ESRB
European Systemic Risk Board
European System of Financial Supervision

Adverse scenario for the European Securities and Markets Authority's money market fund stress testing guidelines in 2021

Introduction

The European Supervisory Authorities, in cooperation with the European Systemic Risk Board (ESRB), are required by legislation to conduct stress tests to assess the resilience of financial institutions or market participants to adverse market developments. As part of this cooperation, the ESRB designs scenarios of adverse economic and financial market developments.

In this document the ESRB describes the adverse financial market scenario for the stress-testing exercise by the European Securities and Markets Authority (ESMA). Specifically, ESMA has developed guidelines for managers of money market funds (MMFs) who are required to conduct internal stress tests and report the results to the competent authorities and ESMA.[1] To this end, the European Central Bank (ECB), in collaboration with the ESRB and ESMA, has updated the calibration of stress parameters for the 2021 ESMA MMF guidelines.[2] These were approved by the ESRB General Board on 17 December 2021 and transmitted to ESMA on 19 December 2021.

Assumptions about redemptions and additional guidance on applying the scenario, which are needed for ESMA's MMF stress test, are provided by ESMA and presented in ESMA's MMF stress-testing guidelines.

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[1] Article 28 of Regulation (EU) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds (OJ L 169, 30.6.2017, p. 8) (the "MMF Regulation") provides that ESMA will issue guidelines that establish common reference parameters of the stress test scenarios to be included in the stress tests that managers of MMFs are required to conduct.

[2] The scenario presented in this document is not a forecast. It should not be interpreted as either the ESRB's expectations about future economic and financial developments or any unintended consequences of future monetary policy decisions. It constitutes a severe yet plausible hypothetical scenario.

Scenario methodology and calibration

This section discusses the calibration methodology and the main sources of risk that lead to the adverse scenario, as well as the key features that ESMA considers relevant to the MMF sector. The calibration of the scenario has benefited from interactions with ESMA and from discussions with ESRB member institutions.

Calibration methodology

The methodology for the scenario calibration is based on a non-parametric application of a multivariate copula model, as used in previous stress tests such as those conducted under the 2020 ESMA MMF stress-testing guidelines.[3] The scenario is the outcome of several simulations based on different triggers that reflect the main sources of financial stability risks, with a special focus on corporate and government credit spreads, swap rates, foreign exchange rates and securitisations in the European Union and other advanced economies. The calibration sample and probability of the triggering events have been set in close collaboration with ESMA to reflect the main features of the scenario as motivated by the current risk landscape identified by the ESRB General Board. More precisely, the sample period chosen for the calibration spans from January 2004[4] to August 2021 and the probability of the triggering events is set over the horizon of one quarter for all the tables in the scenario with exception of the one referring to liquidity shocks, which has been calibrated over a five-day horizon. The shocks reported should be interpreted as one-off, instantaneous and permanent shifts in asset prices relative to their cut-off date levels, as specified in ESMA's guidelines.

Scenario

The scenario reflects the ESRB's assessment of prevailing sources of systemic risks identified for the EU financial system as at December 2021. These include: (i) an increase in the number of insolvencies in the private sector due to a weaker-than-expected economic recovery, (ii) rising credit risk and profitability and solvency pressures on banks, insurers and pension schemes in the light of the COVID-19 crisis, (iii) a re-emergence of sovereign financing risk and debt sustainability concerns, and (iv) disorderly asset price adjustments with episodes of market disruptions and high levels of volatility.

The adverse scenario is calibrated to be severe, and consistent with the uncertainty about the rollout and effectiveness of vaccines with respect to virus mutations and with the persistence of global supply chain problems. In the adverse scenario, liquidity and solvency pressures in the non-financial corporate (NFC) sector become more broad-based and severe as the economic recovery slows. In such a scenario, a renewed deterioration in cash flows and a rising debt burden trigger a surge in defaults in the NFC sector. The distress in this sector spills over

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[3] See ESRB (2019), "Technical note on the Financial Shock Simulator (FSS)", February.

[4] The model uses daily data and the majority of time series have sufficient data as at 2004.

to the financial system through rising credit risk on bank balance sheets and concomitant pressure on bank profitability and capital ratios. This in turn leads to a tightening of financing conditions and reduces lending to the real economy. This will also affect MMFs, which play a role in banks' and non-banks' cash and liquidity management and offer the possibility to redeem at short notice (daily or even intraday frequency). For example, at the onset of the COVID-19 pandemic, euro area MMFs invested in private debt experiencing unexpected outflows of more than 10% of assets under management.[5] This stress led them to let short-term assets mature and if that was not sufficient to sell them. So, severe stress in the MMF sector may spill over to those sectors that are reliant on MMFs to manage their liquidity.

The adverse scenario also assumes an upward trend of risk-free rates on account of a rise in inflation rates and inflation expectations that is more protracted than anticipated. Countries' fiscal positions continue to deteriorate by more than expected as a result of the prolonged health crisis and the extension of public support programmes. This gives rise to renewed concerns about the sustainability of public debt in some countries. Together with rising inflation expectations, these concerns trigger a sharp increase in risk premia and a widening of credit spreads worldwide.

In the adverse scenario, the above-mentioned developments are captured looking at the 99th percentile of the distribution. Countries with an elevated debt burden and unfavourable debt dynamics are particularly affected, which increases sovereign spreads. In addition to a rise in risk premia, countries with less deep and liquid sovereign bond market are also severely affected by the increase in liquidity risk premia in sovereign bond yields. This increase also reflects the prudential valuation of financial instruments held at fair value, which are significantly affected by market volatility, amplifying the severity of the liquidity shocks. In addition, the dispersion of sovereign bond yields across the European Union increases on account of cross-country heterogeneity in primary deficits, debt levels and potential growth rates as well as the differences in the structure of sovereign bond markets. Rising government bond yields spill over to other asset classes, including corporate bonds. The tightening of financing conditions creates an adverse feedback loop between the financial system and the real economy.

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[5] See ESRB (2021), "Issues note on systemic vulnerabilities of and preliminary policy considerations to reform money market funds", June.

Annex A

Table A.1: Shocks to swap rates

Shocks to interest rate yields Absolute changes (basis points)							
Geographic area	**Country**	**Description**	**1M**	**3M**	**6M**	**1Y**	**2Y**
EU	Euro area	Interest rate swap on the EUR (euro)	31	33	37	50	50
EU	Bulgaria	Interest rate swap on the BGN (Bulgarian lev)	31	33	37	50	50
EU	Czech Republic	Interest rate swap on the HRK (Croatian kuna)	31	33	37	50	50
EU	Denmark	Interest rate swap on the CZK (Czech koruna)	31	33	37	50	50
EU	Croatia	Interest rate swap on the DKK (Danish krone)	31	33	37	50	50
EU	Hungary	Interest rate swap on the HUF (Hungarian forint)	54	54	61	81	81
EU	Poland	Interest rate swap on the PLN (Polish zloty)	31	33	37	50	50
EU	Romania	Interest rate swap on the RON (Romanian leu)	24	25	30	40	47
EU	Sweden	Interest rate swap on the SEK (Swedish krona)	12	12	14	19	25
Rest of Europe	United Kingdom	Interest rate swap on the GBP (British pound)	43	43	48	64	71
Rest of Europe	Iceland	Interest rate swap on the ISK (Icelandic króna)					
Rest of Europe	Norway	Interest rate swap on the NOK (Norwegian krone)	7	7	7	10	16
Rest of Europe	Russia	Interest rate swap on the RUB (Russian ruble)	19	20	24	32	40
Rest of Europe	Switzerland	Interest rate swap on the CHF (Swiss franc)	12	12	14	18	22
Rest of Europe	Turkey	Interest rate swap on the TRY (Turkish lira)	30	32	39	51	66
North America	Canada	Interest rate swap on the CAD (Canadian dollar)	20	20	22	29	38
North America	United States	Interest rate swap on the USD (US dollar)	35	35	39	52	61
Australia and Pacific	Australia	Interest rate swap on the AUD (Australian dollar)	19	19	22	29	38
Australia and Pacific	New Zealand	Interest rate swap on the NZD (New Zealand dollar)					
South and Central America	Brazil	Interest rate swap on the BRL (Brazilian real)					
South and Central America	Chile	Interest rate swap on the CLP (Chilean peso)	54	54	61	81	100
South and Central America	Colombia	Interest rate swap on the COP (Colombian peso)	31	31	35	47	60
South and Central America	Mexico	Interest rate swap on the MXN (Mexican peso)	45	45	51	68	70
Asia	China	Interest rate swap on the CNY (Chinese yuan)	6	6	7	9	9
Asia	Hong Kong	Interest rate swap on the HKD (Hong Kong dollar)	32	34	41	55	69
Asia	India	Interest rate swap on the INR (Indian rupee)	41	44	52	69	85
Asia	Japan	Interest rate swap on the JPY (Japanese yen)	2	2	2	3	5
Asia	Korea	Interest rate swap on the KRW (South Korean won)	21	22	27	35	45
Asia	Malaysia	Interest rate swap on the MYR (Malaysian ringgit)	20	20	23	30	38
Asia	Singapore	Interest rate swap on the SGD (Singapore dollar)	35	35	40	53	59
Asia	Thailand	Interest rate swap on the THB (Thai baht)	36	36	41	55	59
Africa	South Africa	Interest rate swap on the ZAR (South African rand)	5	5	5	7	8
EU	All countries	Default value	28	29	33	44	46
Other advanced economies	All countries	Default value	20	20	22	29	36
Emerging markets	All countries	Default value	30	31	36	48	57

Note: The grey cells indicate data are not available.

Table A.2: Shocks to government bond yields

Shocks to government bond yields Absolute changes (basis points)					
Geographic area	Country	3M	6M	1Y	2Y
EU	Belgium	83	92	121	122
EU	Bulgaria	50	55	72	136
EU	Czech Republic	137	154	205	206
EU	Denmark	88	98	129	134
EU	Germany	38	42	55	64
EU	Ireland	85	95	125	129
EU	Greece	85	95	125	180
EU	Spain	107	120	158	166
EU	France	69	77	101	106
EU	Croatia	64	72	94	108
EU	Italy	118	133	175	188
EU	Cyprus	110	123	163	171
EU	Latvia	63	70	92	105
EU	Lithuania	65	73	95	114
EU	Luxembourg	39	43	56	62
EU	Hungary	127	143	188	202
EU	Malta	78	87	115	126
EU	Netherlands	59	65	85	88
EU	Austria	80	89	117	131
EU	Poland	131	147	194	215
EU	Portugal	94	105	138	142
EU	Romania	92	102	135	139
EU	Slovenia	58	65	85	89
EU	Slovakia	92	102	135	136
EU	Finland	72	80	97	114
EU	Sweden	64	71	93	104
EA (weighted averages)	Euro area (weighted averages)	73	82	108	116
EU (weighted averages)	EU (weighted averages)	77	86	114	123
Advanced economies	United Kingdom	68	75	99	100
Advanced economies	Switzerland	24	27	37	40
Advanced economies	Norway	57	65	79	86
Advanced economies	Iceland	40	44	59	64
Advanced economies	Liechtenstein	40	44	59	64
Advanced economies	United States	77	86	115	125
Advanced economies	Japan	101	151	165	189
Advanced economies	Advanced economies non-EU and non-US	52	66	80	89
Advanced economies	Advanced economies (weighted average)	60	72	91	99
Emerging markets	Emerging markets	358	387	518	525
World	World	209	230	304	312

Note: The weighted averages are based on real GDP and some missing values have been interpolated. "Advanced economies non-EU and non-US" refers to all other advanced economies (as defined by IMF).

Table A.3: Shocks to foreign exchange rates (EUR appreciation against USD)

Shocks to FX (appreciation of the EUR against the USD) Relative changes (%)			
Geographic area	**Description**	**Exchange rate name**	**Shock**
EU	USDBGN represents 1 USD per x BGN (Bulgarian lev)	**USDBGN**	-25.7
EU	EURCZK represents 1 EUR per x CZK (Czech koruna)	**EURCZK**	-3.4
EU	EURHRK represents 1 EUR per x HRK (Croatian kune)	**EURHRK**	1.5
EU	EURHUF represents 1 EUR per x HUF (Hungarian forints)	**EURHUF**	-7.0
EU	USDNOK represents 1 USD per x NOK (Norwegian krone)	**USDNOK**	-23.5
EU	EURPLN represents 1 EUR per x PLN (Polish zloty)	**EURPLN**	-4.8
EU	EURRON represents 1 EUR per x RON (Romanian leu)	**EURRON**	0.0
EU	EURRSD represents 1 EUR per x RSD (Serbian dinar)	**EURRSD**	-2.7
EU	USDSEK represents 1 USD per x SEK (Swedish krona)	**USDSEK**	-26.0
Rest of Europe	EURCHF represents 1 EUR per x CHF (Swiss franc)	**EURCHF**	3.9
Rest of Europe	EURRUB represents 1 EUR per x RUB (Russian ruble)	**EURRUB**	13.1
Rest of Europe	EURGBP represents 1 EUR per x GBP (British pound)	**EURGBP**	16.4
Rest of Europe	EURTRY represents 1 EUR per x TRY (Turkish lira)	**EURTRY**	16.5
North America	USDCAD represents 1 USD per x CAD (Canadian dollar)	**USDCAD**	-13.8
North America	EURUSD represents 1 EUR per x USD (US dollar)	**EURUSD**	26.0
Australia and Pacific	AUDUSD represents 1 AUD per x USD (Australian dollar)	**AUDUSD**	18.3
Australia and Pacific	NZDUSD represents 1 NZD per x USD (New Zealand dollar)	**NZDUSD**	19.5
South and Central America	USDARS represents 1 USD per x ARS (Argentine peso)	**USDARS**	-2.3
South and Central America	USDBRL represents 1 USD per x BRL (Brazilian real)	**USDBRL**	-15.0
South and Central America	USDMXN represents 1 USD per x MXN (Mexican peso)	**USDMXN**	-10.4
Asia	USDCNY represents 1 USD per x CNY (Chinese yuan renminbi)	**USDCNY**	-1.4
Asia	USDHKD represents 1 USD per x HKD (Hong Kong dollar)	**USDHKD**	-0.4
Asia	USDINR represents 1 USD per x INR (Indian rupee)	**USDINR**	-3.5
Asia	USDJPY represents 1 USD per x JPY (Japanese yen)	**USDJPY**	-9.5
Asia	USDKRW represents 1 USD per x KRW (South korean won)	**USDKRW**	-4.2
Asia	USDMYR represents 1 USD per x MYR (Malaysian ringgit)	**USDMYR**	-3.1
Asia	USDSGD represents 1 USD per x SGD (Singapore dollar)	**USDSGD**	-10.6
Asia	USDTHB represents 1 USD per x THB (Thai baht)	**USDTHB**	-3.0
Asia	USDTWD represents 1 USD per x TWD (New Taiwan dollar)	**USDTWD**	
Africa	USDZAR represents 1 USD per x ZAR (South African rand)	**USDZAR**	-15.6

Table A.4: Shocks to foreign exchange rates (EUR depreciation against USD)

Geographic area	Description	Exchange rate name	Shock
header: **Shocks to FX (depreciation of the EUR against the USD)** **Relative changes (%)**			
EU	USDBGN represents 1 USD per x BGN (Bulgarian lev)	**USDBGN**	17.3
EU	EURCZK represents 1 EUR per x CZK (Czech koruna)	**EURCZK**	4.0
EU	EURHRK represents 1 EUR per x HRK (Croatian kune)	**EURHRK**	-1.4
EU	EURHUF represents 1 EUR per x HUF (Hungarian forints)	**EURHUF**	6.2
EU	USDNOK represents 1 USD per x NOK (Norwegian krone)	**USDNOK**	18.0
EU	EURPLN represents 1 EUR per x PLN (Polish zloty)	**EURPLN**	5.0
EU	EURRON represents 1 EUR per x RON (Romanian leu)	**EURRON**	0.8
EU	EURRSD represents 1 EUR per x RSD (Serbian dinar)	**EURRSD**	-2.3
EU	USDSEK represents 1 USD per x SEK (Swedish krona)	**USDSEK**	19.4
Rest of Europe	EURCHF represents 1 EUR per x CHF (Swiss franc)	**EURCHF**	-4.2
Rest of Europe	EURRUB represents 1 EUR per x RUB (Russian ruble)	**EURRUB**	-10.6
Rest of Europe	EURGBP represents 1 EUR per x GBP (British pound)	**EURGBP**	-8.1
Rest of Europe	EURTRY represents 1 EUR per x TRY (Turkish lira)	**EURTRY**	-5.7
North America	USDCAD represents 1 USD per x CAD (Canadian dollar)	**USDCAD**	9.3
North America	EURUSD represents 1 EUR per x USD (US dollar)	**EURUSD**	-17.9
Australia and Pacific	AUDUSD represents 1 AUD per x USD (Australian dollar)	**AUDUSD**	-15.5
Australia and Pacific	NZDUSD represents 1 NZD per x USD (New Zealand dollar)	**NZDUSD**	-14.8
South and Central America	USDARS represents 1 USD per x ARS (Argentine peso)	**USDARS**	3.0
South and Central America	USDBRL represents 1 USD per x BRL (Brazilian real)	**USDBRL**	13.0
South and Central America	USDMXN represents 1 USD per x MXN (Mexican peso)	**USDMXN**	8.5
Asia	USDCNY represents 1 USD per x CNY (Chinese yuan renminbi)	**USDCNY**	3.3
Asia	USDHKD represents 1 USD per x HKD (Hong Kong dollar)	**USDHKD**	0.4
Asia	USDINR represents 1 USD per x INR (Indian rupee)	**USDINR**	3.0
Asia	USDJPY represents 1 USD per x JPY (Japanese yen)	**USDJPY**	6.5
Asia	USDKRW represents 1 USD per x KRW (South korean won)	**USDKRW**	3.9
Asia	USDMYR represents 1 USD per x MYR (Malaysian ringgit)	**USDMYR**	3.9
Asia	USDSGD represents 1 USD per x SGD (Singapore dollar)	**USDSGD**	7.1
Asia	USDTHB represents 1 USD per x THB (Thai baht)	**USDTHB**	3.8
Asia	USDTWD represents 1 USD per x TWD (New Taiwan dollar)	**USDTWD**	
Africa	USDZAR represents 1 USD per x ZAR (South African rand)	**USDZAR**	16.1

Note: The grey cells indicate where data are not available. A positive figure indicates an appreciation of the first currency against the second.

Table A.5: Shocks to bid-ask spreads

Shocks to bid-ask prices of government bonds Absolute changes (euro)				
	3M	6M	1Y	2Y
Germany	0.13	0.14	0.35	0.61
Spain	0.82	1.02	1.61	1.64
France	0.17	0.22	0.85	1.07
Italy	0.87	1.03	1.48	1.51
Netherlands	0.13	0.14	0.35	0.62
Other	0.42	0.51	0.93	1.09

Table A.6: Shocks to residential mortgage-backed securities (RMBS)

Shocks to RMBS Absolute changes (bps)				
Geographic area	AAA	AA	A	BBB
EU	247	276	284	329
North America	279	331	333	379
Asia	242	283	295	331
All	256	297	302	346

Table A.7: Shocks to credit spreads (corporate and asset-backed securities)

	Shocks to general corporate credit yields (1-3 years) Absolute changes (basis points)			
	Non-financial	Financial covered	Financial	All
AAA	192	215	238	215
AA	208	238	269	238
A	229	296	363	296
BBB	328	372	427	376
BB	356	410	467	411
B	380	448	491	440
<=CCC	421	486	643	517
Investment grade	239	280	324	281
High yield	386	448	534	456
All	312	364	429	368

Shocks to CDX absolute changes Absolute changes (basis points)		
Geographic area	Index	1Y
EU	Itraxx Overall 5y	157
	Itraxx Crossover 5y	448
	Itraxx High vol 5y	235
	Itraxx Non financial 5y	157
	Itraxx SubFinancial 5y	330
US	Investment grade CDSI	135
	High yield CDSI	460