



Takasbank
Liquidity Risk Stress 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 Liquidity 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**.
- Stress tests are used predominantly in analyzing fragilities against credit and liquidity risks exposure.
- Credit risk-related stress testing focuses on whether the losses incurred after the default of a clearing member could be covered by with default management resources,
- Liquidity risk stress tests focus on the adequacy of only the liquid part of default management resources
- The qualification criterion used by the Takasbank (at the basis scenario) is whether “qualified default management resources” along with capital allocated and committed, if liquid, cover fund requirement stemming from the default of the member having the highest risk.
- Liquidity stress testing also takes into consideration the use of the resource needs arising under the historical credit risk stress scenarios, the changes taking place in the situations of liquidity providers and the possible swift changes in the liquidity preference in the market.

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 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 Director sand to the Capital Markets Board.

International Regulation on Stress Testing

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 and their shareholdings** have defaulted **under rare but possible extraordinary stress conditions**.

-Pursuant to the Principle No. 7.4,

- A central counterparty is obliged to have adequate **liquid resources** to meet payment obligations with a high confidence level in case of default of a participant who will impose the CCP to **the highest amount of total payment obligations under various stress scenarios**.

Takasbank Stress Testing Model 1/5

Stress testing is based on the **uncovered risk** amounts to which the members are 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 Liquidity Stress Testing Model 2/5

1. Base Liquidity Scenarios:

- Base scenario covers stress conditions at 99.90% confidence level in the past 5 years' historical data with holding periods of 3 days for the Derivatives Market, 2 days for the Securities Lending Market, Borsa İstanbul Money Market and Borsa İstanbul Cash Equity.
- Related parameters are applied via the Historical Simulation Value at Risk Method.
- Liquidity stress test (base scenario), conducted on daily basis, tests whether **total resource requirement** arising under the conditions of the base credit risk stress scenario of the two member with the greatest risk and their shareholdings *against* the **qualified default management resources**(resources invested in ON or available and those are eligible ☐ for CBRT liquidity facilities)

Takasbank Liquidity Stress Testing Model 3/5

2. Historical Event Scenarios :

- Historical event scenarios are applied for Derivatives Market, Securities Lending Market and Cash Equity and scenarios covers the highest percentage changes occurred in the stock exchange index and TRY/USD exchange between 2001, 2008, 2018 and 2021.
- 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 **total resource requirement** arising from the default of the **first member** and **first two** with the highest risk exposure is compared with the **default management resources (Cover 1, Cover 2)**.

Takasbank Liquidity Stress Testing Model 4/5

3. Market Liquidity Scenario:

–Scenario used in the basic liquidity stress test is also applicable for this hypothetical scenario .

-**Uncovered risk exposure** is increased by **10% assuming** that liquidity providers would act worse than expected even in stressed conditions.

-It is measured whether qualified liquid assets that are explained under the basic liquidity stress test cover marginal increase in uncovered exposure under Cover 2.

Takasbank Liquidity Stress Testing Model 5/5

4.Cash Collateral Scenarios:

Since MKT members may have set up cash collateral amounts under **different compositions**, the adequacy of the amount of **qualified default management resources** under stress conditions is tested in **3 different scenarios**.

In the **first scenario** showing the current situation, the test is conducted by

assuming that the qualified liquid assets are **only the cash TL** amounts that the members invested on the day of analysis.

In the **second scenario**, a test is performed assuming that **only half of the Cash TL** in the first scenario is in the collateral accounts of the members.

Finally, if there is a test under the relevant market rules, the scenario in which the member has **only the minimum amount of cash TL** as collateral is performed.



Liquidity Risk Stress Tests Results 2022 Q2



Liquidity Risk Stress Testing Results

1. Base Liquidity Scenario Results: Cash Equity Market

July - September 2022		CCP Markets				
(During Quarter)	Derivatives	Equity	Sec. Lending	Fixed Income	SWAP	OTC
Recourse Requirement of Largest (Two) Members Under Stress Conditions	5,711,890,612	185,698,096	157,949,213	734,679,506	415,297,472	40,999,077
Cash and Qualified Collateral of Largest (Two) Members	8,808,732,316	156,588,947	204,489,804	1,938,033,433	717,416,107	98,804,001
Eligible Cash and Qualified Guarantee Fund Size	818,052,143	50,492,066	24,440,616	1,046,300,269	1,676,881,203	29,930,005
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	100,065,440	157,113,142	3,702,600
Committed Capital in Liquid Assets	64,175,070	15,913,100	4,342,100	118,012,564	176,072,488	4,943,500
Total Qualified Recourses	9,743,085,929	234,912,614	236,524,620	3,202,411,706	2,727,482,940	137,380,106
(Qualified Liquid Recourses/Recourse Requirement)	171%	127%	150%	436%	657%	335%



Liquidity Risk Stress Testing Results

2. Historical Liquidity Scenario Results 2001-2008 Crisis

2001		CCP Markets		
30/06/2022	Derivatives	Equity	Sec. Lending	SWAP
Reource Requirement of Largest (Two) Members Under Stress Conditions	14,399,370,166	243,017,430	27,517,546	3,504,729,187
Cash and Qualified Collateral of Largest (Two) Members	8,510,108,629	92,625,491	139,075,334	967,609,089
Eligible Cash and Qualified Guarantee Fund Size	949,045,155	51,245,834	30,373,741	1,065,335,877
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	169,109,800
Committed Capital in Liquid Assets	69,597,000	15,913,100	4,342,100	225,788,400
Total Qualified Recources	9,580,877,183	171,702,925	177,043,275	2,427,843,166
(Qualified Liquid Recources/Reource Requirement)	67%	71%	643%	69%

2008		CCP Markets		
30/06/2022	Derivatives	Equity	Sec. Lending	SWAP
Reource Requirement of Largest (Two) Members Under Stress Conditions	3,663,827,087	109,642,057	13,355,669	705,923,262
Cash and Qualified Collateral of Largest (Two) Members	8,510,108,629	92,625,491	139,075,334	967,609,089
Eligible Cash and Qualified Guarantee Fund Size	949,045,155	51,245,834	30,373,741	1,065,335,877
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	169,109,800
Committed Capital in Liquid Assets	69,597,000	15,913,100	4,342,100	225,788,400
Total Qualified Recources	9,580,877,183	171,702,925	177,043,275	2,427,843,166
(Qualified Liquid Recources/Reource Requirement)	261%	157%	1326%	344%

Liquidity Risk Stress Testing Results

2. Historical Liquidity Scenario Results 2018-2021 Crisis

2018	CCP Markets			
30/06/2022	Derivatives	Equity	Sec. Lending	SWAP
Recourse Requirement of Largest (Two) Members Under Stress Conditions	5,681,111,531	28,099,038	2,742,485	1,620,065,700
Cash and Qualified Collateral of Largest (Two) Members	8,510,108,629	92,625,491	139,075,334	967,609,089
Eligible Cash and Qualified Guarantee Fund Size	949,045,155	51,245,834	30,373,741	1,065,335,877
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	169,109,800
Committed Capital in Liquid Assets	69,597,000	15,913,100	4,342,100	225,788,400
Total Qualified Recourses	9,580,877,183	171,702,925	177,043,275	2,427,843,166
(Qualified Liquid Recourses/Recourse Requirement)	169%	611%	6456%	150%

2021	CCP Markets			
30/06/2022	Derivatives	Equity	Sec. Lending	SWAP
Recourse Requirement of Largest (Two) Members Under Stress Conditions	5,484,984,754	119,126,267	13,638,303	1,242,703,130
Cash and Qualified Collateral of Largest (Two) Members	8,510,108,629	92,625,491	139,075,334	967,609,089
Eligible Cash and Qualified Guarantee Fund Size	949,045,155	51,245,834	30,373,741	1,065,335,877
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	169,109,800
Committed Capital in Liquid Assets	69,597,000	15,913,100	4,342,100	225,788,400
Total Qualified Recourses	9,580,877,183	171,702,925	177,043,275	2,427,843,166
(Qualified Liquid Recourses/Recourse Requirement)	175%	144%	1298%	195%

Liquidity Risk Stress Testing Results

3. Market Liquidity Scenario Results Derivatives Market

April - June 2022		CCP Markets				
30/06/2022	Derivatives	Equity	Sec. Lending	Fixed Income	SWAP	OTC
Recourse Requirement of Largest (Two) Members Under Stress Conditions	5,206,028,424	328,302,678	119,504,432	189,488,238	923,627,813	28,491,170
Cash and Qualified Collateral of Largest (Two) Members	8,510,108,629	92,625,491	139,075,334	184,328,536	967,609,089	79,073,533
Eligible Cash and Qualified Guarantee Fund Size	949,045,155	51,245,834	30,373,741	1,074,732,650	1,065,335,877	30,071,784
Allocated Capital in Liquid Assets	52,126,400	11,918,500	3,252,100	103,382,700	169,109,800	3,702,600
Committed Capital in Liquid Assets	69,597,000	15,913,100	4,342,100	138,032,400	225,788,400	4,943,500
Total Qualified Resources	9,580,877,183	171,702,925	177,043,275	1,500,476,286	2,427,843,166	117,791,417
(Qualified Liquid Resources/Recourse Requirement)	184%	52%	148%	792%	263%	413%



Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: Derivatives

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	5,087,111,324	8,510,108,629	949,045,155	52,126,400	69,597,000	9,580,877,183	188%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	5,087,111,324	5,519,062,099	949,045,155	52,126,400	69,597,000	6,589,830,654	130%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	5,087,111,324	4,476,985,728	949,045,155	52,126,400	69,597,000	5,547,754,282	109%

Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: Equity

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	328,302,678	92,625,491	51,245,834	11,918,500	15,913,100	171,702,925	52%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	328,302,678	46,312,746	51,245,834	11,918,500	15,913,100	125,390,180	38%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	328,302,678	31,186,543	51,245,834	11,918,500	15,913,100	110,263,978	34%

Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: Security Lending

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	119,386,221	139,075,334	30,373,741	3,252,100	4,342,100	177,043,275	148%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	119,386,221	69,537,667	30,373,741	3,252,100	4,342,100	107,505,608	90%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	119,386,221	35,461,235	30,373,741	3,252,100	4,342,100	73,429,176	62%

Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: Fixed Income

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	187,687,829	184,328,536	1,074,732,650	103,382,700	138,032,400	1,500,476,286	799%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	187,687,829	150,002,911	1,074,732,650	103,382,700	138,032,400	1,466,150,661	781%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	187,687,829	115,677,287	1,074,732,650	103,382,700	138,032,400	1,431,825,036	763%

Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: SWAP

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	900,145,750	967,609,089	1,065,335,877	169,109,800	225,788,400	2,427,843,166	270%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	900,145,750	877,832,557	1,065,335,877	169,109,800	225,788,400	2,338,066,635	260%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Resources	(Qualified Liquid Resources/Reource Requirement)
FOM (Largest 2 Members)	900,145,750	788,056,026	1,065,335,877	169,109,800	225,788,400	2,248,290,103	250%

Liquidity Risk Stress Testing Results

4. Cash Collateral Liquidity Scenario Results: OTC

Only Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	28,389,301	79,073,533	30,071,784	3,702,600	4,943,500	117,791,417	415%

Cash/2

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	28,389,301	54,905,610	30,071,784	3,702,600	4,943,500	93,623,494	330%

Minimum Cash

Markets (Quarter End)	Reource Requirement of Largest (Two) Members Under Stress Conditions	Cash and Qualified Collateral of Largest (Two) Members	Eligible Cash and Qualified Guarantee Fund Size	Allocated Capital in Liquid Assets	Committed Capital in Liquid Assets	Total Qualified Reources	(Qualified Liquid Reources/Recour ce Requirement)
FOM (Largest 2 Members)	28,389,301	30,737,687	30,071,784	3,702,600	4,943,500	69,455,570	245%



Thanks



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