



Takasbank

Credit Risk Stress Tests for CCP Markets

Central Counterparty Department



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Stress Testing Results (**2022-2**)

Introduction

- Stress Testing, is defined as all the methods employed to evaluate the fragility of a portfolio, financial institution or the financial system under shocks and extraordinary market conditions.
- Stress tests reflect the change in market price, the shifts in the yield curve and the sudden changes that may occur in the yield and shape of this curve; the conditions whereby the assumptions made in order to measure the risk their validity; the extreme movements experienced in the past, the effects of the crisis likely to prevail in the past and in the future and also the analysis to be made includes all financial tools and portfolios.



Takasbank-CCP Stress Tests

- The stress tests, in the CCP services, are used to test the adequacy of the financial resources comprising of collaterals, guarantee fund contributions and other financial resources **under extreme market conditions**.
- In this framework, Takasbank has adopted the adequacy criteria under the base-case historical scenario that the ability of the margin requirements deposited by the members and the guarantee fund contributions and the capital amount allocated by Takasbank should meet the fund requirements in the event of **default of two members with the highest risks in the market and their shareholdings**.
- **Historical base scenario** in identifying the extreme market conditions describes the scenarios based on statistical time series which represent market conditions that might happen under a higher confidence level than the one used in initial margin calculations.

Takasbank Default Management Resources

- In case of any default in the markets to which the CCP service is provided, the resources are as follows:

1	• Initial margin of member in default
2	• Default fund contribution of the member in default
3	• Dedicated capital of Takasbank for covered risks in accordance with Article No:39
4	• Default fund contributions of non-defaulting members
5	• Commitment from remaining capital of Takasbank
6	• Additional default fund contributions of non-defaulting members

- The resources in the first 5 lines are classified as the **funded** resources which will be used immediately in case of any default and it is aimed to meet the margin requirement firstly with these resources in case of default of the largest two members with the highest exposure.
- The additional guarantee fund contribution to be requested from non-defaulted members constitute the **non-funded** default management resources.

Local Regulation and International Regulation on Stress Testing



- Pursuant to **Article 40** of the Central Counterparty Regulation, Takasbank is obliged to;
 - Confirm the adequacy of the collaterals in the markets to which the CCP service is provided, the guarantee fund contributions and the resources it allocates and commits from its capital through stress tests,
 - Report the stress testing results quarterly to the Board of Directors and to the Capital Markets Board.

- In the CPMI-IOSCO's document of Principles for Financial Infrastructure Institutions,
 - Pursuant to the Principle No. 4.4, Central Counterparties,
 - Are obliged to demonstrate whether they can meet or not the possible losses with its **financial resources** in case that the **two**
 - **members with the largest exposure** have defaulted **under rare but possible**
extraordinary stress conditions.

Takasbank Stress Testing Model 1/3

- Stress testing is based on the **uncovered risk** amounts to which the member sare exposed under extreme market conditions.
- Theoretically, in identification of extreme market conditions, *statistical time series based historical scenarios* which represent the market movements that may occur under a higher confidence level than the one employed in calculation of the initial margin and *historical event scenarios* which are based on the past crisis experience are utilized.



Takasbank Stress Testing Model 2/3

I. Base Scenarios:

- In the base scenarios used for stress testing in the Derivatives Market and Securities Lending Market to which the CCP service is provided, the extreme market conditions are depicted by the volatility calculated statistically with the past 5 years' historical data at 99.90% confidence level. Holding periods are applied as 3 days for the Derivatives Market, 2 days for the Securities Lending Market, Borsa İstanbul Money Market and Borsa İstanbul Cash Equity.
- In the base scenarios, related parameters are applied via the Historical Simulation Value at Risk Method.
- - It is observed whether total risk exposure of the two members with the highest exposure and their shareholdings which is calculated on daily basis under stress conditions is met by the default management resources of Takasbank in case of any default.

Takasbank Stress Testing Model 3/3

II. Historical Event Scenarios :

- In the historical event scenarios, the highest daily percentage changes recorded in the stock index and TRL/USD rate in 2001, 2008, 2018 and 2021 are used.
- The historical event scenarios, different from the base scenario, have been applied only to the positions as of the last days of the months in the analysis period and the assumed resource requirement arising from the default of the two members with the highest risk exposure and their shareholdings is compared with the default management resources .



Credit Risk Stress Tests

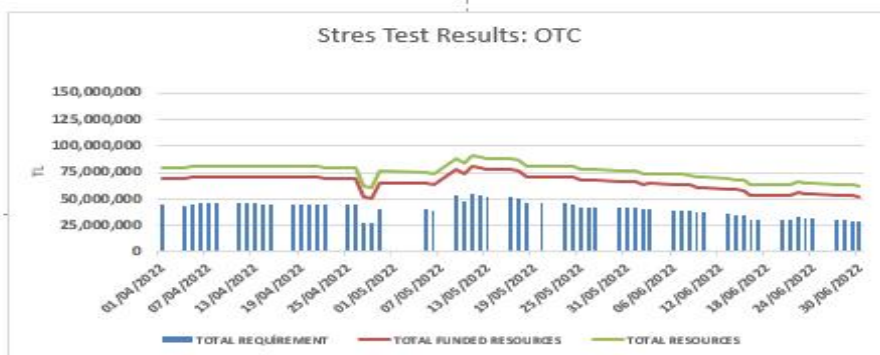
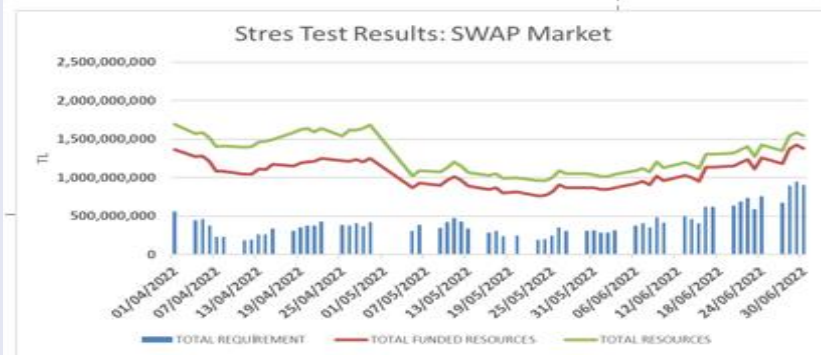
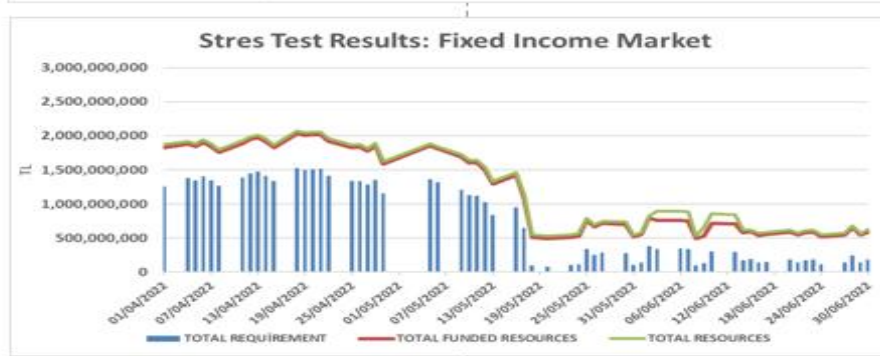
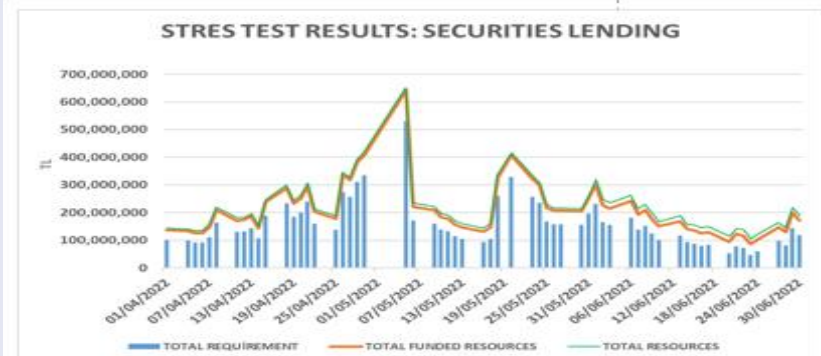
April - June 2022



1.Base Scenario Stress Testing Results:

April - June 2022		CCP Markets				
Default Management Resources						
	Derivatives	Equity	Sec. Lending	Fixed Income	SWAP	OTC
Initial margin of member in default	4,650,516,247	174,968,016	156,355,150	665,656,517	306,959,001	38,634,073
Default fund contribution of the member in default	221,987,961	4,490,973	3,818,033	114,101,251	62,298,151	1,440,333
Dedicated capital of Takasbank for covered risks in accordance with Article No:39	52,126,400	11,918,500	3,252,100	103,382,700	169,109,800	3,702,600
Default fund contributions of non-defaulting members	527,804,320	23,615,902	13,460,754	45,593,198	239,184,180	10,063,777
Commitment from remaining capital of Takasbank	69,597,000	15,913,100	4,342,100	138,032,400	225,788,400	4,943,500
Funded Resources (I)	6,342,711,266	261,783,200	208,820,222	1,184,234,863	1,057,508,768	65,602,060
Additional default fund contributions of non-defaulting members	527,804,320	23,615,902	13,460,754	45,593,198	239,184,180	10,063,777
Non-funded Resources (II)	527,804,320	23,615,902	13,460,754	45,593,198	239,184,180	10,063,777
Total Resources(I+II)	6,870,515,587	285,399,103	222,280,976	1,229,828,061	1,296,692,949	75,665,837
Average Requirement	5,711,890,612	185,698,096	157,949,213	734,679,506	415,297,472	40,999,077

1.Base Scenario Stress Testing Results:



Stress Testing Results

2. Historical Stress Test Results :

April - June 2022	Scenario	CCP Markets					
		Derivatives	EQUITY	Sec. Lending	Fixed Income	SWAP	OTC
Margin Requirement (Average)	2001	14,559,024,486	288,940,764	50,883,657	2,461,137,007	-	-
	2008	3,704,450,102	130,361,266	24,696,434	495,722,714	-	-
	2018	5,744,101,369	33,408,952	5,071,225	1,137,663,835	1,060,957,630	65,278,900
	2021	5,545,800,019	141,637,720	25,219,063	872,667,330	1,577,527,886	70,355,777
Total Resources (I+II)		6,155,251,701	492,594,944	289,758,191	1,423,279,430	930,478,467	71,401,346



Stress Testing Results

3. Reverse Stress Test Results :

30/06/2022	Number Of Members Covered by Default Waterfall							Number Of Members Covered by Default Waterfall (Exc. Additional DF Requirement)					
Piyasa	Derivatives	EQUITY	Sec. Lending	Fixed Income	SWAP	OTC		Derivatives	EQUITY	Sec. Lending	Fixed Income	SWAP	OTC
2001 Crisis	1	2	3	-	1	-		1	2	2	-	0	-
2008 Crisis	4	8	3	-	10	-		4	6	2	-	7	-
2018 Crisis	3	51	3	0	2	1		3	51	3	0	2	1
2021 Crisis	3	6	3	0	3	1		3	5	2	0	3	1
Base Scenario	3	2	3	38	15	10		3	2	3	38	9	9



Sensitivity Analysis

April - June 2022		CCP Markets				
30/06/2022	Derivatives	EQUITY	Sec. Lending	Fixed Income	SWAP	OTC
Total Requirement	13,125,428,502	1,173,605,961	310,356,080	297,069,820	1,242,627,231	68,406,637
New Total Requirement	13,256,682,787	1,185,342,020	313,459,641	300,040,518	1,255,053,503	69,090,704
Stress Value	131,254,285	11,736,060	3,103,561	2,970,698	12,426,272	684,066
Stress (%)	1%	1%	1%	1%	1%	1%





Thanks



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