



Takasbank

Credit Risk Stress Tests for CCP Markets

Central Counterparty Department



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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.

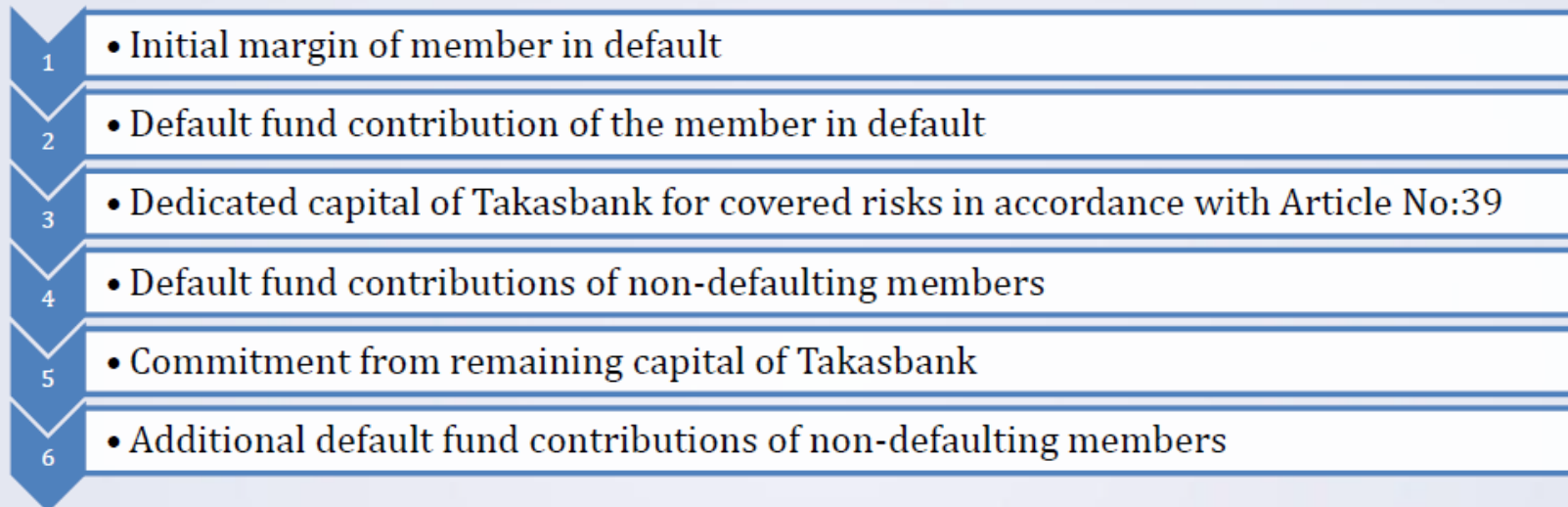


Takasbank-CCP Stress Tests

- 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:



- 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.



TakasbankStress 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 applied in the stress testing for Derivatives Market, Securities Lending Market and Cash Equity, the highest percentage changes occurred in the stock exchange index and TRY/USD Exchange between 2001 February and 2008 October have been 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 .

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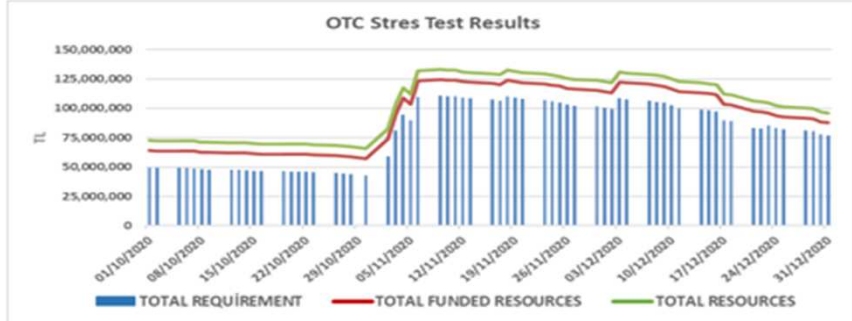
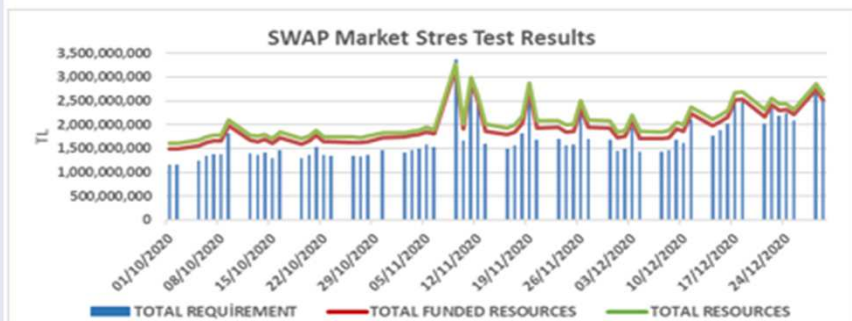
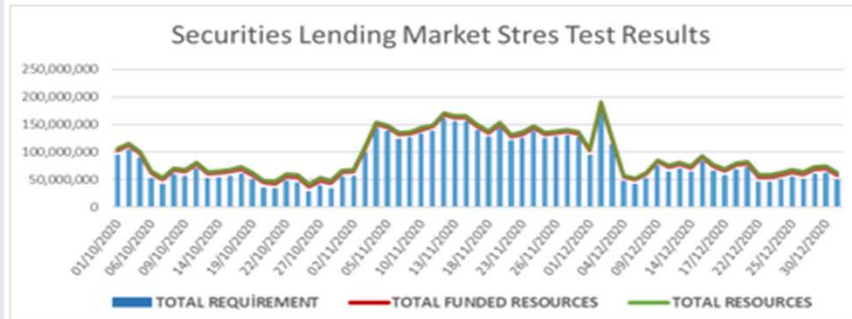
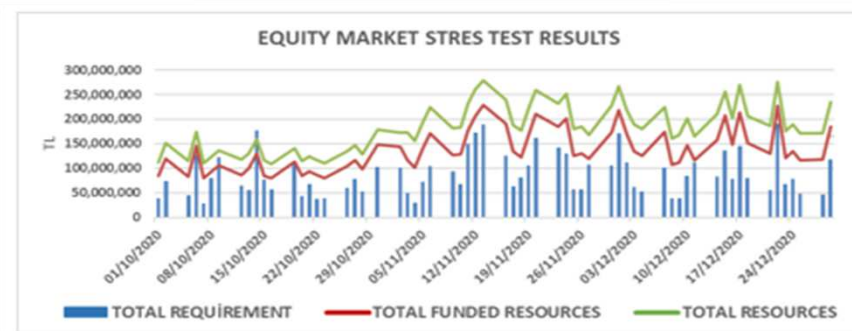
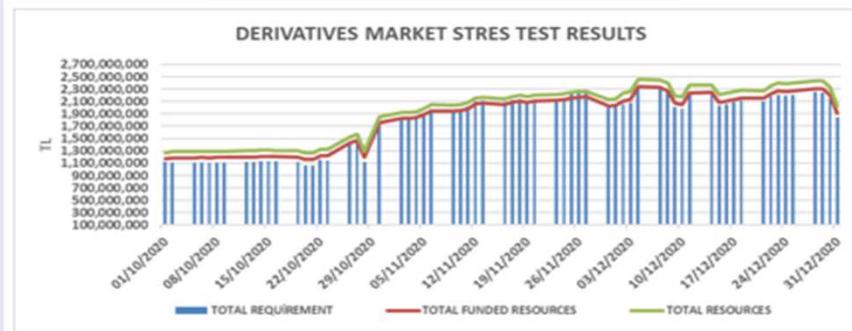
Credit Risk Stress Tests October-December 2020



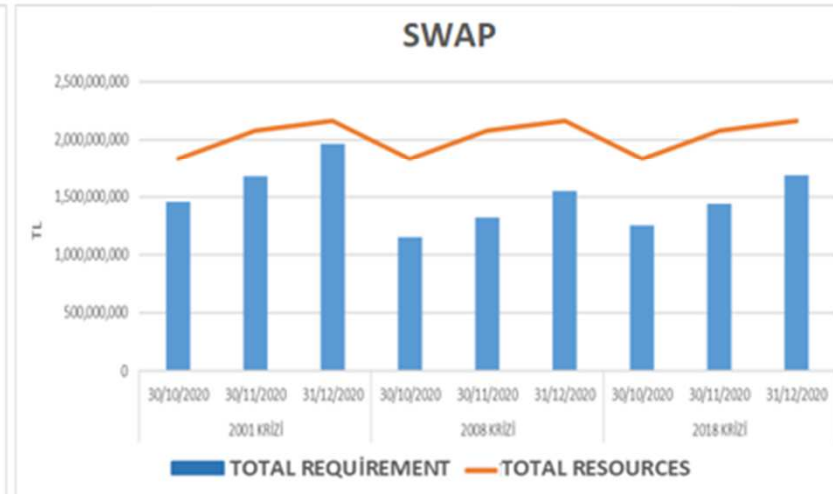
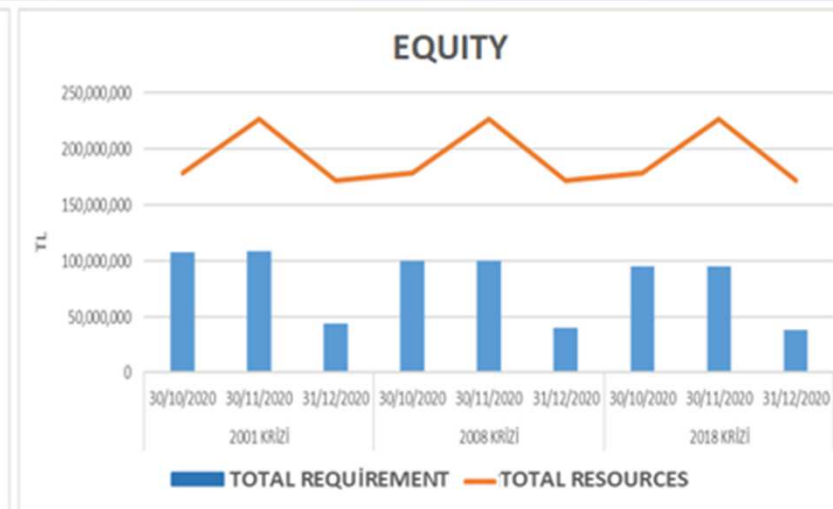
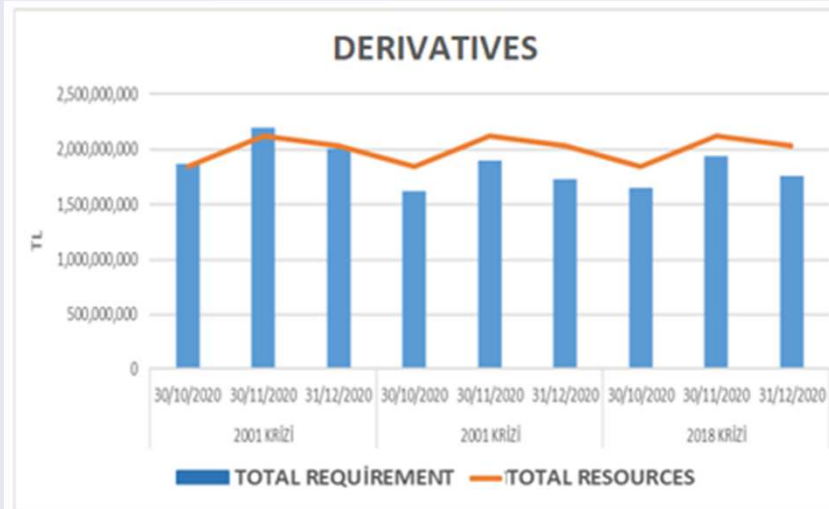
1.Base Scenario Stress Testing Results:

October - December 2020 / Default Waterfall Resources	CCP Markets					
	Derivatives	Cash Equity	Sec. Lending	Fixed Income	SWAP	OTC
Initial margin of member in default	1,573,489,542	65,507,922	82,518,924	5,240,773,731	1,300,815,706	79,024,431
Default fund contribution of the member in default	33,647,949	5,053,761	1,427,646	281,801,525	173,344,536	1,000,000
Dedicated capital of Takasbank for covered risks in accordance with Article No:39	29,392,000	5,368,000	867,000	71,989,000	91,187,000	1,607,000
Default fund contributions of non-defaulting members	107,045,435	44,971,542	4,140,015	101,831,377	119,876,208	8,578,057
Commitment from remaining capital of Takasbank	86,227,000	15,749,000	2,544,000	211,188,000	267,511,000	4,713,000
Funded Resources (I)	1,829,801,926	136,650,225	91,497,586	5,907,583,634	1,952,734,450	94,922,488
Additional default fund contributions of non-defaulting members	107,045,435	44,971,542	4,140,015	101,831,377	119,876,208	8,578,057
Non-funded Resources (II)	107,045,435	44,971,542	4,140,015	101,831,377	119,876,208	8,578,057
Total Resources(I+II)	1,936,847,360	181,621,767	95,637,601	6,009,415,011	2,072,610,658	103,500,545
Average Requirement	1,804,194,193	88,419,689	83,248,976	5,644,780,340	1,745,149,581	81,183,891

1.Base Scenario Stress Testing Results:



2. Historical Event Scenarios Stress Testing Results:



Stress Testing Results

3. Reverse Stres Test Results :

Market	Number of Members Covered by Default Waterfall						Number of Members Covered by Default Waterfall (Exc. Additional DF Requirement)					
	Derivatives	Equity	Sec Lend	FI	SWAP	OTC	Derivatives	Equity	Sec Lend	FI	SWAP	OTC
2001 Crisis	2	5	2	-	2	-	1	2	2	-	2	-
2008 Crisis	3	6	2	-	4	-	2	2	2	-	3	-
2018 Crisis	3	6	2	-	3	-	2	2	2	-	2	-
Base Scenario	3	6	2	10	2	5	2	2	2	10	2	5



Sensitivity Analysis

October - December 2020		Markets				
31/12/2020	VIOP	PAY	ÖPP	BAP	SWAP	OTC
Total Requirement	830,826,508	49,622,006	48,521,843	3,413,043,870	1,447,297,491	71,854,207
New Total Requirement	839,134,590	50,089,491	49,151,204	3,445,101,549	1,461,770,466	72,595,810
Stress Value	8,308,082	467,485	629,361	32,057,679	14,472,975	741,603
Stress (%)	1.00%	0.94%	1.30%	0.94%	1.00%	1.03%





Thanks

 + (90) 212 315 25 25

 mkt@takasbank.com.tr

 www.takasbank.com.tr

