



Takasbank
Liquidity Risk Stress For CCP Markets
Central Counterparty Department



Agenda

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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.

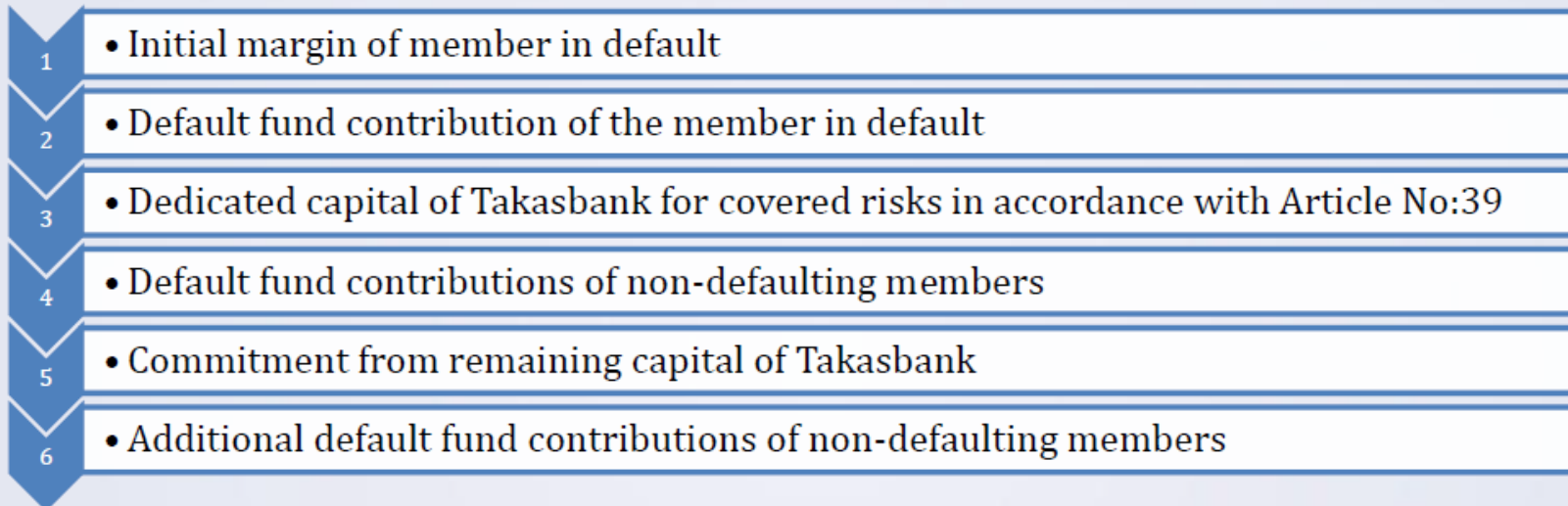


Takasbank-CCP Liquidity Stress Tests

- 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:



- 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 February and 2008 October.
- 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 1.

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 2020 Q4



Liquidity Risk Stress Testing Results

1. Base Liquidity Scenario Results: Cash Equity Market

October - December 2020		Markets				
Markets (During Quarter) Base Scenario	Derivatives	Equity	Securities Lending	Fixed Income	SWAP	OTC
Recourse Requirement of Largest (Two) Members Under Stress Conditions	1,804,194,193	88,419,689	83,248,976	5,644,780,340	1,745,149,581	81,183,891
Cash and Qualified Collateral of Largest (Two) Members	2,704,520,771	66,676,661	124,841,782	8,781,385,373	1,927,477,842	150,035,834
Eligible Cash and Qualified Guarantee Fund Size	230,450,241	57,657,871	10,996,245	1,054,828,385	855,732,792	22,007,627
Allocated Capital in Liquid Assets	29,392,000	5,368,000	867,000	71,865,279	29,392,000	1,607,000
Committed Capital in Liquid Assets	85,432,049	15,749,000	2,544,000	207,688,637	85,432,049	4,713,000
Total Qualified Recourses	3,049,795,060	145,451,533	139,249,027	10,115,767,674	2,898,034,683	178,363,461
(Qualified Liquid Recourses/Recourse Requirement)	169%	165%	167%	179%	166%	220%

Liquidity Risk Stress Testing Results

2. Historical Liquidity Scenario Results 2001-2008 Crisis

2001		Markets			
Markets (Quarter End)	Derivatives	Equity	Securities Lending	SWAP	
Resource Requirement of Largest Members Under Stress Conditions	2,007,357,452	43,925,951	50,660,012	1,963,908,422	
Cash and Qualified Collateral of Largest Members	3,302,591,594	29,167,541	49,425,262	2,691,165,486	
Eligible Cash and Qualified Guarantee Fund Size	246,746,287	68,032,345	11,685,696	842,190,902	
Allocated Capital in Liquid Assets	29,392,000	5,368,000	867,000	29,392,000	
Committed Capital in Liquid Assets	86,227,000	15,749,000	2,544,000	86,227,000	
Total Qualified Resources	3,664,956,880	118,316,886	64,521,958	3,648,975,388	
(Qualified Liquid Resources/Resource Requirement)	183%	269%	127%	186%	

2008		Markets			
Markets (Quarter End)	Derivatives	Equity	Securities Lending	SWAP	
Resource Requirement of Largest Members Under Stress Conditions	1,731,369,406	40,603,804	46,302,425	1,551,353,369	
Cash and Qualified Collateral of Largest Members	3,302,591,594	29,167,541	49,425,262	2,691,165,486	
Eligible Cash and Qualified Guarantee Fund Size	246,746,287	68,032,345	11,685,696	842,190,902	
Allocated Capital in Liquid Assets	29,392,000	5,368,000	867,000	29,392,000	
Committed Capital in Liquid Assets	86,227,000	15,749,000	2,544,000	86,227,000	
Total Qualified Resources	3,664,956,880	118,316,886	64,521,958	3,648,975,388	
(Qualified Liquid Resources/Resource Requirement)	212%	291%	139%	235%	

Liquidity Risk Stress Testing Results

3. Market Liquidity Scenario Results Derivatives Market

October - December 2020		Markets				
Markets (During Quarter)	Derivatives	Equity	Securities Lending	Fixed Income	SWAP	OTC
Reource Requirement of Largest (Two) Members Under Stress Conditions	1,871,695,994	54,746,884	48,990,036	3,959,098,167	1,925,138,239	77,501,632
Cash and Qualified Collateral of Largest (Two) Members	3,302,591,594	29,167,541	49,425,262	8,272,165,802	2,691,165,486	174,934,360
Eligible Cash and Qualified Guarantee Fund Size	246,746,287	68,032,345	11,685,696	1,099,248,392	842,190,902	22,329,261
Allocated Capital in Liquid Assets	29,392,000	5,368,000	867,000	71,989,000	29,392,000	1,607,000
Committed Capital in Liquid Assets	86,227,000	15,749,000	2,544,000	211,188,000	86,227,000	4,713,000
Total Qualified Recources	3,664,956,880	118,316,886	64,521,958	9,654,591,194	3,648,975,388	203,583,621
(Qualified Liquid Recources/Reource Requirement)	196%	216%	132%	244%	190%	263%

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/Reource Requirement)
FOM (Largest 2 Members)	1,849,238,621	3,302,591,594	246,746,287	29,392,000	86,227,000	3,664,956,880	198%

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/Reource Requirement)
<input type="checkbox"/> FOM (Largest 2 Members)	1,849,238,621	1,780,137,682	246,746,287	29,392,000	86,227,000	2,142,502,969	116%

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/Reource Requirement)
FOM (Largest 2 Members)	1,849,238,621	1,070,016,215	246,746,287	29,392,000	86,227,000	1,432,381,501	77%

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/Reource Requirement)
FOM (Largest 2 Members)	53,212,877	29,167,541	68,032,345	5,368,000	15,749,000	118,316,886	222%

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/Reource Requirement)
<input type="checkbox"/> FOM (Largest 2 Members)	53,212,877	14,583,770	68,032,345	5,368,000	15,749,000	103,733,115	195%

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/Reource Requirement)
FOM (Largest 2 Members)	53,212,877	3,787,281	68,032,345	5,368,000	15,749,000	92,936,626	175%

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 Recources	(Qualified Liquid Recources/Reource Requirement)
FOM (Largest 2 Members)	48,947,473	49,425,262	11,685,696	867,000	2,544,000	64,521,958	132%

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 Recources	(Qualified Liquid Recources/Reource Requirement)
<input type="checkbox"/> FOM (Largest 2 Members)	48,947,473	24,712,631	11,685,696	867,000	2,544,000	39,809,327	81%

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 Recources	(Qualified Liquid Recources/Reource Requirement)
FOM (Largest 2 Members)	48,947,473	14,556,553	11,685,696	867,000	2,544,000	29,653,249	61%

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 Reources	(Qualified Liquid Reources/Reource Requirement)
FOM (Largest 2 Members)	3,909,572,802	8,272,165,802	1,099,248,392	71,989,000	211,188,000	9,654,591,194	247%

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/Reource Requirement)
<input type="checkbox"/> FOM (Largest 2 Members)	3,909,572,802	8,253,475,208	1,099,248,392	71,989,000	211,188,000	9,635,900,601	246%

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/Reource Requirement)
FOM (Largest 2 Members)	3,909,572,802	8,234,784,615	1,099,248,392	71,989,000	211,188,000	9,617,210,007	246%

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 Reources	(Qualified Liquid Reources/Reource Requirement)
FOM (Largest 2 Members)	1,881,698,171	2,691,165,486	842,190,902	29,392,000	86,227,000	3,648,975,388	194%

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/Reource Requirement)
<input type="checkbox"/> FOM (Largest 2 Members)	1,881,698,171	2,669,662,600	842,190,902	29,392,000	86,227,000	3,627,472,502	193%

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/Reource Requirement)
FOM (Largest 2 Members)	1,881,698,171	2,648,159,714	842,190,902	29,392,000	86,227,000	3,605,969,616	192%

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/Reource Requirement)
FOM (Largest 2 Members)	76,988,230	174,934,360	22,329,261	1,607,000	4,713,000	203,583,621	264%

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/Reource Requirement)
FOM (Largest 2 Members)	76,988,230	165,482,972	22,329,261	1,607,000	4,713,000	194,132,232	252%

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/Reource Requirement)
FOM (Largest 2 Members)	76,988,230	156,031,583	22,329,261	1,607,000	4,713,000	184,680,844	240%



Thanks

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