ISTANBUL STOCK EXCHANGE

REPO MARKET FOR SPECIFIED SECURITIES & BONDS AND BILLS MARKET RISK MANAGEMENT APPLICATION GUIDE

Bonds and Bills Market Management

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REPO MARKET FOR SPECIFIED SECURITIES & BONDS AND BILLS MARKET RISK MANAGEMENT APPLICATIONS

1. INTRODUCTION

This guide describes the applications relating to the Repo Market for Specified Securities, a new market to be opened within the ISE Bonds and Bills Market and the changes in the risk management system of the Bonds and Bills Market. Accordingly, this guide describes in detail:

- Operation of the Repo Market for Specified Securities which has been established within the Bonds and Bills Market in order to provide the market participants with the opportunity to acquire a specified security through reverse repo for a specified period;

- How future date transactions can be executed more securely and at a lower collateral cost within the current risk management system which is applied in all sub-markets of the Bonds and Bills Market and is designed to manage the daily price change risk;

- General principles of operation of the dynamic risk management system which has been developed to provide a similar risk management system for the Repo Market for Specified Securities.

2. REPO MARKET FOR SPECIFIED SECURITIES

The purpose of the Repo Market for Specified Securities is to realize repo transactions on preferred securities within the organized market and then to provide the opportunity to deliver such securities to the buyer. Offering the possibility to exchange the security within a specified period, the Market is intended to create an effective interest by ensuring a securities flow in the forward and spot market.

2.1 General Principles

In the Market, sales with repurchase agreement and purchases with resale agreement are executed over a specified security. In these transactions, it is possible to negotiate by specifying the price of the security in addition to the repo rate. Government debt securities

issued in Turkish Lira (GDS), revenue-indexed bonds (RIB), private debt securities listed on the Exchange, also debt securities issued in Turkish Lira by Privatization Administration, Housing Development Administration of Turkey, and local administrations, and liquidity bills issued by the Central Bank of the Republic of Turkey can be traded on the Market. After the transaction, the securities are not blocked, and are delivered to the buyer. At maturity, the buying party will deliver the same type and amount of securities to Takasbank to be transferred to the selling party.   Trades can be executed with a starting value date being the transaction date, or a future date up to maximum 7 days.

The obligations of the parties to the trade on a value date basis are given in the table below.

Table 1: Trade Obligations on a Value Date Basis

	Value Date 1	Value Date 2
Party realizing repo	sells security	repurchases security
	borrows cash	pays principal + interest - withholding tax
Party realizing reverse-repo	purchases security	resells security
	lends cash	gets principal + interest - withholding tax

A repo- reverse repo transaction for specified securities can be considered as two concurrent and connected outright purchase-repurchase transactions.   In the first transaction, the security, the description of which is specified during the entry of the order, is sold by the party that realizes repo over the specified price.   In the second transaction, the security of the same description is re-sold to the party that realizes repo.

2.2   Transmission of Orders

In the Repo Market for Specified Securities, limit or market orders and fill and kill, or fill or kill orders which are used with the said type of orders, can be given.
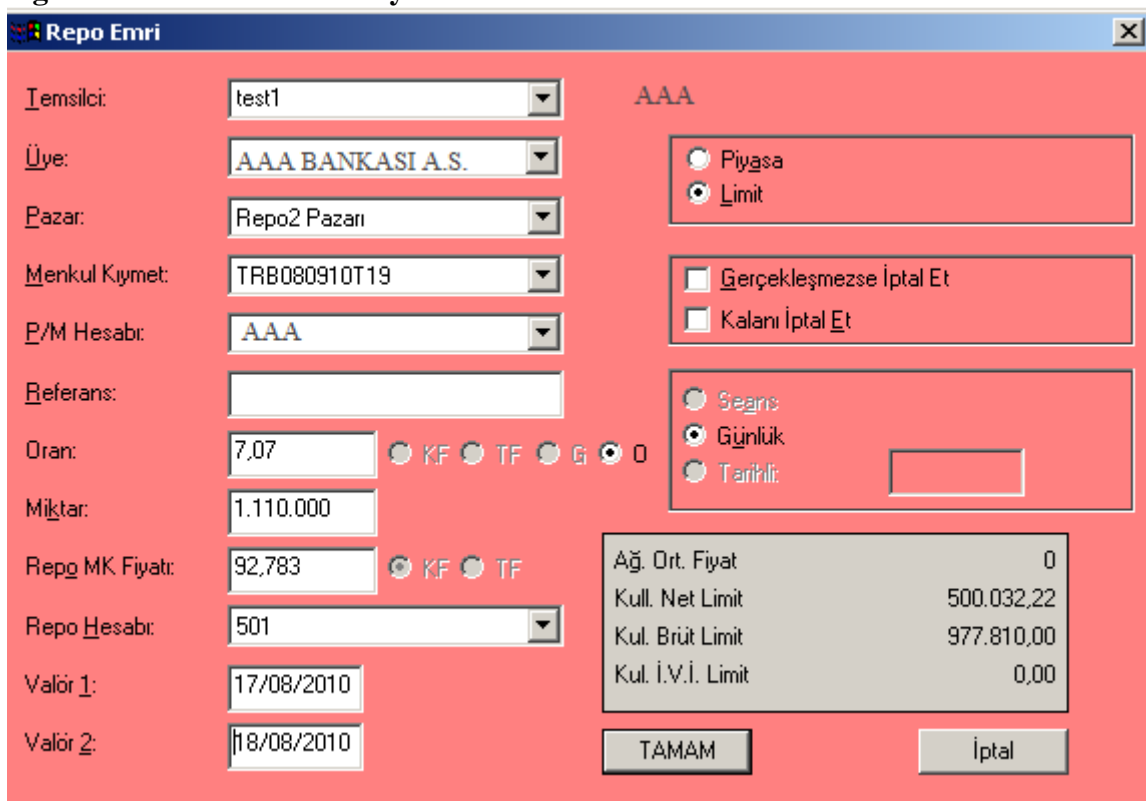
In the transmission of limit orders from OTASS terminals;

- market   - security   - P/M account (if a customer order, then reference information)
- rate   - amount   - repo security price
- value date 1   - value date 2

elements should be entered. (Figure 1)

In market orders, unlike the above mentioned limit orders, repo rate and repo security price information are not entered.

Figure 1: OTAS Order Entry Screen

The price information to be entered in "Repo MK Fiyatı" (Repo Security Price) field is determined according to the order entry method which is used in the Outright Purchases and Sales Market for such security. If the security is a security which is traded on the Outright Purchases and Sales Market by yield, then dirty price information is entered in this field. In all other securities, the order entry method is as specified for the Outright Purchases and Sales Market.[1]

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[1] Further information about order entry methods for securities is available in the Circular on Operations Principles of the Bonds and Bills Market or the "Securities Data File" at http://www.imkb.gov.tr/Data/BondsandBillsData.aspx.

Orders can also be entered to the Repo Market for Specified Securities through TBPAPI terminals according to the general rules mentioned above.[2]

In the transmission of orders, a repo rate tick of 0.01% is used, while a tick of 0.001 TL is used for the security price. Orders are transmitted as TL 10,000 minimum and its multiplies. Maximum order size which can be entered for a single order is TL 10,000,000.

2.3 Order Matching Rules

On the market, trades are executed according to multi price continuous auction method. In the execution of orders, repo rate and security price at the relevant repo maturity are taken into account. If repo rates and security prices are equal, then time priority applies. Accordingly,

- ➢ repo orders are matched with reverse-repo orders with the same or a lower rate and with the same or a higher security price;
- ➢ reverse repo orders are matched with repo orders with the same or a higher rate and with the same or a lower security price.

Figure 2: Order Depth Window

	Alış/Repo Miktar	Repo2 MK Fiyatı (Repo)	Alış/Repo Oranı	Satış/Ters Repo Oranı	Repo2 MK Fiyatı (T. Repo)	Satış/T. Repo Miktar
1	700.000	88,084	7,12	7,13	88,086	50.000
2	50.000	88,084	7,12	7,13	88,086	1.000.000
3	10.000	88,085	7,12	7,13	88,085	110.000
4	5.000.000	87,050	7,01	7,25	90,023	250.000
5	200.000	88,085	7,01			

Emir Bazında Derinlik 17/08/2010 - 18/08/2010 TRB080910T19/Repo2 Pazarı

In case of same-day beginning value-dated investment fund transactions, which are executed after 14:00 hrs, the weighted average repo rate at the relevant maturity which occurs until 14:00 at the market and the weighted average price of the security in question are taken as reference, provided that they are in favor of the fund. Accordingly, reverse repo transactions can be realized at or above the weighted average rate and at or below the weighted average security price while repo orders can be realized at or below the average weighted rate and at or above the weighted average security price. However, the authorized intermediary institution can specify its own rate/price for a security or a maturity at which no trade has been realized within the day.

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[2] Transmission of orders through TBPAPI is described in detail in the programming guide at http://www.imkb.gov.tr/UyeOzel/SoftwareAndDocuments/BondMarket.aspx.

Figure 3: Trades Window

	İşlem No	Pazar	A/S	Menkul Kıymet	Valör 1	Valör 2	VKG	Fiyat/Oran	Tutar	Miktar	Repo MK Fiyatı	Takas Fiyatı	Valör 2 Fiyatı	Repo Fai
1	201008190000001	Repo2 Pazarı	R	TRB080910T19	19/08/2010	20/08/2010	1	7,00	50.000,00	50.725	98,578	98,578	98,597	
2	201008190000001	Repo2 Pazarı	P	TRB080910T19	19/08/2010	20/08/2010	1	7,00	50.000,00	50.725	98,578	98,578	98,597	
3	201008190000002	Repo2 Pazarı	R	TRB120111T10	19/08/2010	20/08/2010	1	5,00	50.000,00	52.495	95,256	95,256	95,269	
4	201008190000002	Repo2 Pazarı	P	TRB120111T10	19/08/2010	20/08/2010	1	5,00	50.000,00	52.495	95,256	95,256	95,269	
5	201008190000003	Repo2 Pazarı	R	TRT010910K15	19/08/2010	20/08/2010	1	8,75	50.000,00	761.155	6,569	6,569	6,571	
6	201008190000003	Repo2 Pazarı	P	TRT010910K15	19/08/2010	20/08/2010	1	8,75	50.000,00	761.155	6,569	6,569	6,571	
7	201008190000004	Repo2 Pazarı	R	TRB080910T19	20/08/2010	23/08/2010	3	7,00	80.000,00	81.155	98,578	98,578	98,635	
8	201008190000004	Repo2 Pazarı	P	TRB080910T19	20/08/2010	23/08/2010	3	7,00	80.000,00	81.155	98,578	98,578	98,635	
9	201008190000005	Repo2 Pazarı	R	TRB080910T19	23/08/2010	24/08/2010	1	12,00	150.000,00	198.445	75,589	75,589	75,614	
10	201008190000005	Repo2 Pazarı	P	TRB080910T19	23/08/2010	24/08/2010	1	12,00	150.000,00	198.445	75,589	75,589	75,614	

3. BONDS AND BILLS MARKET RISK MANAGEMENT SYSTEM

The basic approach of the current risk management system used in the sub-markets of the Bond and Bills Market aims to cover deficits caused by price fluctuations likely to arise in the process of acquiring securities or cash to fulfill the obligation in no later than one day if any of the parties fail to satisfy its obligation at the value date.

In the previous application;

- ❖ on the one hand, the fact that the same collateral is taken for both the transactions with a value date being the transaction day, which are exposed to a relatively lower price change risk, and the transactions with a future value date; and
- ❖ on the other hand, the fact that risks management involves a fixed collateral without making a revaluation of the collaterals according to changing market conditions until the value date

do not only increase the cost of spot transactions but also prevent fair distribution of the costs of value date transactions between the parties.   This can lead to increased costs without increasing settlement assurance.

In addition, the current application does not permit differentiation between collaterals which are taken on a transaction basis of the traded securities which are likely to differ in terms of the price fluctuations they are exposed to and in terms of liquidity, and makes it difficult to trade such securities in the sub-markets of the Bonds and Bills Market.

For the purpose of eliminating the problems described above, the trading limits and the collateralization system, which constitute the backbone of the current risk management system that aims to manage the daily price change risk has been re-arranged to achieve the targets below:

- o To reduce the blocked collateral amount down to an acceptable level without sacrificing security for spot transactions,
- o To achieve a realistic and fair distribution of the cost of the future value-dated trades between the parties without scarifying trading and settlement security by evaluating dynamically the daily risk of the trades and taking the required amount of collateral from the party that creates the settlement risk;
- o To create a realistic risk management system also for the Repo Market for Specified

Securities which may be essentially considered as two different outright purchases and sales transactions;

o To ensure that a different rate of blockage than the rate of blockage charged to GDS trades is taken for trades involving private sector debt securities which differ from GDSs in terms of the price fluctuations they are exposed to and in terms of liquidity.

With the new risk management system, in order to reach the above mentioned targets:

o the amount of collateral received from transactions is decreased from 5% (1/20) to 2.5% (1/40);

o daily evaluation is carried out for the trades carried out in the Repo Market for Specified Securities and the future value date transactions, and the differences in value which occur, is countered by blocking either the relevant member's collateral or making a margin call in order to secure the settlement obligations of the trade;

o the amount of the blockage resulting from the transactions of the private sector debt instruments (PDS) is determined to be twice (1/20) the amount applied to GDSs (1/40); in other words, a trading limit equal to the transaction amount is used for a GDS transaction, whereas a trading limit twice the transaction amount is used for a PDS transaction.

Effective from December 17, 2010, the new risk management principles is applied to future value-dated transactions which were executed prior to that date.

3.1 Daily Revaluation Principles

In the new risk management system, the *theoretical prices* which are used in the daily revaluation of the future value-dated trades in the Outright Purchases and Sales Market and the trades in the Repo Market for Specified Securities refer to the notional/benchmark price at the settlement date of the trade, which is calculated using the spot prices and interest rates effective on the evaluation date.

Such theoretical prices are calculated based on the weighted average price (WAP) which is calculated for the trades executed in the Outright Purchases and Sales Market on the relevant securities on the previous transaction day and the overnight repo rate. In this framework,

from amongst the same day value-dated trades, which are to be settled within the Exchange (except those trades the parties to which are the same institution), average weighted prices of securities:

- whose number of trades is equal to or above 5% of the total number of trades (x)
- whose nominal trading amount is equal to or above 5% of the total nominal amount (y)
- which involve 5 or more members who are parties to the trade (z)

shall be used in the calculation of the theoretical price. For securities which fail to meet these criteria, theoretical price will be calculated using daily announced current prices instead of the weighted average price.

In that case;

$$\underline{\text{Theoretical Price}} \quad = F*(1 + \frac{R*(V-D)}{36500})$$

R= weighted average overnight repo rate (occurring in the current Repo-Reverse Repo Market)
V= Settlement date
D= Valuation date
F=Weighted average price or current price

Sample Application 1
On 15.04.2010; on the presumption that the same day value-dated trades which are realized on the security TRT020211T11 and settled within the Exchange satisfy the coefficient criteria (x, y, z) described above, the weighted average price calculated for that security is TL 90,000.

R= % 7,25   V= 19.04.2010   D= 16.04.2010   (V-D= 3)

then

$$\underline{\text{Theoretical Price}} \quad = 90,000*(1 + \frac{7,25*3}{36500}) = \underline{90,054} \text{ TL}$$

In that case, the theoretical price to be used in the future value date trades realized on the security TRT020211T11 on the Outright Purchases and Sales Market and the daily revaluation (mark-to-market) of the trades on the Repo Market for Specified Securities on 16.04.2010 will be TL 90,054. Collaterals / limit blockages of those members who create settlement risks will be calculated taking this theoretical price into account.

3.2 Outright Purchases and Sales Market Risk Management

With the new risk management system, with regard to the future value-dated outright

purchases and sales transactions, the limit of the party carrying the settlement risk will be blocked in consideration of the settlement risk which occurs due to the changes in the value of the security until the value date.

The revaluation amount is found by multiplying the theoretical price calculated for the settlement date on the valuation date with the nominal amount of the trade. The *difference* between the revaluation amount which is calculated and the trade value will be the basis for the collateral blockage. In that case;

<u>Difference</u> = [(Theoretical Price x Nominal) – (Trade Price x Nominal)]

The amount of difference calculated as a result of revaluation shows the trade deficit which will arise if the trade in question is not settled. For this reason, in addition to the trading limit which is blocked at the order stage, a blockage equal to the amount which creates settlement risk shall be applied to the trading limit of:

- the selling party if the theoretical price is higher than the trading price;
- the buying party, in the contrary case,

in order to minimize the losses which are likely to arise in case of default.

On the other hand, if the theoretical price is higher than the trade price, the blockage which is imposed at the amount of the trade value during the order stage will be insufficient. For this reason, an additional blockage will be necessary for the one-day price change with regard to the difference amount. In the contrary case (where theoretical price is lower than the contract price), no additional blockage will be imposed as sufficient blockage exists for the contract).[3]

In this framework, the blockage is calculated as follows:

a) If Theoretical Price > Trading Price, then

<u>Blockage</u> = Difference + (Difference / valuation coefficient)

(If this trade were a PDS trade; Blockage = Difference + (Difference / valuation coefficient)x2)

b) If Theoretical Price < Trading Price, then

<u>Blockage</u> = Difference

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[3] In the Outright Purchases and Sales Market, the trading limit which is blocked at the time of the order is equal to [trading price x nominal]. If the theoretical price is higher than the trading price, the trading value which is found as a result of revaluation will be higher as much as the amount of difference than the original trading value. However, because the trading limit is not blocked (collateral is not taken) at the beginning for such excess which occurred on the revaluation date, the revaluation difference has to be considered as an additional trading amount, and limit should be blocked also for such amount.

The member who wants to remove the limit blockage which is calculated as explained above, has to deliver the securities corresponding to the amount of devaluation to the relevant repository of the custody house determined by the Exchange (Takasbank).

Sample Application 2
For an outright purchase-sales transaction with a future value date as shown in the table below, risk management is carried out as follows on the presumption that the theoretical prices given in the table will occur as a result of the revaluation to be carried out until the value date.

Table 2: Outright Purchases and Sales Market Risk Evaluation Example

Transaction Date	15.04.2010
Settlement Date	20.04.2010
Nominal Amount (Q)	1.000.000-TL
Trading Price (P)	TL 85,000
Traded Value	TL 850.000
Theoretical price calculated for 16.04.2010 (TP)	TL 86,000
Theoretical price calculated for 19.04.2010 (TP)	TL 84,500
Valuation Coefficient (VM)*	40

* Determined by the ISE Bonds and Bills Market.

1. Assume that the theoretical value resulting from revaluation for a security with a nominal amount of TL 1,000,000 on 16.04.2010 is TL 860,000. In that case, there is a risk that the <u>selling member</u> may fail to satisfy its settlement obligation for this transaction which amounts to TL 850,000.[4] For this reason, the <u>trading limit collateral</u> of the selling member is blocked by 860,000 - 850.000=10.000 TL. In addition, as described above, as the theoretical price is higher than the contract price an additional blockage will be necessary for the one-day price change of the difference. Such blockage will be calculated as 10.000 / 40 = TL 250 (Difference / valuation coefficient). Therefore, in addition to the trading limit which is blocked at the order stage, the total blockage resulting from revaluation will be = 10,000 + 250 = TL 10,250.

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[4] As the selling member can sell the security, which is valued at TL 850,000 for TL 860,000at the current market, it carries withdrawal risk (settlement risk for the market).

As the buying member does not carry settlement risk, no blockage will be imposed to the buyer.

2. Assume that the theoretical value resulting from revaluation of the security with a nominal amount of TL 1,000,000 on 19.04.2010 is TL 845,000. In that case, there is a risk that the buying member may fail to satisfy its settlement obligation for this transaction which amounts to TL 850,000. Therefore, in addition to the trading limit which is blocked at the order stage, a blockage of 850,000 - 845,000 = TL 5,000 will be imposed to the member buying the security in question.

As the selling member does not carry settlement risk, no blockage will be imposed to the seller in this case.

3.3 Risk Management of Repo Market for Specified Securities

The trades on the Repo Market for Specified Securities are considered as two concurrent and connected outright purchase and sales transactions, therefore the principles of risk management applied to the trades on the Outright Purchases and Sales Market are applied to both transactions separately.

Sample Application 3

With the assumption that the theoretical prices given in the table have formed until the Value Date 2 for a repo-reverse repo transaction for specified securities, the details of which are given in the below table;

1. In the period from 17.08.2010, i.e. the Transaction Date to 23.08.2010, i.e. Starting Value Date (V1), (Period 1), it may be considered that the party that realizes repo executes an outright sales transaction at a nominal amount of TL 1,176,475 of a security specified in the contract with a value date of 23.08.2010 and a value of TL 1,000,000.- while the party that realizes reverse-repo executes an outright purchase transaction with the same value date.

2. In the period from 23.08.2010, i.e. the Starting Value Date to 31.08.2010, i.e. Ending Value Date (V2), (Period 2), it may be considered that the party that realizes reverse repo executes an outright sales transaction at a nominal amount of TL 1,176,475 of a security specified in the contract with a value date of 31.08.2010 and a value of TL 1,001,304.- while the party that realizes repo executes an outright purchase transaction with the same

value date.

Table 3: Risk Valuation Example for the Repo Market For Specified Securities

Transaction Date	17.08.2010
Starting Value Date (V1)	23.08.2010
Ending Value Date (V2)	31.08.2010
Repo Rate (%)	7,00
Principal Amount (Traded Value)	TL 1,000,000
Security Price	TL 85,000
Security Settlement Price *	TL 85,000
Nominal Amount **	TL 1,176,475
Theoretical price calculated for 18.08.2010	TL 86,000
Theoretical price calculated for 20.08.2010	TL 84,000
Theoretical price calculated for 24.08.2010	TL 84.500
Theoretical price calculated for 27.08.2010	TL 85.500
Value at Value Date 2 (Traded Value) Principal + Interest - Withholding	1.000.000+1.534,25-230,14 = 1,001,304.11-TL
Valuation coefficient (VM)***	40

* Calculated by OTASS according to the order entry method of the related security
**Calculated by OTASS as multiples of five using the settlement price of the underlying security.
*** Determined by the ISE Bonds and Bills Market.

For the trade in question, blockages will be applied as follows as a result of the revaluation carried out for the dates whose theoretical prices are given in the table:

Period 1:

Between 17.08.2010 – 23.08.2010, the party that realizes repo is the security seller whereas the party that realizes reverse repo is the security buyer.

  a) The theoretical value resulting from revaluation for the security with a nominal amount of TL 1,176,475 on 18.04.2010 will be TL 1,011,768.50. In that case, the settlement risk of this trade which has a settlement value of TL 1,000,000 stems from the party that realizes repo (security seller).[5] For this reason, the trading limit collateral of the member selling such security (the party that realizes repo) is blocked by 1,011,768.50 – 1,000,000=11,768.50 TL. In addition, as described above, the theoretical price is higher

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[5] Because the member that realizes repo can sell the security of TL 1.000.000 at TL 1.011.768,50, its current market value, it carries withdrawal risk (settlement risk for the market).

than the trading price and an additional blockage will be necessary for the one-day price change with regard to the difference amount in order to realize a smooth settlement. This amount will be calculated as 11,768.50 / 40 = TL 294.21 (Difference / valuation coefficient). In that case, total blockage = 11,768.50 + 294.21 = 12,062.71 TL.

As the member that realizes reverse repo (security buyer) does not carry settlement risk, no blockage will be imposed to it.

b) The theoretical value resulting from revaluation of a security with a nominal amount of TL 1,176,475 on 20.08.2010 will be TL 988,239. In that case, the settlement risk of this trade which has a settlement value of TL 1,000,000 stems from the party that realizes reverse repo (security buyer).[6] For this reason, the trading limit collateral of the member buying such security (the party that realizes reverse repo) is blocked by 1,000,000 – 988,289=11,761.00 TL. (As the theoretical price is lower than the trading price, the amount of difference of the one-day price change does not pose additional settlement risk.)

As the member that realizes repo (security seller) does not carry settlement risk, no blockage will be imposed to it.

Period 2:

Between 24.08.2010 – 31.08.2010, the party that realizes repo is the security buyer whereas the party that realizes reverse repo is the security seller.

c) The theoretical value resulting from revaluation for a security with a nominal amount of TL 1,176,475 on 24.08.2010 will be TL 994,121.38. In that case, the settlement risk of this trade which has a settlement value of TL 1,001,304.11 (principal + interest – withholding tax) stems from the party that realizes repo (security buyer). For this reason, the trading limit collateral of the member buying such security (the party that realizes repo) is blocked by 1,001,304.11 – 994,121.38=7,182.73 TL. (As the theoretical price is lower than the trading price, the amount of difference of the one-day price change does not pose additional settlement risk.)

As the member that realizes reverse repo (security seller) does not carry settlement risk, no blockage will be imposed to it.

d) The theoretical value resulting from revaluation of a security with a nominal amount of TL 1,176,475 on 27.08.2010 will be TL 1,005,886.13. In that case, the settlement

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[6] Because the member that realizes reverse repo can buy the security of TL 1.000.000 for TL 988.239, its current market value, it carries withdrawal risk (settlement risk for the market).

risk of this trade which has a settlement value of TL 1,001,304.11 (principal + interest – withholding tax) stems from the party that realizes reverse repo (security buyer). For this reason, the trading limit collateral of the member selling such security (the party that realizes reverse repo) is blocked by 1,005,886.13 – 1,001,304.11 = 4,582.02 TL. In addition, as described above, the theoretical price is higher than the trading price and an additional blockage will be necessary for the one-day price change with regard to the difference amount in order to realize a smooth settlement. Such amount will be calculated as 4,582.02 / 40 = TL 114.55 (Difference / valuation multiple). In that case, total blockage = 4,582.02 + 114.55 = 4,696.57 TL.

As the member that realizes repo (security buyer) does not carry settlement risk, no blockage will be imposed to it.