



Scenarios for the European Securities and Market Authority's EU-wide central counterparty stress test in 2017

Introduction

In accordance with its mandate, the European Securities and Markets Authority (ESMA), in cooperation with the ESRB, initiates and coordinates EU-wide stress tests to assess the resilience of central counterparties (CCPs) to adverse market developments. ESMA plans to conduct a stress test for central counterparties in 2017 and has requested adverse financial scenarios and measures of probability of default for clearing members. The ECB, in collaboration with the ESRB, has developed a methodology and calibrated adverse financial scenarios for this exercise. This document sets out these scenarios and provides details on the methodology used for their calibration.¹ It has been approved by the ESRB General Board and transmitted to ESMA.

The shock profiles for the individual risk factors presented in this document should be interpreted as one-off, instantaneous shifts in asset prices relative to their mid-September 2016 levels. Each scenario includes more than 500 individual risk factors, reflecting the variety of products cleared by European CCPs. Annex A presents the methodology used for calibrating the scenarios. Annex B presents the three scenarios, with shocks originating in the credit default swap (CDS), foreign exchange (FX) and money markets. Annex C describes the methodology for deriving the probabilities of default (PDs) of CCP clearing members which will be used by ESMA to define their default scenarios.

The scenarios cover an assumed, abrupt materialisation of one or multiple risks to the EU financial system as identified by the ESRB. The materialisation of these risks would unfold in a weak macroeconomic environment characterised by subdued nominal growth, by banks in various EU Member States facing high levels of non-performing loans, and by continued low interest rates that put downward pressure on banks' profitability. The risks that may materialise and have adverse consequences in such an environment include a repricing of global risk or a reversal of risk premia and related price adjustments reflecting a possible rise in concerns over public debt sustainability. Moreover, stress could arise in the investment fund sector and amplify liquidity risks and spillovers to the broader financial sector. For the purposes of designing suitable scenarios to stress test CCPs, it is important to note that these risks could materialise jointly and reinforce each other.

¹ The scenarios have been designed using a nonparametric conditional expected shortfall technique. This tool, which is part of the suite of stress test models used by the ECB's Directorate General Macroeconomic Policy and Financial Stability, is described in more detail in Box 2 of the adverse scenario provided for the 2015 EIOPA EU-wide pension fund stress test (see <https://eiopa.europa.eu/Publications/Surveys/ESRB-2015-03-20%20GB%2021%20%20EIOPA%20%20pension%20fund%20ST%20after%20ESRB%20GB.pdf>).



Narrative of the CCP stress test scenarios

The scenarios for the CCP stress test take as a starting point the materialisation of any of the key risks to the EU financial system identified by the ESRB. This could happen in the event that new information or data is released that hints at a likely or actual materialisation of one or more of these risks. This, in turn, may result in a surge in risk premia, leading to major shifts in market prices across a broad range of asset classes. In such an event, market price movements would be coupled with increased volatility. The dependence between asset prices observed during normal times would likely change materially during a short period of time, with no clear direction of safe-haven flows across countries and markets. While such unprecedented asset price movements may be short-lived and global financial markets may stabilise swiftly, it is assumed that markets would undergo pronounced stress lasting for at least five days.

Calibration of the scenario

The scenarios are designed to ensure that CCPs clearing a wide range of financial products are subjected to sufficient stress. To achieve this, three adverse scenarios have been designed. They differ from each other with respect to the market segment in which a shock is assumed to originate. Each scenario is consistent in that historical dependencies of all risk factors vis-à-vis the shock origin are accounted for. Table 1 provides an overview of the scenarios and Annex B provides details of the individual risk factors.

In the CDS spread shock scenario, the set of risk factors that are shocked consists of six underlying iTraxx indices comprising European sovereigns and financial and non-financial corporations. The FX scenario uses the exchange rates of the euro vis-à-vis a subset of major currencies (Swiss franc, Chinese renminbi, pound sterling, Japanese yen, US dollar, Australian dollar and Canadian dollar). In this scenario a negative shock means a depreciation of the euro. Finally, the interest rate scenario assumes an onset of turbulence in money markets, which is reflected by considering a shock to the euro swap rate curve.

Table 1: Scenarios – shock origins and shock directions

#	Description	Acronym	Shock direction
1	CDS markets	CDS	+
2	Foreign exchange markets	FX	-
3	Money market and swap rates	RATES	+

The scenarios are derived using a two-step procedure. In a first step, a nonparametric conditional expected shortfall shock simulation is conducted using a rolling window of 60 business days over a sample period from January 1990 to September 2016. This step produces for each 60-day window the responses of individual risk factors conditional on the specific variables used as the shock origin. In a second step, for each scenario the 60-day



window which, on average, implies the maximum conditional responses to the shock is selected to produce the scenario shock responses.

Overview of the scenario results

Table 2 presents the median responses of risk factors to the shock for each of the three scenarios across seven different market segments and using a two-day or a five-day forward horizon.² Overall, the responses are largest for the segments with variables that co-move with the variables used as the shock origins. The shocks for this exercise are generally smaller than those used in the 2016 bottom-up stress-test, which were not calibrated consistently across variables. However, for many of the risk factors, the responses to the shock are close to the historical two-day minimum or maximum shifts in risk factors. To recall, following the default of a clearing member, a CCP needs to be able to withstand adverse price changes for a minimum of two to five days to close out positions.

Table 2: Scenarios – median responses

	Segment	Type	Units	Scenarios		
				CDS	FX	RATES
Market segments	Equities	Price	percent	-16.1	-7.7	-8.0
		Volatility	multiple	1.29	1.09	1.08
	Commodities	Price	percent	-8.9	-1.9	-2.8
		Volatility	multiple	1.03	1.04	1.00
	Sovereign bonds	Yield 1Y	bps	9	4	18
		Yield 5Y	bps	42	11	24
		Yield 10Y	bps	45	21	42
		Yield 30Y	bps	28	26	45
	FX	Price	percent	-2.8	-5.7	-4.5
		Volatility	multiple	1.29	1.03	1.00
	CDS	Indices	multiple	1.45	1.27	1.22
		Sectors	multiple	1.53	1.21	1.44
	Rates	OIS rates	bps	-5	1	3
		Other Rates	bps	14	3	10
		Volatility	multiple	1.10	1.01	1.02
	Corporate bonds	Yield uncovered bonds	bps	64	26	61
Yield covered bonds		bps	46	22	54	

Note: For volatility shocks, a “multiple” is a factor that will be applied to volatility starting points as observed at a reference date. For the CDS segment, “indices” refers to a set of underlying iTraxx indices and “sectors” refers to various underlying industries.

² See the accompanying tables (Annex B) for the detailed shock profiles for all individual risk factors. CDS, FX, and RATES scenarios are generated using a two-day simulation horizon. In addition, the CDS and RATES scenarios are scaled up to a five-day horizon. These horizons were chosen in order to align the magnitude of the shocks with episodes of market stress in the past.

Annex A: Methodology for designing scenarios for ESMA's EU-wide CCP stress test

1. Methodology

1.1 Risk factor coverage

Each scenario calibrated by ECB staff includes more than 500 risk factors.³ These risk factors cover seven segments: (i) equity markets (ii) commodity markets, (iii) sovereign bond markets, (iv) foreign exchange markets, (v) CDS markets, (vi) money markets, and (vii) corporate bond markets. The database contains prices, yields, and implied volatilities. The sample period for all risk factors includes daily data from 4 January 1999 to 16 September 2016 (about 7,000 time series observations). Each of the consistent scenarios originates from a set of shocks to particular variables from which the responses of all other risk factors across segments are derived.

1.2 Simulation methodology

The simulation methodology is based on a nonparametric conditional expected shortfall approach. In each of the scenarios, the shock originates in a market segment to which CCPs are exposed. The dependencies of all risk factors vis-à-vis the shock origin are captured in a nonparametric manner, i.e. without pre-imposing any parametric functional form on either the marginal distributions or the copula that, together, constitute a joint distribution of all factors. Many of the factors involved in the scenarios are characterised by highly non-normal features; therefore, a nonparametric approach is warranted in order to avoid parametric misspecification that might otherwise result in an underestimation of tail risk responses.

The scenarios are designed under the assumption of a predefined shock probability of 0.1%, along with a forward horizon of two or five business days.⁴ First, a nonparametric conditional expected shortfall shock simulation is conducted using a rolling window of 60 business days over the whole sample period and the conditional responses of all risk factors are recorded. Then, in a second step, the 60-day window which, on average, implies the maximum conditional responses to the shock is selected to generate the shock responses.

To illustrate the window selection step, Chart A1 shows the evolution of the average response of 15 different sector-specific equity market indices, with the bank equity index used as the shock origin. Each point in the chart corresponds to the end of a 60-day window. As an example, the maximum negative response of equity market index returns to a shock to the

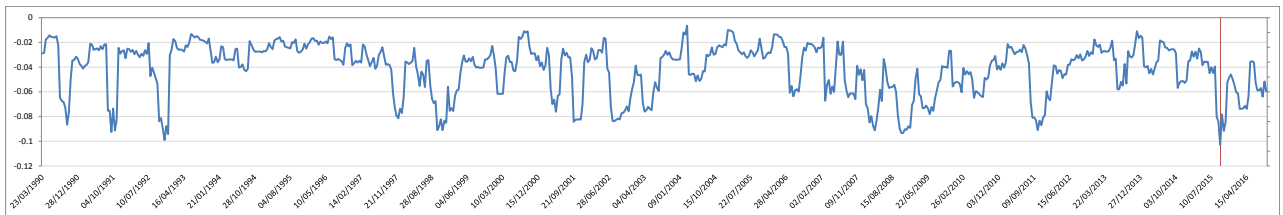
³ While the scenarios were calibrated using 1075 individual risk factors, Annex B reports 553 risk factors for each scenario. This reflects aggregation and, in particular, money market rates and volatility shocks being reported only for selected tenors. Sector level CDS shocks were reported as a 90th percentile over the single name CDS shocks/responses corresponding to the various sectors.

⁴ Under the plain bootstrap approach, used in these simulations, it was not possible to achieve higher severity over a two-day horizon, as reducing the probability to below 0.1% did not add to the severity for statistical reasons. Therefore, the shock response profiles were initially simulated at the two-day horizon with a 0.1% probability and then scaled up to a five-day horizon for CDS and RATES scenarios in order to achieve higher severity.



bank equity price return can be found when referring to the 60-day window spanning the period August to September 2015.

Chart A1. Average equity market index returns following a shock to bank equity returns based on a 60-day moving window



This window selection approach is employed for all seven market segments and across the three scenarios.



Annex B: Financial scenarios for individual risk factors

Segment	#	Unique ID	Name	CDS	FX	RATES
Equities - Prices	1	Stocks_PX_LAST_SXCGSP Index	STOXX Europe 600 Consumer Goods Industry	-13.4%	-6.5%	-8.6%
	2	Stocks_PX_LAST_SXB5SCP Index	STOXX Europe 600 Basic Materials Industry	-15.6%	-10.5%	-8.9%
	3	Stocks_PX_LAST_SX6P Index	STOXX Europe 600 Utilities Industry*	-14.8%	-2.9%	-6.5%
	4	SXCSVP INDEX	STOXX Europe 600 Consumer Services Industry	-12.4%	-7.4%	-7.1%
	5	SXIDUP index	STOXX Europe 600 Industrials Industry	-19.7%	-9.2%	-6.7%
	6	Stocks_PX_LAST_SXDP Index	STOXX Europe 600 Health Care Industry*	-4.8%	-5.5%	-8.2%
	7	Stocks_PX_LAST_SX7P Index	STOXX Europe 600 Banks Supersector	-16.6%	-10.2%	-5.5%
	8	Stocks_PX_LAST_SXIP Index	STOXX Europe 600 Insurance Supersector	-19.3%	-10.4%	-7.7%
	9	SXFP Index	STOXX Europe 600 Financial Services Supersector	-11.2%	-7.9%	-7.6%
	10	SX86P index	STOXX Europe 600 Real Estate Supersector	-15.5%	-6.3%	-9.8%
	11	Stocks_PX_LAST_SXEP Index	STOXX Europe 600 Oil & Gas Supersector	-20.7%	-7.3%	-9.9%
	12	Stocks_PX_LAST_SXKP Index	STOXX Europe 600 Telecommunications Supersector	-17.4%	-6.6%	-8.5%
	13	Stocks_PX_LAST_SX8P Index	STOXX Europe 600 Technology Supersector	-20.7%	-10.0%	-6.4%
	14	Stocks_PX_LAST_National Min INDEX	National indices, Min of DAX30/CAC40/FTSE100	-17.3%	-10.1%	-8.9%
Equities - Volatilities	15	Stocks_HIST_PUT_IMP_VOL_SXEP Index	STXE 600 Oil&Gas € Pr	1.27	1.00	1.16
	16	Stocks_HIST_PUT_IMP_VOL_SX7P Index	STXE 600 Banks € Pr	1.95	1.00	1.01
	17	Stocks_HIST_PUT_IMP_VOL_SXDP Index	STXE 600 HealthCare € Pr	1.71	1.00	1.04
	18	Stocks_HIST_PUT_IMP_VOL_SXKP Index	STXE 600 Telcom € Pr	1.16	1.05	1.00
	19	Stocks_HIST_PUT_IMP_VOL_SXIP Index	STXE 600 Insurance € Pr	1.65	1.22	1.03
	20	Stocks_HIST_PUT_IMP_VOL_SX6P Index	STXE 600 Utilities € Pr	1.29	1.00	1.00
	21	Stocks_HIST_PUT_IMP_VOL_SX8P Index	STXE 600 Technology € Pr	1.00	1.09	1.08
	22	Stocks_HIST_PUT_IMP_VOL_Max(STXE 600 Constr&Mtr, STXE 600 Ind)	STXE 600 Industrials	1.51	1.09	1.09
	23	Stocks_HIST_PUT_IMP_VOL_National Max Index	National indices, Max of DAX30/CAC40/FTSE100	1.59	1.44	1.13
	24	XA31 Index_PX_LAST	VSTOXX, Generic 1st future	1.29	1.30	1.47
	25	XA32 Index_PX_LAST	VSTOXX, Generic 2nd future	1.18	1.30	1.44
Commodities - Prices	26	CMDTY_PX_LAST_LA1 Comdty	Aluminium	-12.7%	-4.1%	-7.1%
	27	XHG1 Comdty_PX_LAST	Generic 1st 'HG' Future - Copper	-11.7%	-7.1%	2.2%
	28	XL11 Comdty_PX_LAST	Generic 1st 'LL' Future - Lead	-25.0%	-12.0%	1.4%
	29	XLN1 Comdty_PX_LAST	Generic 1st 'LN' Future - Nickel	-15.2%	-6.8%	-8.3%
	30	XLT1 Comdty_PX_LAST	Generic 1st 'LT' Future - Tin	-5.8%	-12.5%	2.8%
	31	XLX1 Comdty_PX_LAST	Generic 1st 'LX' Future - Zinc	-13.2%	-6.8%	2.3%
	32	IOE1 Comdty_PX_LAST	Generic 1st 'IOE' Future - Iron Ore	-5.5%	-12.0%	2.7%
	33	XS 1 Comdty_PX_LAST	Generic 1st 'S' Future - Soy	1.4%	-7.6%	-5.4%
	34	XC 1 Comdty_PX_LAST	Generic 1st 'C' Future - Corn	-4.3%	-7.9%	-0.5%
	35	GC 1 Comdty_PX_LAST	Generic 1st 'GC' Future - Gold	-4.6%	-8.9%	-3.5%
	36	XPA1 Comdty_PX_LAST	Generic 1st 'PA' Future - Palladium	2.7%	-10.4%	-0.2%
	37	XS1 Comdty_PX_LAST	Generic 1st 'SI' Future - Silver	-5.4%	-10.4%	-4.0%
	38	CMDTY_PX_LAST_Min(WTI, Brent)	Oil	-27.4%	-9.2%	-18.2%
	39	CMDTY_PX_LAST_XO1 Comdty	Coal	-10.6%	-1.9%	-10.7%
	40	CMDTY_PX_LAST_KC1 Comdty	Coffee	-9.8%	-6.3%	-0.1%
	41	CMDTY_PX_LAST_MO1 Comdty	Emissions	-2.2%	-3.6%	-5.6%
	42	CMDTY_Index_F3EPIP\$	Transportation	-4.4%	-4.6%	-0.5%
	43	CMDTY_PX_LAST_W 1 Comdty	Wheat	-14.6%	-12.0%	-1.1%
	44	CMDTY_PX_LAST_DM1 Comdty	Power (PJM (New York))	-22.5%	-7.2%	-22.9%
	45	G1 Comdty	Phelix power future DE, 1-month, Baseload	-22.7%	0.1%	-12.0%
	46	G1 Comdty	Phelix power future DE, 1-month, Peakload	-15.3%	0.6%	-23.9%
	47	G2 Comdty	Phelix power, monthly, baseload, generic 2nd future	-11.6%	-1.7%	-5.0%
	48	G3 Comdty	Phelix power, monthly, baseload, generic 3rd future	-1.1%	-1.6%	-2.7%
	49	G4 Comdty	Phelix power, monthly, baseload, generic 4th future	-5.3%	-0.6%	-1.8%
	50	G5 Comdty	Phelix power, monthly, baseload, generic 5th future	-21.5%	-1.8%	-1.6%
	51	G6 Comdty	Phelix power, monthly, baseload, generic 6th future	-22.8%	-1.5%	-1.6%
	52	G7 Comdty	Phelix power, monthly, baseload, generic 7th future	-7.6%	-0.7%	-1.9%
	53	GT1 Comdty	Phelix power, quarterly, baseload, generic 1st future	-11.9%	-0.7%	-3.7%
	54	GT2 Comdty	Phelix power, quarterly, baseload, generic 2nd future	-10.1%	-0.8%	-1.6%
	55	GT3 Comdty	Phelix power, quarterly, baseload, generic 3rd future	-8.9%	-0.2%	-0.2%
	56	GT4 Comdty	Phelix power, quarterly, baseload, generic 4th future	-9.1%	-1.2%	-8.7%
	57	GT5 Comdty	Phelix power, quarterly, baseload, generic 5th future	-10.9%	-1.2%	0.9%
	58	GT6 Comdty	Phelix power, quarterly, baseload, generic 6th future	-7.3%	-0.9%	-1.0%
	59	GT7 Comdty	Phelix power, quarterly, baseload, generic 7th future	-6.0%	-0.5%	-1.1%
	60	HP1 Comdty	Phelix power, yearly, baseload, generic 1st future	-10.0%	-1.6%	-0.8%
	61	HP2 Comdty	Phelix power, yearly, baseload, generic 2nd future	-7.6%	-1.9%	-0.6%
	62	HP3 Comdty	Phelix power, yearly, baseload, generic 3rd future	-6.9%	-1.7%	-0.2%
	63	HP4 Comdty	Phelix power, yearly, baseload, generic 4th future	-4.9%	-1.9%	-4.9%
	64	HP5 Comdty	Phelix power, yearly, baseload, generic 5th future	-5.8%	-1.1%	-5.8%
	65	HP6 Comdty	Phelix power, yearly, baseload, generic 6th future	-6.9%	-1.9%	-6.9%
	66	G2 Comdty	Phelix power, monthly, peakload, generic 2nd future	-16.3%	2.7%	-6.1%
	67	G3 Comdty	Phelix power, monthly, peakload, generic 3rd future	-10.6%	-6.5%	-2.9%
	68	G4 Comdty	Phelix power, monthly, peakload, generic 4th future	-11.9%	2.1%	-2.9%
	69	G5 Comdty	Phelix power, monthly, peakload, generic 5th future	-14.8%	-0.8%	-1.6%
70	G6 Comdty	Phelix power, monthly, peakload, generic 6th future	-7.6%	-4.6%	-1.6%	
71	G7 Comdty	Phelix power, monthly, peakload, generic 7th future	-6.4%	0.4%	-3.0%	
72	H1 Comdty	Phelix power, quarterly, peakload, generic 1st future	-13.9%	-1.4%	-4.0%	
73	H2 Comdty	Phelix power, quarterly, peakload, generic 2nd future	-8.4%	-0.8%	-2.1%	
74	H3 Comdty	Phelix power, quarterly, peakload, generic 3rd future	-8.7%	-3.5%	-1.0%	
75	H4 Comdty	Phelix power, quarterly, peakload, generic 4th future	-9.2%	-2.2%	-2.1%	
76	H5 Comdty	Phelix power, quarterly, peakload, generic 5th future	-6.3%	-2.3%	-0.6%	
77	H6 Comdty	Phelix power, quarterly, peakload, generic 6th future	-5.3%	-1.1%	-0.5%	
78	H7 Comdty	Phelix power, quarterly, peakload, generic 7th future	-3.9%	-2.3%	-1.4%	



Segment	#	Unique ID	Name	CDS	FX	RATES
	79	NE1 Comdty	Phelix power, yearly , peakload, generic 1st future	-10.1%	-2.1%	-1.3%
	80	NE2 Comdty	Phelix power, yearly , peakload, generic 2nd future	-5.3%	-1.2%	-0.5%
	81	NE3 Comdty	Phelix power, yearly , peakload, generic 3rd future	-6.2%	-2.1%	-0.6%
	82	NE4 Comdty	Phelix power, yearly , peakload, generic 4th future	-4.9%	-2.0%	-4.9%
	83	NE5 Comdty	Phelix power, yearly , peakload, generic 5th future	-7.4%	-0.5%	-5.2%
	84	NE6 Comdty	Phelix power, yearly , peakload, generic 6th future	-6.0%	-0.8%	-5.1%
	85	CMDTY_PX_LAST_NG1 Comdty	Natural Gas, Henry Hub (Nymex)	-2.1%	-5.2%	-2.9%
	86	TZ1 Comdty, FN1 Comdty	Natural Gas, min(TTF, UK), monthly, baseload, generic 1st future	-20.5%	-5.6%	-9.6%
	87	TZ2 Comdty, FN2 Comdty	Natural Gas, min(TTF, UK), monthly, baseload, generic 2nd future	-19.4%	-0.4%	-14.9%
	88	QZ1 Comdty, QR1 Comdty	Natural Gas, min(TTF, UK), quarterly, baseload, generic 1st future	-18.5%	-1.0%	-16.3%
	89	QZ2 Comdty, QR2 Comdty	Natural Gas, min(TTF, UK), quarterly, baseload, generic 2nd future	-11.9%	-1.2%	-11.1%
	90	QTT1 Comdty	TTF Natural Gas, yearly, baseload, generic 1st future	-11.9%	-1.5%	-11.9%
	91	QTT2 Comdty	TTF Natural Gas, yearly, baseload, generic 2nd future	-7.2%	-2.5%	-7.2%
	92	SA1 Comdty	Natural Gas (UK), seasonal, generic 1st future	-11.8%	-0.9%	-11.8%
	93	SA2 Comdty	Natural Gas (UK), seasonal, generic 2nd future	-9.0%	-2.9%	-9.3%
Commodities - Volatilities	94	CMDTY_HIST_PUT_IMP_VOL_MO1 Comdty	Emissions	1.00	1.00	1.00
	95	CMDTY_HIST_PUT_IMP_VOL_W 1 Comdty	Wheat	1.07	1.13	1.00
	96	CMDTY_HIST_PUT_IMP_VOL_LA1 Comdty	Aluminium	1.00	1.00	1.00
	97	CMDTY_HIST_PUT_IMP_VOL_NG1 Comdty	Natural Gas	1.00	1.00	1.05
	98	CMDTY_HIST_PUT_IMP_VOL_Max(Brent, WTI)	Oil	1.35	1.05	1.35
	99	CMDTY_HIST_PUT_IMP_VOL_HP1 Comdty	Phelix, yearly, baseload, generic 1st future	1.10	1.03	1.05
	100	CMDTY_HIST_PUT_IMP_VOL_KC1 Comdty	Coffee	1.37	1.08	1.00
	101	CMDTY_HIST_PUT_IMP_VOL_DM1 Comdty	Electricity	1.00	1.16	1.00
Sovereign bonds	102	FM.B.BE.EUR.RT.BB.BE1YT_RR.YLD	BE - 1Y	9	-4	30
	103	FM.B.BG.BGN.RT.BB.BG1YT_RR.YLD	BG - 1Y	-71	-51	-73
	104	FM*CY1	CY - 1Y	29	30	36
	105	FM.B.CZ.CZK.RT.BB.CZ1YT_RR.YLD	CZ - 1Y	34	-16	62
	106	FM.B.DK.DKK.RT.BB.DK1YT_RR.YLD	DK - 1Y	4	-10	-3
	107	FM.B.DE.EUR.RT.BB.DE1YT_RR.YLD	DE - 1Y	11	-37	0
	108	FM.B.IE.EUR.RT.BB.IE1YT_RR.YLD	IE - 1Y	88	62	108
	109	FM.B.ES.EUR.RT.BB.ES1YT_RR.YLD	ES - 1Y	50	30	50
	110	FM*FI1	FI - 1Y	30	30	37
	111	FM.B.FR.EUR.RT.BB.FR1YT_RR.YLD	FR - 1Y	9	-3	25
	112	FM*GR1	GR - 1Y	100	102	123
	113	FM.B.HR.HRK.RT.BB.HR1YT_RR.YLD	HR - 1Y	-9	-3	-22
	114	FM.B.IT.EUR.RT.BB.IT1YT_RR.YLD	IT - 1Y	57	34	57
	115	FM.B.LT.EUR.RT.BB.LT1YT_RR.YLD	LT - 1Y	-7	-37	18
	116	FM*LU1	LU - 1Y	31	31	38
	117	FM*LV1	LV - 1Y	33	33	40
	118	FM*MT1	MT - 1Y	33	33	40
	119	FM.B.HU.HUF.RT.BB.HU1YT_RR.YLD	HU - 1Y	89	1	8
	120	FM.B.NL.EUR.RT.BB.NL1YT_RR.YLD	NL - 1Y	4	3	-4
	121	FM.B.AT.EUR.RT.BB.AT1YT_RR.YLD	AT - 1Y	-19	-24	-41
	122	FM.B.PL.PLN.RT.BB.PL1YT_RR.YLD	PL - 1Y	29	-72	-89
	123	FM.B.PT.EUR.RT.BB.PT1YT_RR.YLD	PT - 1Y	35	17	56
	124	FM.B.RO.RO.N.RT.BB.RO1YT_RR.YLD	RO - 1Y	0	98	32
	125	FM*SI1	SI - 1Y	43	43	53
	126	FM.B.SK.EUR.RT.BB.SK1YT_RR.YLD	SK - 1Y	-168	21	-104
	127	FM.B.SE.SEK.BL.BB.GTSEK1Y.YLD	SE - 1Y	6	12	4
	128	FM.B.GB.GBP.RT.BB.GB1YT_RR.YLD	GB - 1Y	-1	14	-3
	129	FM.B.AU.AUD.RT.BB.AU1YT_RR.YLD	AU - 1Y	-6	4	30
	130	FM.B.CA.CAD.RT.BB.CA1YT_RR.YLD	CA - 1Y	4	14	3
	131	FM.B.JP.JPY.RT.BB.JP1YT_RR.YLD	JP - 1Y	1	2	-1
	132	FM.B.NO.NOK.RT.BB.NO1YT_RR.YLD	NO - 1Y	1	2	-34
	133	FM.B.CH.CHF.RT.BB.CH1YT_RR.YLD	CH - 1Y	3	-24	-52
	134	FM.B.US.USD.BL.BB.USGG12M.HST	US - 1Y	0	2	-5
	135	FM.B.BE.EUR.DS.BB.BMBG05Y.YLD	BE - 5Y	61	11	61
	136	FM.B.BG.BGN.RT.BB.BG5YT_RR.YLD	BG - 5Y	27	26	26
	137	FM.B.CZ.CZK.RT.BB.CZ5YT_RR.YLD	CZ - 5Y	21	16	-69
	138	FM.B.DK.DKK.DS.BB.BMDK05Y.YLD	DK - 5Y	44	-1	22
	139	FM.B.DE.EUR.DS.BB.BMDE05Y.YLD	DE - 5Y	42	19	55
	140	FM.B.IE.EUR.DS.BB.BMIE05Y.YLD	IE - 5Y	48	19	70
	141	FM.B.ES.EUR.DS.BB.BMES05Y.YLD	ES - 5Y	79	20	74
	142	FM.B.FR.EUR.DS.BB.BMFR05Y.YLD	FR - 5Y	56	18	55
	143	FM.B.HR.HRK.RT.BB.HR5YT_RR.YLD	HR - 5Y	40	-2	20
	144	FM.B.IT.EUR.DS.BB.BMIT05Y.YLD	IT - 5Y	84	16	59
	145	FM.B.LV.EUR.RT.BB.LV5YT_RR.YLD	LV - 5Y	-16	4	1
	146	FM.B.LT.EUR.RT.BB.LT5YT_RR.YLD	LT - 5Y	34	1	1
	147	FM.B.HU.HUF.RT.BB.HU5YT_RR.YLD	HU - 5Y	93	4	9
	148	FM.B.MT.EUR.RT.BB.MT5YT_RR.YLD	MT - 5Y	11	7	11
	149	FM.B.NL.EUR.DS.BB.BMNL05Y.YLD	NL - 5Y	51	16	61
	150	FM.B.AT.EUR.DS.BB.BMOE05Y.YLD	AT - 5Y	53	23	57
	151	FM.B.PL.PLN.RT.BB.PL5YT_RR.YLD	PL - 5Y	-6	-8	-32
	152	FM.B.PT.EUR.DS.BB.BMPT05Y.YLD	PT - 5Y	105	13	51
	153	FM.B.RO.RO.N.RT.BB.RO5YT_RR.YLD	RO - 5Y	58	-98	17
	154	FM.B.SI.EUR.RT.BB.SI5YT_RR.YLD	SI - 5Y	92	58	0
	155	FM.B.SK.EUR.RT.BB.SK5YT_RR.YLD	SK - 5Y	41	-1	21
	156	FM.B.FI.EUR.DS.BB.BMFI05Y.YLD	FI - 5Y	43	11	57
	157	FM.B.SE.SEK.DS.BB.BMSD05Y.YLD	SE - 5Y	34	2	25
	158	FM.B.GB.GBP.DS.BB.BMUK05Y.YLD	GB - 5Y	62	10	50
	159	FM.B.AU.AUD.RT.BB.AU5YT_RR.YLD	AU - 5Y	30	13	12
	160	FM.B.CA.CAD.RT.BB.CA5YT_RR.YLD	CA - 5Y	15	-5	-4
	161	FM.B.JP.JPY.DS.BB.BMJP05Y.YLD	JP - 5Y	5	8	7
	162	FM.B.NO.NOK.DS.BB.BMNO5Y.YLD	NO - 5Y	10	4	34
	163	FM.B.CH.CHF.DS.BB.BMSW05Y.YLD	CH - 5Y	23	27	42
	164	FM.B.US.USD.BL.BB.USGG5YR.HST	US - 5Y	14	-4	6



Segment	#	Unique ID	Name	CDS	FX	RATES
	165	FM.B.AT.EUR.DS.BB.BMOE10Y.YLD	AT - 10Y	49	24	46
	166	FM.B.BE.EUR.DS.BB.BMBG10Y.YLD	BE - 10Y	61	24	45
	167	FM.B.BG.BGN.RT.BB.BG10YT_RR.YLD	BG - 10Y	7	-10	124
	168	FM*CY10	CY - 10Y	56	22	47
	169	FM.B.CZ.CZK.RT.BB.CZ10YT_RR.YLD	CZ - 10Y	25	7	8
	170	FM.B.DE.EUR.DS.BB.BMBD10Y.YLD	DE - 10Y	34	23	41
	171	FM.B.DK.DKK.DS.BB.BMDK10Y.YLD	DK - 10Y	36	2	0
	172	FM.B.ES.EUR.DS.BB.BMES10Y.YLD	ES - 10Y	76	22	42
	173	FM.B.FI.EUR.RT.BB.FI10YT_RR.YLD	FI - 10Y	45	21	62
	174	FM.B.FR.EUR.DS.BB.BMFR10Y.YLD	FR - 10Y	45	26	44
	175	FM.B.GB.GBP.DS.BB.BMUK10Y.YLD	GB - 10Y	51	22	48
	176	FM.B.GR.EUR.DS.BB.BMGR10Y.YLD	GR - 10Y	138	20	43
	177	FM.B.HR.HRK.RT.BB.HR10YT_RR.YLD	HR - 10Y	50	28	44
	178	FM.B.HU.HUF.RT.BB.HU10YT_RR.YLD	HU - 10Y	120	-2	9
	179	FM.B.IE.EUR.DS.BB.BMIR10Y.YLD	IE - 10Y	55	36	54
	180	FM.B.IT.EUR.DS.BB.BMIT10Y.YLD	IT - 10Y	83	21	31
	181	FM.B.LT.EUR.RT.BB.LT10YT_RR.YLD	LT - 10Y	-16	0	177
	182	FM*LV10	LV - 10Y	63	24	52
	183	FM.B.LU.EUR.4F.BB.BMLU10Y.YLD	LU - 10Y	41	24	67
	184	FM.B.MT.EUR.RT.BB.MT10YT_RR.YLD	MT - 10Y	6	4	6
	185	FM.B.NL.EUR.DS.BB.BMNL10Y.YLD	NL - 10Y	46	23	48
	186	FM.B.PL.PLN.RT.BB.PL10YT_RR.YLD	PL - 10Y	109	-8	-14
	187	FM.B.PT.EUR.DS.BB.BMPT10Y.YLD	PT - 10Y	96	25	45
	188	FM.B.RO.RO.N.RT.BB.RO10YT_RR.YLD	RO - 10Y	44	98	30
	189	FM.B.SE.SEK.DS.BB.BMSD10Y.YLD	SE - 10Y	40	4	24
	190	FM.B.SI.EUR.RT.BB.SI10YT_RR.YLD	SI - 10Y	75	51	37
	191	FM.B.SK.EUR.RT.BB.SK10YT_RR.YLD	SK - 10Y	84	18	93
	192	FM.B.AU.AUD.RT.BB.AU10YT_RR.YLD	AU - 10Y	26	16	4
	193	FM.B.CA.CAD.RT.BB.CA10YT_RR.YLD	CA - 10Y	20	-1	-4
	194	FM.B.JP.JPY.DS.BB.BMJP10Y.YLD	JP - 10Y	4	10	9
	195	FM.B.NO.NOK.DS.BB.BMNW10Y.YLD	NO - 10Y	36	16	31
	196	FM.B.CH.CHF.DS.BB.BMSG10YR.HST	CH - 10Y	42	7	24
	197	FM.B.US.USD.BL.BB.USGG10YR.HST	US - 10Y	14	-1	6
	198	FM.B.BE.EUR.DS.BB.BMBG30Y.YLD	BE - 30Y	40	31	48
	199	FM.B.DK.DKK.DS.BB.BMDK30Y.YL	DK - 30Y	-5	20	13
	200	FM.B.DE.EUR.DS.BB.BMBD30Y.YLD	DE - 30Y	17	32	50
	201	FM.B.ES.EUR.DS.BB.BMES30Y.YLD	ES - 30Y	56	33	46
	202	FM.B.FR.EUR.DS.BB.BMFR30Y.YLD	FR - 30Y	30	33	46
	203	FM.B.IT.EUR.DS.BB.BMIT30Y.YLD	IT - 30Y	40	22	27
	204	FM.B.NL.EUR.DS.BB.BMNL30Y.YLD	NL - 30Y	21	33	48
	205	FM.B.AT.EUR.DS.BB.BMOE30Y.YLD	AT - 30Y	30	32	49
	206	FM.B.PT.EUR.RT.BB.PT30YT_RR.YLD	PT - 30Y	76	34	44
	207	FM.B.FI.EUR.DS.BB.BMFI10Y.YLD	FI - 30Y	44	22	45
	208	FM.B.SE.SEK.RT.BB.SE30YT_RR.YLD	SE - 30Y	30	21	33
	209	FM.B.GB.GBP.DS.BB.BMUK30Y.YL	GB - 30Y	15	3	7
	210	FM.B.CA.CAD.DS.BB.BMCN30Y.YLD	CA - 30Y	14	4	5
	211	FM.B.JP.JPY.RT.BB.JP30YT_RR.YLD	JP - 30Y	9	28	14
	212	FM.B.CH.CHF.RT.BB.CH30YT_RR.YLD	CH - 30Y	26	23	46
	213	FM.B.US.USD.BL.BB.USGG30YR.HST	US - 30Y	19	4	4
FX - Prices	214	EXR_AUD_EUR_A	EUR - AUD	-3.9%	-1.8%	-6.3%
	215	EXR_CAD_EUR_A	EUR - CAD	-3.3%	-5.7%	-9.7%
	216	EXR_CHF_EUR_A	EUR - CHF	-4.2%	-2.5%	-0.7%
	217	EXR_CNY_EUR_A	EUR - CNY	-4.8%	-6.5%	-4.5%
	218	EXR_GBP_EUR_A	EUR - GBP	-4.5%	-4.4%	-4.7%
	219	EXR_JPY_EUR_A	EUR - JPY	-8.4%	-6.6%	-1.1%
	220	EXR_USD_EUR_A	EUR - USD	-4.8%	-7.1%	-4.7%
	221	EXR_ARS_EUR_A	EUR - ARS	-4.1%	-6.9%	-6.0%
	222	EXR_BRL_EUR_A	EUR - BRL	0.6%	-5.9%	-17.1%
	223	EXR_CZK_EUR_A	EUR - CZK	1.1%	-0.5%	-3.3%
	224	EXR_DKK_EUR_A	EUR - DKK	0.0%	-0.1%	0.1%
	225	EXR_DZD_EUR_A	EUR - DZD	-3.0%	-0.2%	-0.1%
	226	EXR_EGP_EUR_A	EUR - EGP	-3.3%	-7.1%	-3.9%
	227	EXR_HKD_EUR_A	EUR - HKD	-4.6%	-7.1%	-4.7%
	228	EXR_HRK_EUR_A	EUR - HRK	0.1%	0.1%	-0.7%
	229	EXR_HUF_EUR_A	EUR - HUF	3.0%	-2.9%	-0.4%
	230	EXR_IDR_EUR_A	EUR - IDR	-3.5%	-6.9%	-6.8%
	231	EXR_ILS_EUR_A	EUR - ILS	-2.8%	-4.0%	-4.5%
	232	EXR_INR_EUR_A	EUR - INR	-2.2%	-7.3%	-3.5%
	233	EXR_KRW_EUR_A	EUR - KRW	-0.1%	-7.9%	-6.6%
	234	EXR_MAD_EUR_A	EUR - MAD	-0.3%	-1.6%	-0.8%
	235	EXR_MXN_EUR_A	EUR - MXN	-0.8%	-6.7%	-9.7%
	236	EXR_MYR_EUR_A	EUR - MYR	-2.2%	-6.3%	-3.8%
	237	EXR_NOK_EUR_A	EUR - NOK	-1.3%	-2.8%	0.0%
	238	EXR_NZD_EUR_A	EUR - NZD	-8.1%	-4.0%	-6.2%
	239	EXR_PHP_EUR_A	EUR - PHP	-2.2%	-7.7%	-5.6%
	240	EXR_PLN_EUR_A	EUR - PLN	4.8%	-3.3%	-6.5%
	241	EXR RON_EUR_A	EUR - RON	0.7%	-0.6%	1.3%
	242	EXR RUB_EUR_A	EUR - RUB	0.9%	-6.7%	-4.8%
	243	EXR SEK_EUR_A	EUR - SEK	2.3%	-2.3%	-3.2%
	244	EXR SGD_EUR_A	EUR - SGD	-3.3%	-5.4%	-3.1%
	245	EXR THB_EUR_A	EUR - THB	-4.6%	-6.9%	-3.5%
	246	EXR TRY_EUR_A	EUR - TRY	-0.6%	-5.7%	-7.8%
	247	EXR TWD_EUR_A	EUR - TWD	-3.5%	0.7%	-3.9%
	248	EXR ZAR_EUR_A	EUR - ZAR	-3.4%	-7.3%	-8.5%



Segment	#	Unique ID	Name	CDS	FX	RATES
FX - Volatilities	249	EXR_CHF_EUR_AFX_Implied_VOLA	CHF Vol	1.26	1.03	0.99
	250	EXR_CNY_EUR_AFX_Implied_VOLA	CNY Vol	1.30	1.12	1.30
	251	EXR_CZK_EUR_AFX_Implied_VOLA	CZK Vol	1.21	1.00	1.00
	252	EXR_GBP_EUR_AFX_Implied_VOLA	GBP Vol	1.29	1.26	1.06
	253	EXR_HUF_EUR_AFX_Implied_VOLA	HUF Vol	1.18	1.00	1.00
	254	EXR_JPY_EUR_AFX_Implied_VOLA	JPY Vol	1.25	1.18	1.00
	255	EXR_PLN_EUR_AFX_Implied_VOLA	PLN Vol	1.29	1.00	1.00
	256	EXR_SEK_EUR_AFX_Implied_VOLA	SEK Vol	1.36	1.00	0.99
257	EXR_USD_EUR_AFX_Implied_VOLA	USD Vol	1.54	1.16	1.00	
CDS - Indices	258	CDS_5y_EUR_DIXE5EC	ITRAXX EUROPE 5Y	1.44	1.27	1.27
	259	CDS_5y_EUR_DIXH5EC	ITRAXX HIVOL 5Y	1.46	1.27	1.30
	260	CDS_5y_EUR_DIXN5EC	ITRAXX NON FINL 5Y	1.45	1.27	1.21
	261	CDS_5y_EUR_DIXS5EC	ITRAXX SEN FINL 5Y	1.65	1.35	1.21
	262	CDS_5y_EUR_DIXU5EC	ITRAXX SUB FINL 5Y	1.50	1.33	1.22
	263	CDS_5y_EUR_DIXC5EC	ITRAXX XOVER 5Y	1.37	1.26	1.16
CDS - Sectors	264	CDS_5y_EUR_Basic Materials	CDS - Basic Materials	1.46	1.21	1.49
	265	CDS_5y_EUR_Communications	CDS - Communications	1.64	1.17	1.38
	266	CDS_5y_EUR_Consumer (Cyclical)	CDS - Consumer (Cyclical)	1.55	1.21	1.42
	267	CDS_5y_EUR_Consumer (Non-Cyclical)	CDS - Consumer (Non-Cyclical)	1.38	1.28	1.46
	268	CDS_5y_EUR_Energy	CDS - Energy	1.41	1.11	1.40
	269	CDS_5y_EUR_Financials	CDS - Financials	1.65	1.38	1.51
	270	CDS_5y_EUR_Industrial	CDS - Industrial	1.53	1.24	1.44
	271	CDS_5y_EUR_Technology	CDS - Technology	1.29	1.11	1.17
272	CDS_5y_EUR_Utillities	CDS - Utilities	1.54	1.24	1.46	
Rates - OIS	273	EUSWEA Curncy	EUR SWAP (EONIA) 1 MO	-9	-4	0
	274	EUSWEC Curncy	EUR SWAP (EONIA) 3 MO	-15	-1	2
	275	EUSWE1 Curncy	EUR SWAP (EONIA) 1 YR	-22	-5	17
	276	EUSWE2 Curncy	EUR SWAP (EONIA) 2 YR	-28	-3	27
	277	EUSWE5 Curncy	EUR SWAP (EONIA) 5 YR	-36	4	31
	278	EUSWE10 Curncy	EUR SWAP (EONIA) 10 YR	-41	5	34
	279	EUSWE30 Curncy	EUR SWAP (EONIA) 30 YR	-34	18	38
	280	BPSWSA Curncy	GBP SWAP (vs SONIA) 1 MO	0	-9	-5
	281	BPSWSC Curncy	GBP SWAP (vs SONIA) 3 MO	-1	-5	-2
	282	BPSWS1 Curncy	GBP SWAP (vs SONIA) 1 YR	3	5	-6
	283	BPSWS2 Curncy	GBP SWAP (vs SONIA) 2 YR	0	4	5
	284	BPSWS5 Curncy	GBP SWAP (vs SONIA) 5 YR	-25	6	26
	285	BPSWS10 Curncy	GBP SWAP (vs SONIA) 10YR	-41	12	36
	286	BPSWS30 Curncy	GBP SWAP (vs SONIA) 30YR	-34	10	31
	287	USSOA Curncy	USD SWAP OIS 1 MO	0	0	3
	288	USSOC Curncy	USD SWAP OIS 3 MO	0	-1	1
	289	USSO1 Curncy	USD SWAP OIS 1 YR	-2	-3	2
	290	USSO2 Curncy	USD SWAP OIS 2 YR	-5	-10	4
	291	USSO5 Curncy	USD SWAP OIS 5 YR	-25	-7	18
	292	USSO10 Curncy	USD SWAP OIS 10 YR	-49	-4	30
	293	SFSWTA Curncy	CHF SWAP TOIS 1 MO	6	2	1
	294	SFSWTC Curncy	CHF SWAP TOIS 3 MO	-3	-2	2
	295	SFSWT1 Curncy	CHF SWAP TOIS 12 MO	-5	6	8
	296	SFSWT2 Curncy	CHF SWAP TOIS 2 YR	-9	14	10
	297	SFSWT5 Curncy	CHF SWAP TOIS 5 YR	-13	20	12
	298	SFSWT10 Curncy	CHF SWAP TOIS 10 YR	-14	21	13
	299	SFSWT30 Curncy	CHF SWAP TOIS 30 YR	-16	17	13
	300	JYSOA Curncy	JPY SWAP vs TONAR 1 MO	1	-1	0
	301	JYSOC Curncy	JPY SWAP vs TONAR 3 MO	0	0	0
	302	JYSO1 Curncy	JPY SWAP vs TONAR 1 YR	0	5	1
	303	JYSO2 Curncy	JPY SWAP vs TONAR 2 YR	0	4	1
	304	JYSO5 Curncy	JPY SWAP vs TONAR 5 YR	-3	1	3
	305	JYSO10 Curncy	JPY SWAP vs TONAR 10 YR	-5	2	6
	306	JYSO30 Curncy	JPY SWAP vs TONAR 30 YR	-5	1	4
	307	CDSOA Curncy	CAD SWAP OIS 1 MO	3	-3	0
	308	CDSOC Curncy	CAD SWAP OIS 3 MO	-2	1	4
	309	CDSO1 Curncy	CAD SWAP OIS 1 YR	-18	1	11
	310	CDSO2 Curncy	CAD SWAP OIS 2 YR	-20	-2	13
	311	CDSO5 Curncy	CAD SWAP OIS 5 YR	-32	-7	22
	312	DKSWTNA Curncy	DKK SWAP T/N INDEXED 1MO	0	-9	0
	313	DKSWTNC Curncy	DKK SWAP T/N INDEXED 3MO	-5	-10	0
314	DKSWTN1 Curncy	DKK SWAP T/N INDEXED 1YR	-26	-14	17	
315	SKSWTNA Curncy	SEK SWAP OIS 1 MO	0	-3	7	
316	SKSWTNC Curncy	SEK SWAP OIS 3 MO	-8	-3	7	
317	SKSWTN1 Curncy	SEK SWAP OIS 1 YR	-24	0	20	
318	ADSOA Curncy	AUD SWAP OIS 1 MO	-18	-8	9	
319	ADSOC Curncy	AUD SWAP OIS 3 MO	-19	1	20	
320	ADSO1 Curncy	AUD SWAP OIS 12 MO	-30	5	32	
321	NDSOA Curncy	NZD SWAP OIS 1 MO	-1	-2	-1	
322	NDSOC Curncy	NZD SWAP OIS 3 MO	-1	2	1	
323	NDSO1 Curncy	NZD SWAP OIS 1 YR	-10	7	9	
324	MPSWC Curncy	MXN SWAP (TIIE) 3 MO	0	0	-3	
325	MPSW1A Curncy	MXN SWAP (TIIE) 13 MO	-6	-4	3	
326	MPSW2B Curncy	MXN SWAP (TIIE) 26 MO	3	0	0	
327	MPSW5E Curncy	MXN SWAP (TIIE) 65 MO	14	2	-1	
328	MPSW10K Curncy	MXN SWAP (TIIE) 130 MO	17	-2	-10	
329	MPSW32F Curncy	MXN SWAP (TIIE) 390 MO	16	-3	-10	
330	IRSWOA Curncy	INR SWAP ONSH OIS 1 MO	-10	0	-3	
331	IRSWOC Curncy	INR SWAP ONSH OIS 3 MO	-13	-12	-3	
332	IRSWO1 Curncy	INR SWAP ONSH OIS 12MO	-12	-5	-4	
333	IRSWO2 Curncy	INR SWAP ONSH OIS 2 YR	-18	1	-5	
334	IRSWO5 Curncy	INR SWAP ONSH OIS 5 YR	-20	28	-3	
335	IRSWO10 Curncy	INR SWAP ONSH OIS 10YR	-20	37	0	
336	CLSWIBA Curncy	SWAP COP X IBR 1M	-5	3	0	
337	CLSWIBC Curncy	SWAP COP X IBR 3M	2	10	-3	
338	CLSWIB1 Curncy	SWAP COP X IBR 1Y	3	13	8	
339	CLSWIB2 Curncy	SWAP COP X IBR 2 YR	13	11	-10	
340	CLSWIB5 Curncy	SWAP COP X IBR 5 YR	-1	12	4	
341	CLSWIB10 Curncy	SWAP COP X IBR 10YR	5	2	-20	



Segment	#	Unique ID	Name	CDS	FX	RATES
Rates - Other	342	EUR001M Index	1M EUR swap	-1	-6	0
	343	EUR003M Index	3M EUR swap	2	-5	1
	344	EUSA1 Curncy	1Y EUR swap	30	-4	16
	345	EUSA2 Curncy	2Y EUR swap	47	6	33
	346	EUSA5 Curncy	5Y EUR swap	53	14	39
	347	EUSA10 Curncy	10Y EUR swap	42	18	44
	348	EUSA30 Curncy	30Y EUR swap	32	27	52
	349	BP0001M Index	1M GBP swap	-5	-8	2
	350	BP0003M Index	3M GBP swap	0	-8	3
	351	US0001M Index	1M USD swap	3	-1	20
	352	US0003M Index	3M USD swap	8	-1	1
	353	USSWAP1 Curncy	1Y USD swap	29	-9	-10
	354	USSWAP2 Curncy	2Y USD swap	48	-13	-6
	355	USSWAP5 Curncy	5Y USD swap	53	-14	24
	356	USSWAP10 Curncy	10Y USD swap	44	-12	49
	357	USSWAP30 Curncy	30Y USD swap	39	-20	60
	358	SF0001M Index	1M CHF swap	0	-2	1
	359	SF0003M Index	3M CHF swap	-1	-3	3
	360	WIBR1M Index	1M PLN swap	-3	-2	3
	361	WIBR3M Index	3M PLN swap	2	-3	27
	362	PZSW1 Curncy	1Y PLN swap	-4	-13	1
	363	CDOR01 Index	1M CAD swap	4	-6	10
	364	CDOR03 Index	3M CAD swap	11	-5	0
	365	CDSW1 Curncy	1Y CAD swap	22	3	15
	366	CDSW2 Curncy	2Y CAD swap	32	-1	22
	367	CDSW5 Curncy	5Y CAD swap	37	-5	34
	368	CDSW10 Curncy	10Y CAD swap	30	-1	36
	369	CDSW30 Curncy	30Y CAD swap	24	7	31
	370	STIB1M Index	1M SEK swap	-1	-1	2
	371	STIB3M Index	3M SEK swap	-1	0	7
	372	SKSW2 Curncy	2Y SEK swap	37	2	32
	373	SKSW5 Curncy	5Y SEK swap	50	17	51
	374	SKSW10 Curncy	10Y SEK swap	43	3	30
	375	SKSW30 Curncy	30Y SEK swap	42	3	36
	376	HIHD01M Index	1M HKD swap	2	0	24
	377	HIHD03M Index	3M HKD swap	3	-3	26
	378	HDSW1 Curncy	1Y HKD swap	22	-2	0
	379	HDSW2 Curncy	2Y HKD swap	28	1	-3
	380	HDSW5 Curncy	5Y HKD swap	20	18	16
	381	HDSW10 Curncy	10Y HKD swap	16	36	32
	382	JIBA1M Index	1M ZAR swap	-3	9	8
	383	JIBA3M Index	3M ZAR swap	-2	12	12
	384	SASW1 Curncy	1Y ZAR swap	2	5	-8
	385	SASW2 Curncy	2Y ZAR swap	13	9	-19
	386	SASW5 Curncy	5Y ZAR swap	20	16	-35
	387	SASW10 Curncy	10Y ZAR swap	32	21	-40
	388	SASW30 Curncy	30Y ZAR swap	30	20	-38
	389	ADBB1M Curncy	1M AUD swap	-2	2	9
	390	ADBB2M Curncy	3M AUD swap	7	0	9
	391	ADSWAP1Q Curncy	1Y AUD swap	32	4	33
	392	ADSWAP2Q Curncy	2Y AUD swap	64	-1	71
	393	ADSWAP5 Curncy	5Y AUD swap	63	1	62
	394	ADSWAP10 Curncy	10Y AUD swap	77	1	54
	395	ADSWAP30 Curncy	30Y AUD swap	44	12	62
	396	NDBB1M Curncy	1M NZD swap	5	-2	-9
	397	NDBB3M Curncy	3M NZD swap	6	4	6
	398	NDSWAP1 Curncy	1Y NZD swap	-5	5	17
	399	NDSWAP2 Curncy	2Y NZD swap	50	4	32
	400	NDSWAP5 Curncy	5Y NZD swap	63	5	33
	401	NDSWAP10 Curncy	10Y NZD swap	54	6	35
	402	BP0012M Index	1Y GBP swap	15	-7	20
	403	BPSW2 Curncy	2Y GBP swap	55	3	6
	404	BPSW5 Curncy	5Y GBP swap	50	6	29
	405	BPSW10 Curncy	10Y GBP swap	43	12	57
	406	BPSW30 Curncy	30Y GBP swap	29	13	45
	407	SF0012M Index	1Y CHF swap	8	-3	8
	408	SFSW2 Curncy	2Y CHF swap	18	6	15
	409	SFSW5 Curncy	5Y CHF swap	23	12	16
	410	SFSW10 Curncy	10Y CHF swap	22	18	20
	411	SFSW30 Curncy	30Y CHF swap	27	22	19
	412	PZSW2 Curncy	2Y PLN swap	-1	4	-17
	413	PZSW5 Curncy	5Y PLN swap	-1	15	-18
	414	PZSW10 Curncy	10Y PLN swap	-1	19	-24
	415	PZSW30 Curncy	30Y PLN swap	-11	17	-20
	416	JY0001M Index	1M JPY swap	0	-4	0
	417	JY0003M Index	3M JPY swap	0	-2	0
	418	JYSWAP1 Curncy	1Y JPY swap	0	-2	1
	419	JYSWAP2 Curncy	2Y JPY swap	2	2	2
	420	JYSWAP5 Curncy	5Y JPY swap	2	10	6
	421	JYSWAP10 Curncy	10Y JPY swap	7	16	10
	422	JYSW30 Curncy	30Y JPY swap	14	20	10
	423	PRIB01M Index	1M CZK swap	-13	-8	6
	424	PRIB03M Index	3M CZK swap	1	-9	3
	425	PRIB01Y Index	1Y CZK swap	1	-8	-10
	426	CKSW2 Curncy	2Y CZK swap	25	15	24
	427	CKSW5 Curncy	5Y CZK swap	28	29	28
	428	CKSW10 Curncy	10Y CZK swap	28	33	36
	429	CKSW30 Curncy	30Y CZK swap	37	38	-13



Segment	#	Unique ID	Name	CDS	FX	RATES
	430	CIBO01M Index	1M DKK swap	0	-3	4
	431	CIBO03M Index	3M DKK swap	2	-3	6
	432	DKSW1 Curncy	1Y DKK swap	21	-5	22
	433	DKSW2 Curncy	2Y DKK swap	42	4	36
	434	DKSW5 Curncy	5Y DKK swap	51	16	50
	435	DKSW10 Curncy	10Y DKK swap	40	22	48
	436	DKSW30 Curncy	30Y DKK swap	39	29	53
	437	BUBOR01M Index	1M HUF swap	-40	-3	-2
	438	BUBOR03M Index	3M HUF swap	-3	-4	3
	439	HFSW2 Curncy	2Y HUF swap	22	-32	-25
	440	HFSW5 Curncy	5Y HUF swap	14	-38	-32
	441	HFSW10 Curncy	10Y HUF swap	6	-9	-34
	442	NIBOR1M Index	1M NOK swap	-15	-2	6
	443	NIBOR3M Index	3M NOK swap	2	-7	9
	444	NKSW1V3 Curncy	1Y NOK swap	7	7	14
	445	NKSW2 Curncy	2Y NOK swap	4	20	24
	446	NKSW5 Curncy	5Y NOK swap	14	18	28
	447	NKSW10 Curncy	10Y NOK swap	17	18	34
	448	NKSW30 Curncy	30Y NOK swap	10	18	31
	449	SDSW1 Curncy	1Y SGD swap	5	12	8
	450	SDSW2 Curncy	2Y SGD swap	13	10	7
	451	SDSW5 Curncy	5Y SGD swap	26	24	6
	452	SDSW10 Curncy	10Y SGD swap	26	27	3
	453	MIFORIM1 Index	1M INR swap	-99	-36	2
	454	MIFORIM3 Index	3M INR swap	-48	-16	-11
	455	IRSWM1 Curncy	1Y INR swap	-19	0	8
	456	IRSWM2 Curncy	2Y INR swap	-20	14	24
	457	IRSWM5 Curncy	5Y INR swap	-10	24	16
	458	IRSWM10 Curncy	10Y INR swap	-63	-6	16
Rates - Volatilities	459	EUNE11 SMKO Curncy	EUR SWPT NVOL OIS 1Y1Y	1.51	1.00	1.02
	460	EUNE12 SMKO Curncy	EUR SWPT NVOL OIS 1Y2Y	1.49	1.01	1.02
	461	EUNE15 SMKO Curncy	EUR SWPT NVOL OIS 1Y5Y	1.33	1.03	1.04
	462	EUNE110 SMKO Curncy	EUR SWPT NVOL OIS 1Y10Y	1.22	1.04	1.05
	463	EUNE130 SMKO Curncy	EUR SWPT NVOL OIS 1Y30Y	1.23	1.02	1.05
	464	BPNE11 SMKO Curncy	GBP NVOL SWPT OIS 1Y1Y	1.23	1.02	1.03
	465	BPNE12 SMKO Curncy	GBP NVOL SWPT OIS 1Y2Y	1.23	1.02	1.03
	466	BPNE15 SMKO Curncy	GBP NVOL SWPT OIS 1Y5Y	1.25	1.01	1.02
	467	BPNE110 SMKO Curncy	GBP NVOL SWPT OIS 1Y10Y	1.22	1.01	1.03
	468	BPNE130 SMKO Curncy	GBP NVOL SWPT OIS 1Y30Y	1.43	1.02	1.07
	469	USSN011 SMKO Curncy	USD SWPT NORM ATM 1Y1Y	1.34	1.00	1.05
	470	USSN012 SMKO Curncy	USD SWPT NORM ATM 1Y2Y	1.34	1.00	1.05
	471	USSN015 SMKO Curncy	USD SWPT NORM ATM 1Y5Y	1.26	1.00	1.03
	472	USSN0110 SMKO Curncy	USD SWPT NORM ATM 1Y10Y	1.14	1.04	1.03
	473	SFNO0130 ICPL Curncy	CHF SWPT NoVal OIS 1Y30Y	1.00	1.09	1.06
	474	JPNE11 SMKO Curncy	JPY SWPT NVOL OIS 1Y1Y	1.00	1.07	1.07
	475	JPNE12 SMKO Curncy	JPY SWPT NVOL OIS 1Y2Y	1.00	1.07	1.07
	476	JPNE15 SMKO Curncy	JPY SWPT NVOL OIS 1Y5Y	1.03	1.19	1.01
	477	JPNE110 SMKO Curncy	JPY SWPT NVOL OIS 1Y10Y	1.04	1.12	1.01
	478	EUSN011 BBIR Curncy	EUR SWPTN NORM 1Y1Y	1.21	1.04	1.29
	479	EUSN012 BBIR Curncy	EUR SWPTN NORM 1Y2Y	1.07	1.10	1.15
	480	EUSN015 BBIR Curncy	EUR SWPTN NORM 1Y5Y	1.17	1.12	1.00
	481	EUSN0110 BBIR Curncy	EUR SWPTN NORM 1Y10Y	1.20	1.13	1.31
	482	EUSN0130 BBIR Curncy	EUR SWPTN NORM 1Y30Y	1.30	1.03	1.20
	483	BPSN011 BBIR Curncy	GBP SWPTN NORM ATM 1Y1Y	1.20	1.03	1.14
	484	BPSN012 BBIR Curncy	GBP SWPTN NORM ATM 1Y2Y	1.17	1.03	1.21
	485	BPSN015 BBIR Curncy	GBP SWPTN NORM ATM 1Y5Y	1.14	1.02	1.24
	486	BPSN0110 BBIR Curncy	GBP SWPTN NORM ATM 1Y10Y	1.20	1.00	1.20
	487	BPSN0130 BBIR Curncy	GBP SWPTN NORM ATM 1Y30Y	1.40	1.02	1.06
	488	USSN011 BBIR Curncy	USD SWPT NORM ATM 1Y1Y	1.33	1.00	1.03
	489	USSN012 BBIR Curncy	USD SWPT NORM ATM 1Y2Y	1.24	1.00	1.01
	490	USSN015 BBIR Curncy	USD SWPT NORM ATM 1Y5Y	1.12	1.02	1.00
	491	USSN0110 BBIR Curncy	USD SWPT NORM ATM 1Y10Y	1.14	1.02	1.00
	492	USSN0130 BBIR Curncy	USD SWPT NORM ATM 1Y30Y	1.00	1.00	1.01
	493	SFSN011 BBIR Curncy	CHF SWPTN NORM ATM 1Y1Y	1.12	1.00	1.00
	494	SFSN012 BBIR Curncy	CHF SWPTN NORM ATM 1Y2Y	1.00	1.00	1.00
	495	SFSN015 BBIR Curncy	CHF SWPTN NORM ATM 1Y5Y	1.00	1.00	1.00
	496	SFSN0110 BBIR Curncy	CHF SWPTN NORM ATM 1Y10Y	1.00	1.00	1.00
	497	SFSN0130 BBIR Curncy	CHF SWPTN NORM ATM 1Y30Y	1.02	1.09	1.00
	498	JYSN011 BBIR Curncy	JPY SWAPTION NORM 1Y1Y	1.00	1.00	1.00
	499	JYSN012 BBIR Curncy	JPY SWAPTION NORM 1Y2Y	1.00	1.01	1.00
	500	JYSN015 BBIR Curncy	JPY SWAPTION NORM 1Y5Y	1.17	1.00	1.00
	501	JYSN0110 BBIR Curncy	JPY SWAPTION NORM 1Y10Y	1.01	1.00	1.00
	502	JYSN0130 BBIR Curncy	JPY SWAPTION NORM 1Y30Y	1.03	1.00	1.00
	503	CDSN011 BBIR Curncy	CAD SWPTN NORM 1Y1Y	1.03	1.00	1.00
	504	CDSN012 BBIR Curncy	CAD SWPTN NORM 1Y2Y	1.03	1.00	1.00
	505	CDSN015 BBIR Curncy	CAD SWPTN NORM 1Y5Y	1.00	1.00	1.01
	506	CDSN0110 BBIR Curncy	CAD SWPTN NORM 1Y10Y	1.00	1.00	1.00
	507	CDSN0130 BBIR Curncy	CAD SWPTN NORM 1Y30Y	1.00	1.00	2.12
	508	DKSN011 BBIR Curncy	DKK SWPTN NORM 1Y1Y	1.44	1.12	1.91
	509	DKSN012 BBIR Curncy	DKK SWPTN NORM 1Y2Y	1.36	1.09	1.79
	510	DKSN015 BBIR Curncy	DKK SWPTN NORM 1Y5Y	1.22	1.11	1.06
	511	DKSN0110 BBIR Curncy	DKK SWPTN NORM 1Y10Y	1.55	1.00	1.00
	512	DKSN0130 BBIR Curncy	DKK SWPTN NORM 1Y30Y	1.07	1.15	1.00
	513	NKSN0110 BBIR Curncy	NOK SWPTN NORM ATM 1Y10Y	1.52	1.04	1.00
	514	NKSN0130 BBIR Curncy	NOK SWPTN NORM ATM 1Y30Y	1.29	1.00	1.03
	515	SKSN011 SMKO Curncy	SEK SWPTN NORM ATM 1Y1Y	1.31	1.00	1.03
	516	SKSN012 SMKO Curncy	SEK SWPTN NORM ATM 1Y2Y	1.30	1.00	1.02
	517	SKSN015 SMKO Curncy	SEK SWPTN NORM ATM 1Y5Y	1.31	1.01	1.00
	518	SKSN0110 SMKO Curncy	SEK SWPTN NORM ATM 1Y10Y	1.08	1.05	1.00
	519	SKSN0130 SMKO Curncy	SEK SWPTN NORM ATM 1Y30Y	1.09	1.05	1.04



Segment	#	Unique ID	Name	CDS	FX	RATES
	520	SDSN011 BBIR Curncy	SGD SWPTN NORM ATM 1Y1Y	1.09	1.01	1.05
	521	SDSN012 BBIR Curncy	SGD SWPTN NORM ATM 1Y2Y	1.09	1.05	1.05
	522	SDSN015 BBIR Curncy	SGD SWPTN NORM ATM 1Y5Y	1.09	1.05	1.05
	523	SDSN0110 BBIR Curncy	SGD SWPTN NORM ATM 1Y10Y	1.03	1.00	1.01
	524	SDSN0130 BBIR Curncy	SGD SWPTN NORM ATM 1Y30Y	1.02	1.00	1.00
	525	HDSN011 BBIR Curncy	HKD SWPTN NORM ATM 1Y1Y	1.02	1.00	1.00
	526	HDSN012 BBIR Curncy	HKD SWPTN NORM ATM 1Y2Y	1.00	1.00	1.01
	527	HDSN015 BBIR Curncy	HKD SWPTN NORM ATM 1Y5Y	1.00	1.00	1.00
	528	HDSN0110 BBIR Curncy	HKD SWPTN NORM ATM 1Y10Y	1.11	1.01	1.00
	529	HDSN0130 BBIR Curncy	HKD SWPTN NORM ATM 1Y30Y	1.06	1.00	1.02
	530	ADSN011 BBIR Curncy	AUD SWPTN NORM 1Y1Y	1.04	1.00	1.00
	531	ADSN012 BBIR Curncy	AUD SWPTN NORM 1Y2Y	1.02	1.03	1.02
	532	ADSN015 BBIR Curncy	AUD SWPTN NORM 1Y5Y	1.00	1.04	1.08
	533	ADSN0110 BBIR Curncy	AUD SWPTN NORM 1Y10Y	1.07	1.00	1.04
	534	ADSN0130 BBIR Curncy	AUD SWPTN NORM 1Y30Y	1.05	1.00	1.03
	535	NDSN011 BBIR Curncy	NZD SWPT NORM ATM 1Y1Y	1.05	1.00	1.03
	536	NDSN012 BBIR Curncy	NZD SWPT NORM ATM 1Y2Y	1.11	1.00	1.02
	537	NDSN015 BBIR Curncy	NZD SWPT NORM ATM 1Y5Y	1.10	1.00	1.01
	538	NDSN0110 BBIR Curncy	NZD SWPT NORM ATM 1Y10Y	1.00	1.00	1.07
	539	NDSN0130 BBIR Curncy	NZD SWPT NORM ATM 1Y30Y	1.05	1.00	1.05
	540	MPSN011 BBIR Curncy	MXN SWPTN NORM ATM 1Y1Y	1.05	1.00	1.04
	541	MPSN012 BBIR Curncy	MXN SWPTN NORM ATM 1Y2Y	1.05	1.00	1.04
	542	MPSN015 BBIR Curncy	MXN SWPTN NORM ATM 1Y5Y	1.08	1.00	1.00
	543	MPSN0110 BBIR Curncy	MXN SWPTN NORM ATM 1Y10Y	2.44	1.02	1.02
	544	MPSN0130 BBIR Curncy	MXN SWPTN NORM ATM 1Y30Y	1.23	1.02	1.00
Corporate bonds	545	FM.B.U2.EUR.DS.EI.MLEC8AE.YLD	CORP BBB 1-3	33	33	37
	546	FM.B.U2.EUR.DS.EI.MLEC8EE.YLD	CORP BBB 3-5	60	29	61
	547	FM.B.U2.EUR.DS.EI.MLEC8GE.YLD	CORP BBB 5-7	69	20	60
	548	FM.B.U2.EUR.DS.EI.MLEC8JE.YLD	CORP BBB 7-10	68	23	64
	549	FM.B.U2.EUR.DS.BI.IBECVG1.YLD	iBoxx Covered Bond - Euro area (1-3Y)	30	34	43
	550	FM.B.U2.EUR.DS.BI.IBECVG2.YLD	iBoxx Covered Bond - Euro area (3-5Y)	46	27	51
	551	FM.B.U2.EUR.DS.BI.IBECVG3.YLD	iBoxx Covered Bond - Euro area (5-7Y)	50	22	54
	552	FM.B.U2.EUR.DS.BI.IBECVG4.YLD	iBoxx Covered Bond - Euro area (7-10Y)	48	16	60
	553	FM.B.U2.EUR.DS.BI.IBECVG5.YLD	iBoxx Covered Bond - Euro area (>10Y)	37	7	54

Annex C: Methodology for quantifying PDs for ESMA’s default scenarios

There are two approaches to quantify probabilities of default (PDs). First, CDS spreads can be used to infer annual PDs (five-year CDSs were used as they are the most liquid). Second, actual – or “real world” – PDs from Merton-type models can be used. Both approaches have advantages and disadvantages.

While CDS-implied PDs are available for a large number of institutions, they are not a reliable measure of actual probability of default. CDS-implied PDs have the following advantages: i) they can easily be computed from observed CDS spreads, without any further data being required and; ii) they can be obtained for a comprehensive list of institutions, as CDSs are often traded for institutions without traded equity. The disadvantages/caveats are: (i) that CDS spreads, and hence the implied PDs, include a premium that reflects investor risk aversion and which leads to an upward bias relative to actual PDs; this premium is likely to be time varying, which further complicates the interpretation of changes in CDS-implied PDs over time; and (ii) they can be contaminated by implicit or explicit government guarantees. This is a concern in particular for large institutions, whose CDS-implied PDs would for that reason be expected to be downward-biased.

PDs inferred from Merton-type models are a more reliable measure of actual PDs. Their advantages mirror the CDS-implied PDs’ disadvantages, i.e. they should not be contaminated by guarantees or risk premia. Their main disadvantage is that they are available for a smaller number of institutions as their computation requires reliable balance sheet and equity price data. Given this practical disadvantage, the PDs that will be provided for ESMA’s default scenarios will be based on CDSs.

Computation of CDS-implied PDs

The following formula is used to compute CDS-implied PDs data from five-year CDS spreads

$$CDS - implied PD \cong 1 - e^{-\left(\frac{CDS}{LGD}\right) \times \left(\frac{T}{10000}\right)}$$

where T denotes the maturity of the CDS and LGD the loss given default of the clearing members. Since five-year CDS spreads are used, T is set equal to 5, in order to obtain PDs with a one-year horizon. A uniform LGD of 80% will be assumed.⁵

⁵ Neither the assumption about the level of the LGD nor the scaling to a one-year horizon via the parameter T have an effect on the ranking of clearing members resulting from the CDS-implied PDs.