future (%)	5th Future (%)	6th Future (%)	Implied volatility, Future 1m (volatility points x 100)
<b>Power Germany</b>	Monthly	-24	-24	-17				33
	Quarterly		-24	-25	-21			
	Yearly		-10	-9				
<b>Power Spain</b>	Monthly	-17						
	Quarterly		-11	-11	-12			
	Yearly		-3	-3				
<b>Power France</b>	Monthly	-19	-19	-13				
	Quarterly		-14	-13	-12			
<b>Power Italy</b>	Monthly	-14	-13	-11				
	Quarterly		-22	-17	-16			
	Yearly		-6	-5				
<b>Power Nordic countries</b>	Monthly	-28	-21	-18				
	Quarterly		-21	-12	-6			
	Yearly		-9	-4				
<b>Power United Kingdom</b>	Monthly	-12	-9	-10				
	Quarterly		-17	-17	-17			
<b>Power United States</b>	Monthly	-32	-25	-18	-17	-17		

		1st Future (%)	2nd Future (%)	3rd Future (%)	4th Future (%)	5th Future (%)	6th Future (%)
<b>Gas Austria</b>	Monthly	-16	-12	-4			
	Quarterly		-6	-3	-3		
<b>Gas Germany</b>	Monthly	-17	-13	-15			
	Quarterly		-13	-15	-15		
<b>Gas France</b>	Monthly	-16	-13	-13			
	Quarterly		-13	-13	-13		
<b>Gas Italy</b>	Monthly	-10	-9	-9			
	Yearly		-8	-7	-7		
<b>Gas Netherlands</b>	Monthly	-15	-15	-13			
	Quarterly		-13	-12	-19		
	Yearly		-9	-8			
<b>Gas United Kingdom</b>	Monthly	-19	-16	-17			
	Quarterly		-17	-16	-13		
<b>Gas United States</b>	Monthly	-24	-23	-22	-23	-20	-18

Table 8: Shock scenarios – Swaptions (horizon = five business days)

Shocks to swaptions Relative changes (multiples)	
Series	Shock
EUNE11 SMKO Curncy	1.47
EUNE12 SMKO Curncy	1.45
EUNE15 SMKO Curncy	1.37
EUNE110 SMKO Curncy	1.34
EUNE130 SMKO Curncy	1.17
BPNE11 SMKO Curncy	1.32
BPNE12 SMKO Curncy	1.32
BPNE15 SMKO Curncy	1.24
BPNE110 SMKO Curncy	1.18
BPNE130 SMKO Curncy	1.13
USSN011 SMKO Curncy	1.61
USSN012 SMKO Curncy	1.47
USSN015 SMKO Curncy	1.23
USSN0110 SMKO Curncy	1.18
JPNE11 SMKO Curncy	1.63
JPNE12 SMKO Curncy	1.58
JPNE15 SMKO Curncy	1.46
JPNE110 SMKO Curncy	1.55
EUSN011 BBIR Curncy	1.88
EUSN012 BBIR Curncy	2.32
EUSN015 BBIR Curncy	1.42
EUSN0110 BBIR Curncy	1.41
EUSN0130 BBIR Curncy	1.18
BPSN011 BBIR Curncy	1.55
BPSN012 BBIR Curncy	1.38
BPSN015 BBIR Curncy	1.34
BPSN0110 BBIR Curncy	1.18
BPSN0130 BBIR Curncy	1.13
USSN011 BBIR Curncy	1.82
USSN012 BBIR Curncy	1.80
USSN015 BBIR Curncy	1.30
USSN0110 BBIR Curncy	1.23
USSN0130 BBIR Curncy	1.18
SFSN011 BBIR Curncy	1.26
SFSN012 BBIR Curncy	1.40
SFSN015 BBIR Curncy	1.24
SFSN0110 BBIR Curncy	1.20
SFSN0130 BBIR Curncy	1.18
JYSN011 BBIR Curncy	5.01
JYSN012 BBIR Curncy	3.36
JYSN015 BBIR Curncy	3.22
JYSN0110 BBIR Curncy	1.55
JYSN0130 BBIR Curncy	1.32
Series	Shock
CDSN011 BBIR Curncy	1.27
CDSN012 BBIR Curncy	1.21
CDSN015 BBIR Curncy	1.19
CDSN0110 BBIR Curncy	1.16
CDSN0130 BBIR Curncy	1.16
DKSN011 BBIR Curncy	1.76
DKSN012 BBIR Curncy	1.55
DKSN015 BBIR Curncy	1.31
DKSN0110 BBIR Curncy	1.39
DKSN0130 BBIR Curncy	1.17
NKSN0110 BBIR Curncy	1.35
NKSN0130 BBIR Curncy	1.37
SKSN011 SMKO Curncy	1.42
SKSN012 SMKO Curncy	1.35
SKSN015 SMKO Curncy	1.36
SKSN0110 SMKO Curncy	1.23
SKSN0130 SMKO Curncy	1.21
SDSN011 BBIR Curncy	1.34
SDSN012 BBIR Curncy	1.29
SDSN015 BBIR Curncy	1.12
SDSN0110 BBIR Curncy	1.12
SDSN0130 BBIR Curncy	1.19
HDSN011 BBIR Curncy	1.13
HDSN012 BBIR Curncy	1.13
HDSN015 BBIR Curncy	1.16
HDSN0110 BBIR Curncy	1.12
HDSN0130 BBIR Curncy	1.16
ADSN011 BBIR Curncy	1.44
ADSN012 BBIR Curncy	1.60
ADSN015 BBIR Curncy	1.29
ADSN0110 BBIR Curncy	1.18
ADSN0130 BBIR Curncy	1.15
NDSN011 BBIR Curncy	1.76
NDSN012 BBIR Curncy	1.46
NDSN015 BBIR Curncy	1.21
NDSN0110 BBIR Curncy	1.18
NDSN0130 BBIR Curncy	1.16
MPSN011 BBIR Curncy	1.19
MPSN012 BBIR Curncy	1.12
MPSN015 BBIR Curncy	1.11
MPSN0110 BBIR Curncy	1.12
MPSN0130 BBIR Curncy	1.11

Table 9: Shock scenarios – Credit default spreads (horizon = five business days)

General:

Shocks to credit default spreads Relative changes (multiples relative to starting points)		
Geographic Area	Index	Shock
EU	Itraxx Overall 5y	1.8
	Itraxx Crossover 5y	1.6
	Itraxx Senior fin 5y	2.0
	Itraxx SubFinancial 5y	2.0
United States	Investment yield CDSI	1.8
	High yield CDSI	1.6

Individual:

Shocks to credit default spreads Relative changes (multiples relative to starting points)		
Geographic Area	Sector	Shock
EU	Financial	2.60
	Basic Materials	2.44
	Consumer, Cyclical	2.16
	Energy	2.68
	Consumer, Non-Cyclical	1.68
	Diversified	1.84
	Industrial	2.14
	Communications	2.07
	Technology	1.74
	Utilities	1.91

Table 10: Shock scenarios – Corporate debt (horizon = two business days)

Shocks to iBoxx covered bond yields Absolute changes (basis points)		
Geographic Area	Maturity	Shock
<b>Euro area</b>	1 - 3Y	24
	3 - 5Y	29
	5 - 7Y	31
	7 - 10Y	32
	> 10Y	33

Shocks to (Merrill Lynch) BBB bond yields Absolute changes (basis points)		
Geographic Area	Maturity	Shock
<b>Euro area</b>	1 - 3Y	57
	3 - 5Y	68
	5 - 7Y	76
	7 - 10Y	80