

## IV. Special Topics

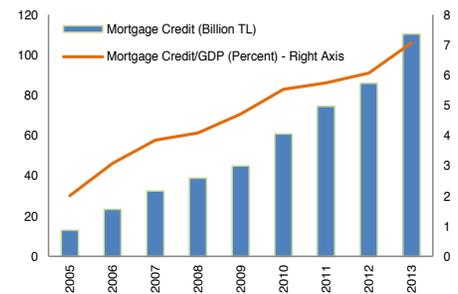
### IV.1. Micro-Dynamics of Mortgage Credits in Turkey

Financial deepening has accelerated with the improvement in macroeconomic structural factors in Turkey. In this process, mortgage credits have been one of the most growing credit types because of the decline in credit interest rates and the extension of credit maturities. For example, the mortgage credit/GDP ratio which had been 2.01 percent in 2005, reached 7.07 percent in 2013 (Chart IV.1.1). In addition, the share of mortgage credits in total assets of the banking sector rose to 6.5 percent in 2013, while it was 3.1 percent in 2005. On the other hand, despite the rapid growth, comparisons with developed and developing European countries imply the existence of high growth potential in the credit / GDP ratio<sup>5</sup> as well as mortgage credits for Turkey. The healthy condition of the projected growth process of mortgage credits and the residential sector has great importance in terms of financial stability. Possible imbalances in credit growth have the potential to affect financial stability due to both an inefficient allocation of resources in the economy and the effects on household indebtedness. A comprehensive analysis of mortgage credits and the housing sector is necessary because of the importance of these credits for the economy. This study, which represents a small part of this comprehensive project, presents the micro-dynamics of mortgage credits in detail.

This study summarizes the results from Altunok et al. (2014), who examined a number of people using credit from different income groups, the amount of credit per capita, the share of average monthly payment and total credit usage. Then, they analyzed the distribution of age, maturity, the non-performing loans (NPL) ratio, and housing values. They examined the credit flow of approximately 1.9 million people using mortgage credit between 2009 and 2013. Due to constraints in accessing the

Chart IV.1.1

Mortgage Credits and Mortgage Credits/GDP



Source: CBRT - BAT-Risk Center

<sup>5</sup> While the Mortgage Credit / GDP ratio was over 100 percent in Denmark and the Netherlands in 2012, the level rose from 2 percent in 2002 to 18 percent in 2012 in countries such as the Czech Republic, Slovenia, Bulgaria and Lithuania.

information about income and housing values in Turkey, two important assumptions were made. Income and housing values were estimated from monthly installment payments and total amount of credit usage respectively. The results of this study should be considered in light of these crucial assumptions. First, eight different income groups were established as multiples of each year's minimum wage.<sup>6</sup> The monthly installment of mortgage credit cannot exceed 70 percent of the declared income. The duration of the average maturity of mortgage credits increased significantly between 2002 and 2008, but then stabilized and began to reach a plateau. Since the study covers data after 2009, the installment amount was set as a reference point to estimate the income of individuals. Chart IV.1.2, illustrates that, because maturities are horizontal after 2009, income is predicted consistently in terms of amount of installments during this period. **As a result, the average income of individuals in each month is calculated as double the amount of installment; then, individuals are grouped according to the calculated income levels.** The limits for these groups are shown in Table IV.1.1 only for the year 2013 and the limits of other years are adjusted based on the relevant years' minimum wage rate. Flow data is used in this study to prevent shifts between income groups due to the inflation adjustment between amounts of installments in different years. Since the amount of the credit installment is one of the main factors in credit usage and the choice of maturity, the correlation between installment choice and total income are considered to be strong.

**Table IV.1.1**  
Income Groups (TL)-Monthly

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8
<b>2013</b>	0-891	892 -2,673	2,674 -4,455	4,456 -8,910	8,911 - 22,275	22,276 - 44,550	44,551 - 89,100	Greater Than 89,101

<sup>6</sup> Inflation changes for the previous years are taken into account in this way.

Tables IV.1.2a and IV.1.2b present the numbers and percentages of people using credit for each income group. In Table IV.1.2a, there seems to be a considerable increase in the total number of people using mortgage credits between 2009 and 2013. While the rate of growth is more pronounced in the lowest three income groups, the maximum increase is observed in the lowest income group. As seen Table IV.1.2b, income group 2, that has the highest share, increased by 69.1 percent and reached 58.8 percent share in 2013. The share of other high-income groups contracted from 2009 to 2013.

In Table IV.1.3a, the amount of mortgage credits per capita is given for each income group and shows whether the increase in the number of people using mortgage credits is supported by the volume of credit usage. The amount of mortgage credit per capita increased in real terms for all income groups except income group 7 between 2009 and 2013. In addition, the volume of credit per capita in high-income groups (i.e., Group 8) is more volatile than low-income groups. Having few people and high credit volume in these groups could be the reason for this result. The Table shows that the average amount of installment for mortgage credits increased for the first seven income groups in real terms and declined in real terms for the highest-income group (Table IV.1.3b). Table IV.1.3c gives the credit shares of income groups for the same years. While the credit shares of two groups with the lowest income increased over 100 percent, there has been approximately 40 percent decrease in the share of high-income groups. The credit shares increased from 78.1 percent to 87.4 percent between 2009 and 2013. Although the share of income group 2 was lower than that of 3 and 4 in 2009, this share was higher than the two groups' shares in 2013.

**Table IV.1.2a**

Number of People Using Mortgage Credit (Thousands)

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8	Toplam
2009	1.9	92.2	91.1	60.5	16.2	2.3	0.6	0.5	265.2
2010	4.3	158.6	119.8	60.7	16.1	2.5	0.6	0.5	363.0
2011	6.2	197.3	109.7	49.6	13.8	2.2	0.6	0.4	379.7
2012	4.5	178.0	107.1	48.3	13.3	2.3	0.7	0.5	354.7
2013	11.3	342.8	150.0	60.2	15.2	2.5	0.8	0.4	583.2
% Change*	484.2	271.9	64.6	-0.6	-6.1	9.7	39.7	-3.3	119.9

\* Represents the percentage change between 2009 and 2013.

Source: BAT-Risk Center

**Table IV.1.2b**

Total Person Index (Percent)

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8
2009	0.7	34.7	34.4	22.8	6.1	0.9	0.2	0.2
2010	1.2	43.7	33.0	16.7	4.4	0.7	0.2	0.1
2011	1.6	52.0	28.9	13.1	3.6	0.6	0.2	0.1
2012	1.3	50.2	30.2	13.6	3.8	0.6	0.2	0.1
2013	1.9	58.8	25.7	10.3	2.6	0.4	0.1	0.1
% Change*	165.7	69.1	-25.1	-54.8	-57.3	-50.1	-36.5	-56.0

\* Represents the percentage change between 2009 and 2013.

Source: BAT-Risk Center

**Table IV.1.3a**

Mortgage Credit Volume Per Capita (Thousand TL)

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8
2009	14.2	37.4	60.5	89.3	162.4	346.2	526.6	813.5
2010	24.4	47.4	76.4	112.7	216.9	435.8	861.1	1,170.4
2011	34.5	45.7	73.5	112.3	206.4	335.5	596.5	1,183.3
2012	33.1	56.9	89.4	134.2	256.8	479.5	594.6	674.2
2013	40.1	65.4	103.3	159.1	299.5	527.4	677.3	1,372.6
% Change*	182.6	75.0	70.6	78.1	84.4	52.3	28.6	68.7
% Real Change**	149.2	41.6	37.2	44.7	51.0	18.9	-4.8	35.3
Variance***	82.2	93.4	212.5	554.2	2,167.5	5,559.5	13,293.2	66,660.9

\* Represents the percentage change between 2009 and 2013.

\*\* Real change is calculated based on the consumer price index.

\*\*\* The variance in each group was calculated and used as an indicator of the volatility.

Source: BAT-Risk Center

**Table IV.1.3b**

Monthly Payment Amount Per Capita (TL)

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8
2009	238	666	1,179	2,006	4,317	10,283	20,186	113,525
2010	272	706	1,276	2,223	4,844	11,170	22,894	111,900
2011	306	776	1,409	2,487	5,429	12,521	25,220	123,260
2012	334	852	1,527	2,684	5,941	14,132	27,836	134,093
2013	373	923	1,687	2,970	6,481	15,511	30,395	151,209
% Change*	57.2	38.6	43.0	48.1	50.1	50.8	50.6	33.2
% RChange**	23.8	5.2	9.6	14.7	16.7	17.4	17.2	-0.2

\* Represents the percentage change between 2009 and 2013.

\*\* Real change is calculated based on the consumer price index.

Source: BAT-Risk Center

**Table IV.1.3c**

Credit Share for Income Groups (Percent)

	Group-1	Group-2	Group-3	Group-4	Group-5	Group-6	Group-7	Group-8
2009	0.2	18.7	29.6	29.5	14.4	4.1	1.8	1.7
2010	0.4	25.8	31.7	24.0	11.8	3.4	1.5	1.4
2011	0.6	33.4	29.7	20.4	10.4	3.0	1.5	1.2
2012	0.5	31.5	30.3	20.5	10.6	3.4	1.6	1.6
2013	0.7	40.8	28.3	17.5	8.2	2.4	1.1	0.9
% Change*	209.4	118.0	-4.3	-40.7	-43.3	-41.1	-36.6	-45.3

\* Represents the percentage change between 2009 and 2013.

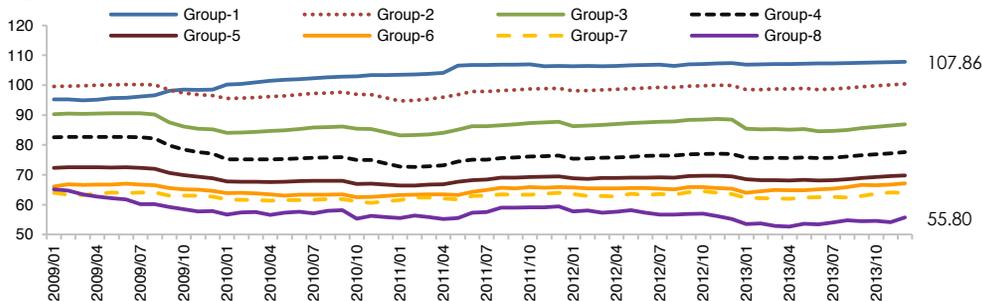
Source: BAT-Risk Center

Chart IV.1.2 shows that the average maturity generally follows a stable trend in mortgage credits used after 2009; however, the average maturity is inversely proportional to the income. This means that people with higher income use more short-term credit. The average maturity of the lowest income group (107 months) is approximately twice that of the average maturity in the highest income group (55 months).

Chart IV.1.3 presents age distributions of people using mortgage credit with flow data set for the period 2009-2013. The proportion of young people under the age of 35 has increased in recent years. While the share of people in the 18-34 age range is 16.9 percent in 2009, it reaches 35.5 percent in 2013. There is a decline the shares of 35-44 and 45-64 age groups in 2013. The weight of people aged 45 and above decreased from the level of 45.2 percent to 32.1 percent. Therefore, the decision of housing purchases was made in earlier ages as a result of the easing of access to credit facilities and also extension of the maturity.

**Chart IV.1.2**

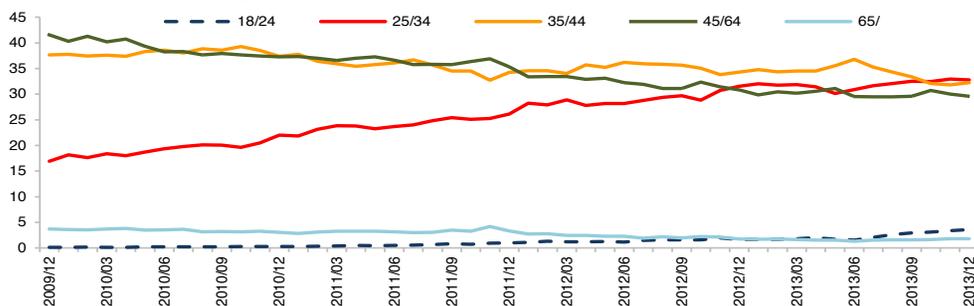
Average Maturity for Income Groups (Stock)



Source: BAT-Risk Center

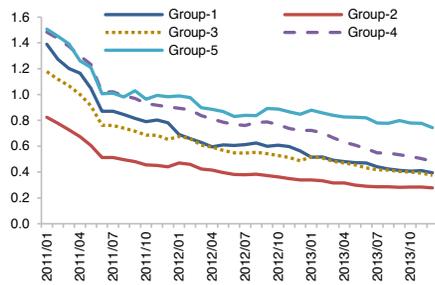
**Chart IV.1.3**

Age Distribution of People Using Mortgage Credit (Percent)



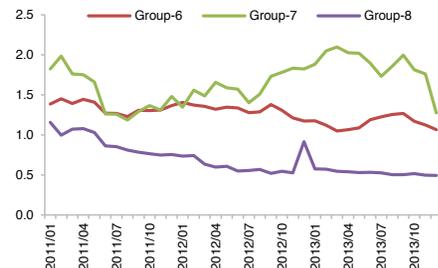
Source: BAT-Risk Center

**Chart IV.1.4**  
NPL Ratios for Income Group (Percent)



Source: BAT-Risk Center

**Chart IV.1.5**  
NPL Ratios for Income Group (Percent)



Source: BAT-Risk Center

Non-performing loan ratios by income groups are given in Charts IV.1.4 and IV.1.5.<sup>7</sup> NPL ratios decreased for all groups between 2011 and 2013, and the decline in the first five low-income groups occurred more smoothly, but there is a fluctuating decline in the other three high-income groups. The volatility of income group 7 is especially higher than the others. However, considering the fact that the share of five low-income groups and the other three high income groups are 95.5 and 4.5 percent respectively, the financial system can feasibly absorb the risks arising from the volatility experienced in these groups. This situation also does not create a great risk for financial system. In addition, the NPL ratios of income groups 2 and 3 are at lower levels within the five low-income groups. The forming of income groups 2 and 3 by fixed income employees may be the reason for this case. Income group 1 has a higher NPL ratio than income groups 2 and 3. This group is formed by the lowest income earners (minimum wage people, etc.); hence, the probability of facing default risk is more likely.

The high shares (86.6 percent) of income groups 2, 3 and 4, require examining the relationship between value of houses and income of individuals in more detail. Because there is no information on the value of houses in the database, an assumption is made for the prices. Since the credit amount cannot exceed 75 percent of the value of real estate, the housing value is estimated as "Credit Amount x 4/3" and nine separate clusters are formed for these values<sup>8</sup>. The lower limits in the housing value clusters show the minimum value of houses purchased (Table IV.1.4).

**Table IV.1.4**  
Housing Value Clusters (Thousand TL)

	Cluster-1	Cluster-2	Cluster-3	Cluster-4	Cluster-5	Cluster-6	Cluster-7	Cluster-8	Cluster-9
<b>2013</b>	0-24	24-60	60-100	100-250	250-500	500-1,000	1,000-5,000	5,000-10,000	Greater Than 10,000

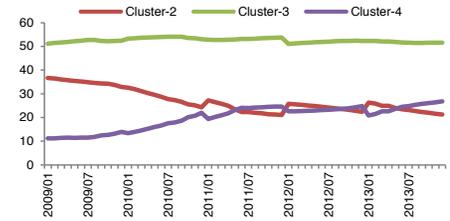
<sup>7</sup> Analysis about NPL ratios has been made based on stock data.

<sup>8</sup> Inflation changes in housing value clusters for the previous years are taken into account with the minimum wage index.

Income group 2, having highest share of credits (40.8 percent), is concentrated in the housing value clusters 2, 3 and 4 with the rate of 99.63 percent. The progress of the credit shares and NPL ratios of the people in these clusters are given in Charts IV.1.6 and IV.1.7. There is a shift from cluster 2 which corresponds to a relatively low housing value and NPL ratio volatility towards cluster 4 which corresponds to higher housing values and NPL ratio volatility. The general trend of the NPL ratios exhibits a similar tendency with the trend of the overall NPL ratio in mortgage credits. The progress of the housing value clusters forming the majority of income group 3 is given in Charts IV.1.8 and IV.1.9. There is a shift from clusters 2 and 3 which corresponds to relatively low housing value and NPL ratio volatility towards cluster 4 which corresponds to higher housing values and NPL ratio volatility. Similar analyses are given for income group 4 in Charts IV.1.10 and IV.1.11. There is a shift from clusters 3 and 4 towards cluster 5. Following a similar trend of NPL ratios on a cluster basis with overall NPL ratios, and NPL ratios on an income basis with a convergence of these NPL ratios to the level of 0.5 percent, shows that the industry is growing in a healthy structure. On the other hand, an ongoing shift from a relatively low housing value and NPL ratio volatility towards higher housing values and NPL ratio volatility may create a risk and should be monitored carefully.

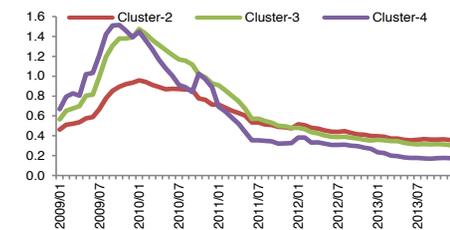
This study analyzed the micro-dynamics of mortgage credits, revealing that maturities of mortgage credits have increased and the NPL ratio has followed a moderate trend despite the rapid growth. The increase in demand usually originates from lower-middle and middle-income people and people under the age of 35. Although the share of total credits of people in these income groups has increased significantly, there has been a steady decline in NPL ratios, especially after 2011. The share of high income individuals has narrowed relatively, indicating that the NPL ratio of these groups has a more volatile structure. On the other hand, despite the low NPL ratio, shifting from a low housing value to a high housing value, experienced in lower-middle and middle-income groups, is closely monitored in terms of financial stability. Furthermore, using income groups and housing segments when making

**Chart IV.1.6**  
Credit Shares of Housing Value Clusters for Income Group 2 (Percent)



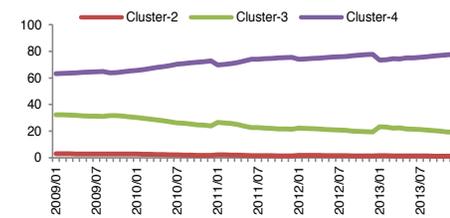
Source: BAT-Risk Center

**Chart IV.1.7**  
NPL Ratios of Housing Value Clusters for Income Group 2 (Percent)



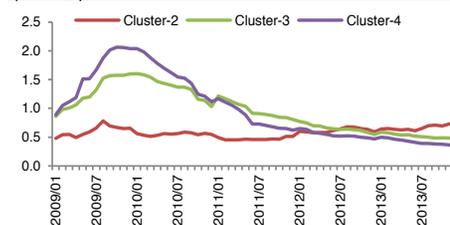
Source: BAT-Risk Center

**Chart IV.1.8**  
Credit Shares of Housing Value Clusters for Income Group 3 (Percent)



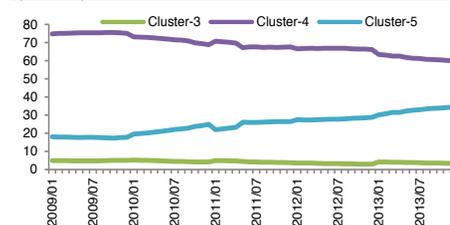
Source: BAT-Risk Center

**Chart IV.1.9**  
NPL Ratios of Housing Value Clusters for Income Group 3 (Percent)



Source: BAT-Risk Center

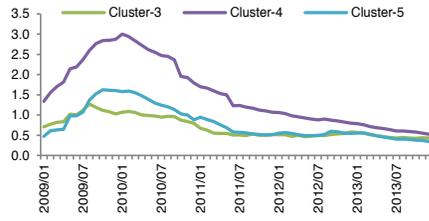
**Chart IV.1.10**  
Credit Shares of Housing Value Clusters for Income Group 4 (Percent)



Source: BAT-Risk Center

**Chart IV.1.11**

NPL Ratios of Housing Value Clusters for Income Group 4 (Percent)



Source: BAT-Risk Center

macro-prudential policies and regulations related to mortgage credits may significantly affect the success of these policies.

The studies examining the relationship among mortgage credits, home ownership, and saving rates will be continued by including prices and interest rates over smaller samples. In this study, we make an important assumption and estimate housing values over the amount of credit used. In the ongoing studies, we will obtain information about housing values and take notice of data sets including housing prices and stock-sale information with regional differences. Then, an analysis related to the points having potential to create a risk in terms of financial stability in the housing sector will be continued. The housing sector has a rapid growth in Turkey and is expected to continue with this increasing trend in the near future. Therefore, an analytical perspective including all aspects of the housing sector will be presented in order for the sector to grow in a healthy way and contribute to financial stability.

## References

Altunok, F., Çapacıoğlu, T., and Hacıhasanoğlu, Y., "Micro-Dynamics of Mortgage Credits in Turkey", Central Bank of Turkey Research Notes in Economics (in publishing process).

## IV.2. Determinants of Hedging in Turkey

FX Risk and its management play an important role in emerging markets when there is a high volatility of exchange rates. Especially after the FED announced a tapering of QE, hedging instruments have drawn attention due to the substantial increase of exchange rates in emerging markets<sup>9</sup>. The high volatility of the Turkish currency between May 2013 and January 2014 makes the Turkish case interesting for analyzing the hedging behavior of firms. Turkish firms with high FX liabilities are prone to utilizing hedging instruments but what the determinants of this choice are is an open question. This section reviews the study of Altunok, Aytug and Hacıhasanoglu (2014).

The literature provides some guidance about the determinants of hedging from both theoretical and empirical perspectives. From a theoretical perspective, firms utilize hedging instruments to minimize tax liability, reduce the financial stress and maximize the wealth portfolio. Smith and Stulz's (1985) study is considered to be the earliest theoretical paper claiming that hedging would result in a reduced tax liability<sup>10</sup>. On the other hand, there is a vast empirical literature that tries to prove different theories about the determinants of hedging. The earliest empirical papers are Smith and Smithson (1993) and Dolde (1995). Both studies survey firms to learn whether firms use derivative instruments since hedging information was not disclosed in the annual reports at the time<sup>11</sup>. However, most of these papers use the data from US firms, thus the determinants of hedging in emerging markets have not yet been examined sufficiently. Only a few papers use non-US data: Marshall (2000), Hagelin (2003), Kim and Sung (2005) and Junior (2007).

9 The Turkish Lira (TL) has depreciated the most, by 25 percent, among emerging countries since then.

10 Froot et al. (1993), De Marzo and Duffie (1995), Burnside et al. (2001) and Schneider and Tornell (2004) are other important theoretical papers.

11 Some of the other empirical papers are Wysocki (1995), Mian (1996), Geczy et al. (1997), Graham and Rogers (2002), Allayannis and Ofek (2001), Carter et al. (2003) and Judge (2006).

Altunok, Aytug and Hacıhasanoglu (2014) investigate the determinants of hedging in Turkey using the data on non-financial Turkish firms. The results show that firm size, which is a proxy for cost of hedging, imports, FX credit, leverage, and gross profit margin are statistically significant determinants of hedging in Turkey. While firm size, imports and FX credit increase the probability of using derivative instruments, leverage and gross profit margin decrease the probability. The results are consistent with the findings in the literature.

This study uses a very unique and comprehensive dataset which includes balance sheet and income statement items as well as outstanding derivatives and imports of non-financial Turkish firms. Balance sheets and income statements come from the dataset of CBRT real sector balance sheets. Outstanding derivatives were collected from the CBRT database. Import data was hand-collected. CBRT real sector balance sheets have data for 9244 firms. While the information on derivatives for all those firms exists, the imports data was acquired for only 437 firms. Thus, the analysis was made with a smaller sample, and then the whole sample was used for a robustness check.

The literature suggests that the balance sheet data needs to be dated prior to the derivatives data in order to mitigate the endogeneity problem. Thus, balance sheet items are reported as of 2012 and the derivatives data is reported as of 2013. The literature also suggests that firm size be used as a proxy for the cost of hedging. In this study, firm size is estimated using logarithm of assets.

Table IV.2.1 shows the summary statistics of variables used in the study. In order to remove the effect of outliers, all variables were winsorized at the 5 percent level. Both samples have similar characteristics. For instance, the means of assets, liquidity, firm age, gross profit margin, ROA and tax to profits ratio are very close. On the other hand, the means of leverage, FX credit and exports are higher for the importers<sup>12</sup> A comparison of hedgers and non-hedgers shows that the means of FX credit

<sup>12</sup> There are 4532 exporters in the whole sample and the exports to assets ratio is 0.30.

and imports are higher for hedgers.

The probit model below is used to examine the determinants of hedging.

$$HEDGE_i = \beta_0 + \beta_1 IMP_i + \beta_2 FXCre_i + \beta_3 Size_i + \beta_4 GPM_i + \beta_5 Lev_i + \beta_6 EXP_i + \beta_7 Liq_i + \varepsilon_i$$

where  $HEDGE_i$  is the hedging dummy,  $IMP_i$  is the ratio of imports to assets,  $FXCre_i$  is the ratio of FX Credit to assets,  $Size_i$  is the log of assets,  $GPM_i$  is gross profit margin,  $Lev_i$  is leverage, defined as assets minus equity divided by equity,  $EXP_i$  is the ratio of exports to assets, and  $Liq_i$  is Liquidity, defined as current assets divided by current liabilities, for firm  $i$ .

The dependent variable is the hedging dummy which takes 1 if a firm utilizes a derivative instrument and 0 otherwise. First, six different specifications of the model were estimated with the small sample. Then, six different specifications of the model were re-estimated with the full sample. The marginal effects of right-hand side variables instead of estimated coefficients are reported in all tables.

**Table IV.2.1**

Descriptive Statistics

	Probit Sample		Hedge=1		Hedge=0		Full Sample	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean
Ln (Assets)	437	0.41	178	1.00	259	0.00	9244	0.09
Leverage	437	18.27	178	1.60	259	18.04	9244	17.05
Liquidity	437	2.81	178	2.50	259	3.03	9244	3.23
Imports/Assets	437	1.66	178	1.61	259	1.70	9239	1.77
Ln (Firm Age)	437	0.31	178	0.41	259	0.24	-	-
Gross Profit Margin	437	3.14	178	3.14	259	3.14	9242	2.91
FX Credit/Assets	437	0.15	178	0.13	259	0.17	9238	0.18
Exports/Assets	437	0.31	178	0.35	259	0.29	9244	0.10
ROA	437	0.49	178	0.54	259	0.45	9244	0.14
FX Credit/Total Credit	437	0.04	178	0.04	259	0.04	9244	0.03
Exports/Sales	437	0.72	178	0.77	259	0.68	9244	0.24
TI Credit/Assets	437	0.42	178	0.44	259	0.40	9240	0.14
Tax/Profits	437	0.13	178	0.11	259	0.15	9244	0.25
Fin Exp/Total Credit	437	0.14	178	0.15	259	0.14	9241	0.13
	436	0.08	178	0.09	258	0.08	8485	0.18

The estimation results are presented in Table IV.2.2. The first column is the benchmark model which includes the variables in the above equation. The second column includes alternative measures of profitability, exports and FX credit. These variables are ROA, the ratios of exports to sales, and FX credit to total credit, respectively. The third column includes additional control variables to the benchmark model such as the ratios of TL credits to assets, tax to profits, and financial expenditures to total credit. Finally, in columns 4, 5, and 6, the three models with industry dummies are re-estimated to control for industry-specific effects.

Firm size, which is a proxy for the cost of hedging, is an important determinant of hedging with a significance level of 1% for all specifications of the model. The literature reveals that large companies are more likely to use derivatives than small firms when fixed costs of hedging are important. Table IV.2.1 also shows that the users of derivatives are larger than non-users and the probit estimation provides evidence that the cost of hedging is an important determinant of hedging<sup>13</sup>. Leverage is expected to be statistically significant since it captures the cost of financial distress. Leverage is also significant with a negative sign for all specifications. The other two determinants of hedging are imports and FX credit. Importers and firms using FX credit are exposed to FX risk more than others. Thus, they are expected to use derivatives to hedge FX risk<sup>14</sup>. As expected, both variables are statistically significant with a positive sign for all specifications. Moreover, the marginal effect of FX credit is almost two times larger than the marginal effect of imports.

The final significant determinant of hedging is gross profit margin. The literature suggests that firms with higher profitability are expected to use fewer derivatives since profitability decreases the cost of financial distress. Gross profit margin is also significant for all specifications with the expected sign.

13 This result might reveal that big firms use derivatives more since they may have an institutionalized finance department.

14 This result might reveal that big firms use derivatives more since they may have an institutionalized finance department.

The model with a larger sample by excluding imports is re-estimated as a robustness check. The results are provided in Table 3. While the full sample has 9244 observations, the small sample has only 437 observations after the imports are excluded. Thus, the sample size increases 25 times. First, the significant variables in our benchmark model still remain significant in the full sample with and without industry dummies. The only difference is that the magnitudes of the significant variables decrease. Second, the additional control variables, the ratio of FX credit to TL credit and ROA are significant in the full sample while they do not have any explanatory power in the small sample. However, the ratio of exports to sales is significant in both samples. Likewise, the ratios of TL credit to assets and tax to profits are also significant in the full sample. The results indicate that determinants of hedging do not change and the estimations are robust in terms of sign and significance.

**Table IV.2.2**  
Determinants of Hedging

	Probability of Using Hedge					
	(1)	(2)	(3)	(4)	(5)	(6)
Imports/Assets	0.205** (0.085)	0.322*** (0.081)	0.197** (0.085)	0.200** (0.086)	0.303*** (0.082)	0.194** (0.086)
FX Credit/Assets	0.379*** (0.130)		0.518*** (0.144)	0.370*** (0.133)		0.507*** (0.148)
LN(Assets)	0.126*** (0.026)	0.113*** (0.025)	0.144*** (0.027)	0.131*** (0.027)	0.120*** (0.026)	0.147*** (0.028)
LN(Firm Age)	-0.057 (0.052)	-0.057 (0.050)	-0.057 (0.053)	-0.067 (0.054)	-0.067 (0.052)	-0.068 (0.055)
Gross Profit Margin	-0.808*** (0.293)		-0.915*** (0.292)	-0.760** (0.306)		-0.874*** (0.304)
Leverage	-0.027*** (0.010)	-0.016* (0.010)	-0.030*** (0.011)	-0.031*** (0.011)	-0.019* (0.010)	-0.034*** (0.012)
Liquidity	-0.018 (0.025)	-0.030 (0.025)	-0.020 (0.025)	-0.020 (0.026)	-0.032 (0.026)	-0.021 (0.026)
Exports/Assets	0.125* (0.074)		0.125 (0.078)	0.125 (0.076)		0.130 (0.080)
ROA		0.074 (0.539)			0.102 (0.551)	
FX Credit/Total Credit		0.087 (0.087)			0.090 (0.089)	
Exports/Sales		0.199** (0.092)			0.181* (0.094)	
TL Credit/Assets			0.259 (0.167)			0.255 (0.170)
Tax/Profits			0.474* (0.254)			0.428 (0.260)
Fin Exp/Total Credit			0.311 (0.190)			0.308 (0.194)
Industry Dummies	No	No	No	Yes	Yes	Yes
Observations	437	437	436	431	431	430
Pseudo R-squared	0.13	0.10	0.14	0.13	0.10	0.14

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

In conclusion, firm size, leverage, imports, FX credit and gross profit margin appear to be significant determinants of hedging in Turkey. The results are consistent with the literature. For the sake of robustness, the benchmark model was re-estimated with alternative measures, additional control variables and a larger sample by excluding imports. These results show that the estimations are robust in terms of sign and significance.

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**Tablo IV.2.3**

Determinants of Hedging-Robustness Check

	Probability of Using Hedge					
	(1)	(2)	(3)	(4)	(5)	(6)
FX Credit/Assets	0.147*** (0.010)		0.156*** (0.013)	0.143*** (0.011)		0.148*** (0.013)
LN(Assets)	0.035*** (0.002)	0.033*** (0.002)	0.042*** (0.002)	0.035*** (0.002)	0.033*** (0.002)	0.042*** (0.002)
LN(Firm Age)	0.006 (0.004)	0.004 (0.004)	0.004 (0.004)	-0.000 (0.004)	-0.003 (0.004)	-0.001 (0.004)
Gross Profit Margin	-0.084*** (0.015)		-0.082*** (0.018)	-0.052*** (0.016)		-0.057*** (0.018)
Leverage	-0.004*** (0.001)	-0.002*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	-0.004*** (0.001)
Liquidity	-0.001 (0.002)	-0.006*** (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.005*** (0.002)	-0.003 (0.002)
Exports/Assets	0.072*** (0.007)		0.081*** (0.008)	0.056*** (0.007)		0.067*** (0.008)
ROA		0.214*** (0.039)			0.204*** (0.038)	
FX Credit/Total Credit		0.064*** (0.006)			0.061*** (0.006)	
Exports/Sales		0.072*** (0.008)			0.053*** (0.008)	
TL Credit/Assets			0.049*** (0.012)			0.038*** (0.012)
Tax/Profits			0.106*** (0.021)			0.084*** (0.021)
Fin Exp/Total Credit			-0.008 (0.009)			-0.010 (0.009)
Industrv Dummies	No	No	No	Yes	Yes	Yes
Observations	9,231	9,233	8,471	9,110	9,112	8,363
Pseudo R-squared	0.20	0.17	0.21	0.21	0.20	0.22
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.10						

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### IV.3. Firm Deposits Over The Business Cycles: The Case of An Emerging Economy

Following the financial crisis of 2008 that erupted upon the default of Lehman Brothers and the years following this first shock, the global economy came to the brink of a collapse. What began in the US suddenly spread out all around the world. Monetary policy authorities responded to the crisis with an extremely loose monetary stance and the Fed, after hitting the zero lower bound of the policy rate, initiated three rounds of its extraordinary monetary policy strategy of quantitative easing (QE). Afterwards, the global economy was shaken by successive rounds of shocks arising from the European debt sustainability crisis, which caused the recovery to take a long time.

The notion of “the financial accelerator mechanism” named after Bernanke et al. (1996 and 1998) is an important theoretical tool to understand the dynamics inherent in the financial crisis. Bernanke et al. (1996) defines the “financial accelerator mechanism” as propagation and amplification of an initial monetary policy or productivity shock in such a way that the initial tiny impulse causes drastic economy-wide effects via credit markets developments. As a result of the initial macroeconomic shock, certain firms could not reach the required credit both due to a fall in their net worth and cash flows, and because banks hesitate extending further credit to them in a tight financial environment. Hence, firms contract their investment spending drastically during a downturn. With an increase in intensity of the initial shock and successive work of that mechanism, where in each turn, a greater portion of the economy is affected by tight financial conditions, the recession deepens and the economic activity spirals downwards.<sup>15</sup>

The financial accelerator mechanism has a differential effect on different economic agents. Compared to small firms, large firms that have access to alternative sources of finance other than bank lending are relatively less affected

<sup>15</sup> Bernanke and Gertler (1989), and Gertler (1992) reaches a similar conclusion..

by a financial crisis. One recent phenomenon that has been discussed extensively in advanced economies is the improved cash position and increase in cash to total asset ratio of big companies in the US and Europe despite the prolonged financial crisis. Although they reached the required liquidity, firms hesitated to invest at that time, which we think is one of the main factors that caused the recession to last a long time. Besides long term factors like the taxation policy, the secular increase in R&D spending and agency problems; relatively cyclical factors like recently increased uncertainty due to the economic crisis are attributed to increased cash holding by companies in advanced economies (Sanchez and Yurdagul (2013), Bates et. al (2009)). During an upturn, while the contraction in credit supply and broken money multiplier decreases the amount of cash that firms hold in the form of deposits, the fact that firms diminish their investment spending with precautionary motives and instead accumulate liquidity against potential windfalls is expected to raise firm deposit growth.

In that regard, the study by Altunok, Aysan and Bulut (2014) investigates whether the same phenomenon occurs in an emerging economy such as Turkey. When the economy enters into a contractionary phase, two counteracting forces affect deposit growth in opposite directions. While on the one hand the banks' hesitation to extend further credit obstructs the healthy work of money creation process, which causes the commercial deposit growth to fall; on the other hand, due to increased uncertainty resulting from economic stress, firms abstain from investing and instead try to recover their liquidity position with precautionary motives, which has the potential to increase commercial deposit growth. The reason this study focuses on just commercial deposit growth instead of total deposits is the fact that firms' deposits play a more critical role in the financial acceleration mechanism over the business cycles.

The literature presents limited studies on the factors determining commercial deposit growth and how commercial deposits behave over the business cycles. The academic research on these issues that study Turkish data generally focus on the behavior of the monetary aggregates (M1 and

M2) instead of deposits themselves and have not reached consistent results (Alp et al. 2011). Alp et al. find that while Turkish Lira denominated deposits are procyclical, foreign currency denominated deposits are countercyclical. Mimir (2013) shows empirically that deposits are countercyclical over the business cycles in the US while analyzing general characteristics of US business cycles, although the theoretical model he proposes yields procyclical behavior in contrast. This study tries to fill the gap in the economic literature by investigating how commercial deposit growth behaves over the business cycles, which plays a major role in the dynamics of an economic crisis.

In this study, we use bank level panel data at monthly frequency that covers the period from January 2003 to August 2013. The data set includes income statements and balance sheets information from 37 banks obtained from the data base of the Central Bank of the Republic of Turkey (CBRT). Real GDP growth is used as an indicator of which phase of the business cycle the economy is going through. The GDP figures are released by the Turkish Statistical Institute (TÜİK) on quarterly bases in Turkey. In order to obtain the data in a monthly basis, quarterly GDP figures were transformed via the method developed by Fernandez (1981) using the Industrial Production Index figures which are released monthly by the Turkish Statistical Institute (TÜİK). Inflation and Current Account Deficit/GDP are used as macroeconomic control variables, whereas the Herfindahl-Hirschman Index is added to regression equation to control for sector concentration of the banking industry. Table IV.3.1 provides the descriptive statistic for the variables used in the study. All the variables are winsorized at a 5 % level to remove the effect of outliers.

**Table IV.3.1**  
Descriptive Statistics

Variable	mean	sd	min	p50	max
Firm Deposit GR	0.043	0.330	-0.950	0.006	7.150
Realgdp Growth	0.007	0.077	-0.210	0.016	0.190
Logage	5.486	1.227	0.000	5.617	7.493
Logassets	9.995	2.204	2.790	9.962	13.715
Return on Equity	0.059	0.088	-0.591	0.052	0.326
Liquid Assets/A	0.006	0.005	0.000	0.006	0.028
ΔCredit/A	0.008	0.021	-0.107	0.007	0.111
Debt-to-Banks/A	0.230	0.210	0.000	0.158	0.941
Herfindahl Index	10.263	0.357	9.629	10.257	11.507
Inflation	0.007	0.008	-0.014	0.006	0.033
Current Account/GDP	0.054	0.033	-0.029	0.057	0.147

The following dynamic panel data model has been estimated to analyze the behavior of the commercial deposits growth over the business cycles:

$$\text{FirmDep Gr}_{it} = \alpha_0 + \mu_i + \text{FirmDep Gr}_{it-1} + \text{FirmDep Gr}_{it-2} + \varphi \text{GDP Gr}_t + \sum_k \delta_k X_{k,i(t)} + \sum_k \beta_k Z_{k,(t)} + \sum_{n=1}^{11} \theta_n DM_n + \epsilon_{it}$$

FirmDep Gr<sub>it</sub> stands for the dependent variable of the study, real growth rate of commercial deposits. In line with the common practice in such dynamic panel models, thinking that the commercial deposit growth has a certain momentum, we add lagged values of the dependent variable to the right hand side of the model. While GDP Gr<sub>t</sub> stands for real GDP growth rate, which is the focus variable of the study,  $X_{k,i(t)}$  is used to control for the bank specific fixed effects that may affect commercial deposit growth. Lastly,  $Z_{k,(t)}$  represents macroeconomic control variables, whereas  $DM_n$  are month dummies to isolate seasonal effects.

To estimate this model, the dynamic panel data method “System GMM” approach is utilized, which was developed by Arellano and Bover (1995) and Blundell and Bond (1998). When such dynamic models are estimated by OLS methods, the estimators happened to be inconsistent. In addition, static panel data methods such as first differencing or fixed effect estimation are not able to remove the serial correlation, heteroskedasticity and endogeneity problems inherent in the data. Hence, similar to this study, instrumental variable methods are needed. Besides estimation results with “System GMM”, we also provide estimation results obtained using “Difference GMM” approach as a robustness check.

The estimation results that are obtained using the “System GMM” estimation are provided in Table IV.3.2. Parallel to the common practice in literature and as a result of test we conducted, the first two lags of the dependent variable, commercial deposit growth are included as additional regressors in the econometric model. When we use more than two lags, the remaining lags are found to be insignificant. We think this is because, on average, the maturity of deposits in Turkey is close to two months.

In the first column, only real GDP growth and lagged values of the dependent variable are used as regressors of the model. Later, in other columns, bank specific and macroeconomic control variables are added to the model as additional regressors. For the model in the last column  $\Delta$ Credit/Assets and Debt to Other Banks/Assets are endogenized. According to regression results, the focus variable of the study, real GDP growth was found to be statistically significant and displayed a negative sign in all of the model specifications. This result is inferred as commercial deposits growth behaves countercyclically over the business cycles. Even if the broken money multiplier process and fall in cash flows to corporations are expected to decrease firms' deposit growth, the estimation results reveal that in an economic downturn the rise in commercial deposit growth due to contraction in investment, and increased precautionary saving to make-up for the liquidity position and balance sheet is more dominant. On the other hand, when the economic activity is in an expansionary phase, firms are in quest of funds to invest and as a result they will firstly deplete their own resources before applying any outside funds.

**Table IV.3.2**  
Commercial Deposit Growth and Business Cycles (System GMM)

Variable	Expected Sign	Firm Deposit Growth					
		(1)	(2)	(3)	(4)	(5)	(6)
<b>Lag Variables</b>							
L1 Firm Deposit Gr	(-)	-0.242*** (0.032)	-0.257*** (0.033)	-0.260*** (0.034)	-0.260*** (0.034)	-0.259*** (0.034)	-0.261*** (0.034)
L2 Firm Deposit Gr	(-)	-0.151*** (0.009)	-0.156*** (0.009)	-0.160*** (0.009)	-0.159*** (0.009)	-0.159*** (0.009)	-0.162*** (0.006)
<b>Growth</b>							
Realgap Gr	(?)	-0.163*** (0.057)	-0.136*** (0.050)	-0.120** (0.049)	-0.098** (0.047)	-0.098** (0.048)	-0.115** (0.050)
Trend		-0.001** (0.000)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)
<b>Bank Specific Variables</b>							
Logage	(+)		0.035 (0.032)	0.058 (0.037)	0.057 (0.037)	0.057 (0.037)	0.038 (0.026)
Logassets	(+)		0.428*** (0.111)	0.413*** (0.114)	0.418*** (0.114)	0.418*** (0.114)	0.250*** (0.072)
Return on Equity	(?)		0.011 (0.229)	-0.022 (0.222)	-0.046 (0.218)	-0.044 (0.236)	-0.091 (0.171)
Liquid Assets/A	(-)		-0.054 (4.531)	1.721 (4.629)	1.783 (4.638)	1.884 (4.562)	-0.062 (3.580)
$\Delta$ Credit/A	(+)		1.268*** (0.392)	1.289*** (0.389)	1.300*** (0.391)	1.293*** (0.353)	1.248*** (0.337)
Debt-to-Banks/A	(-)		-0.765*** (0.228)	-0.822*** (0.249)	-0.822*** (0.247)	-0.824*** (0.246)	-0.568*** (0.190)
<b>Macro Variables</b>							
Herfindahl Index	(-)			-6.234* (3.720)	-6.938* (3.702)	-6.926* (3.675)	-6.806** (2.779)
Inflation	(-)				-2.443*** (0.876)	-2.448*** (0.891)	-2.316*** (0.870)
Current Account/GDP	(?)					0.027 (0.328)	0.046 (0.251)
Constant		-0.671 (0.828)	-3.350*** (0.922)	-2.642*** (0.836)	-2.554*** (0.813)	-2.553*** (0.813)	-1.518** (0.726)
Observations		3,878	3,878	3,878	3,878	3,878	3,878
Number of Banks		37	37	37	37	37	37

In regard to the remaining control variables, estimation results are in line with existing literature. While the inflation that we used as a proxy for the level of overall macroeconomic uncertainty was found to affect commercial deposit growth negatively as expected, the Current Account Deficit/GDP ratio that is used to grasp the effect of the international flows was found to be insignificant despite it displaying the expected sign. The rise in the sector concentration in the banking industry that is measured by the Herfindahl-Hirschman Index revealed to decrease commercial deposit growth. In other words, increased competition in the banking industry raises commercial deposit growth. Among bank specific variables, natural logarithm of total assets,  $\Delta$ Credit/Assets ratio and Debt-to Other Banks were found to be statistically significant. Fast credit growth seems to increase the need for funds, which in turn raises commercial deposit growth, whereas the availability of funds from other banks, especially foreign ones, affects it in the opposite direction. On the other hand, the natural log of a bank's age, return on equity and liquid assets/total assets were found to be statistically insignificant. An estimation of the same models with the "Difference GMM" method instead of the "System GMM", shows that the Herfindahl-Hirschman Index this time became insignificant while the remaining results of the model did not display a significant change. Hence, our results are robust to alternative estimation methods.

As a result, this study shows that the commercial deposits behave countercyclically over the business cycles in Turkey, analyzing bank level panel data with "system GMM" methodology as the estimation strategy. Among control variables, inflation, the Herfindahl-Hirschman Index,  $\ln$  (assets),  $\Delta$ Credit/Assets and Debt to Other Banks/Assets were found to be statistically significant and displayed the expected sign.

Following the global financial crisis, banks and firms in advanced economies hold a huge amount of their resources in terms of either idle cash which has zero return or assets with very low levels of return, such as commercial deposits. This study lays down that the same phenomenon also occurs in an emerging economy like Turkey. Firms during economic stress times abstain from making investment and instead, due to precautionary

motives, hold their resources in relatively more liquid forms.

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#### IV.4. Macroprudential Policies and Smoothing Business Cycles: Evidence from Firm-Level Data for Turkey

The recent global financial crisis has paved the way to a burgeoning literature on the interaction between financial intermediation and the real economy. Following seminal papers by Stiglitz and Weiss (1981), Bernanke and Gertler (1989), and Bernanke, Gertler and Gilchrist (1999), the following literature has highlighted the importance of financial constraints that the firms face in obtaining external funds to explain the business cycles (Christiano, Motto and Rostagno, 2010; Gilchrist and Zakrajsek, 2011). In these types of commonly used models, financial constraints that the firms face are modeled to be an increasing function of the vulnerability of firms' balance sheets. For instance, in response to a rise in firms' leverage, it has become harder to finance capital expenditures, leading to an equilibrium rise in credit spreads. A higher spread in turn reduces investment demand and asset prices, resulting in a further increase in the vulnerability of firms' balance sheets (Chart IV.4.1).

Although such an amplification mechanism has captured much attention in the literature, most of the literature assumes away possible time-variation in the strength of the amplification, where the strength of the this financial amplification cycle can be traced with the sensitivity of the external financing premium (EFP) that the firms face to the firms' leverage. For instance, an increase in the sensitivity can potentially raise the effect of an unfavorable shock on credit market conditions and the business cycles in general. Among the few, Dib (2010) allows for time-variation in the sensitivity, calibrating the disturbances to the sensitivity to match the observed volatility in credit spreads. Gertler and Zakrajsek (2011) use corporate bond yields to extract the strength of the cycle (or the efficiency of financial intermediation, as they call it). Christiano et al. (2014) emphasize uncertainty shocks as a potential determinant of the variation in the strength of amplification. Last, Fendoglu (2014) studies by how much policy makers should reduce the strength of amplification to maximize aggregate welfare. In sum, the

**Chart IV.4.1**  
A Generic Financial Amplification Mechanism

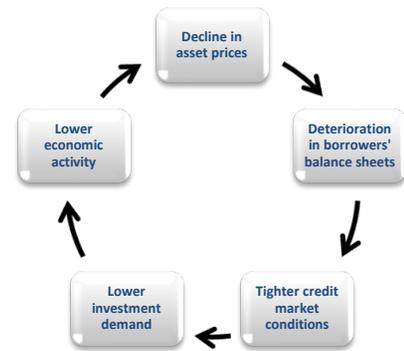


Chart IV.4.2  
The Strength of Financial Amplification

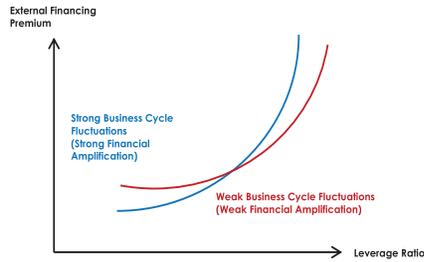
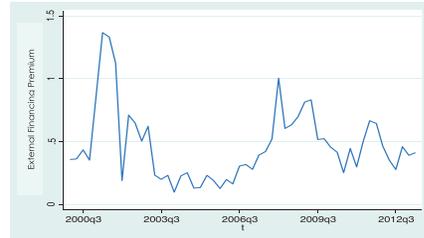


Chart IV.4.3  
External Financing Premium for 2000-2013



Source: Authors' calculations, BIST.

related literature underlines the importance of allowing for time-variation in the strength of financial amplification for welfare considerations and to explain the business cycles (Chart IV.4.2).

In this short note --which summarizes Altunok and Fendođlu (2014)-- we first estimate the strength of financial amplification using firm-level Turkish data, and then assess the effectiveness of the recent macroprudential framework in reducing, if not increasing, the strength of financial amplification. We use about 200 publicly-traded non-financial firm balance sheets and income data (which are covered at the BIST) for the period 2000Q1-2013Q2. We proxy the EFP as the ratio of financial expenses to the sum of pre-tax profit and financial expenses (hence capturing the interest rate burden for the firms) (Chart IV.4.3).

Chart IV.4.3 shows a priori evidence that the EFP rises substantially during economic downturns. To this end, we study the sensitivity of EFP to firms' leverage (henceforth the strength of amplification) and evaluate the effect of the recent macroprudential framework on the sensitivity. Then, we estimate the following fixed-effects panel regression using system-GMM:

$$\Delta EFP_{i,t} = \beta_0 \Delta \text{Leverage}_{i,t} + \beta_1 D_{\text{MacroPrud}} * \Delta \text{Leverage}_{i,t} + \beta_2 D_{\text{MacroPrud}} + \sum_k \beta_k X_{i,t} + \rho \Delta EFP_{i,t-1} + \gamma_i + \varepsilon_{i,t};$$

where  $\Delta EFP_i$  denotes the change in the EFP for firm  $i$ ,  $\Delta \text{Leverage}_i$  denotes the change in firm  $i$ 's leverage ratio, and  $X_i$  the firm-specific control variables. We use total assets and age (in natural logs), the ratio of fixed assets to total assets, stocks to total assets, and change in sales, as control variables.  $D_{\text{MacroPrud}}$  is a dummy variable taking a value 1 after 2010Q4 (the period at which Turkey started implementing the macroprudential framework), and 0 for other periods.

In line with the existing literature, we find a positive relation between the leverage and the EFP for the firm-level data. A rise in the leverage is indeed perceived to be an indicator of higher balance sheet vulnerability. This result is robust, including other important control variables. Secondly, and more central to our discussion, the sensitivity of leverage to the EFP is not time invariant. The sensitivity is lower after the implementation of macroprudential policies. In other words, a unit change in the vulnerability of firms' balance sheets (i.e. the leverage ratio) affects the EFP in a limited fashion during the new framework (<0 and statistically significant). This result holds for other specifications as well (Table 1, columns 3-6). Also, the results are robust using difference GMM, introducing sector-specific fixed effects, non-dynamic estimation methods and using random effects.

Furthermore, we also find that during recessions (which we simply capture by a dummy variable that takes a value 1 for 2001Q1-2001Q4 and 2008Q1-2009Q4) the strength of amplification rises significantly.

**Table IV.4.1**

Strength of Financial Amplification and the Macroprudential Framework

Dependent Variable	External Financing Premium					
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
External Financing Premium, previous period	0.159*** (0.022)	0.158*** (0.022)	0.140*** (0.023)	0.140*** (0.023)	0.147*** (0.023)	0.150*** (0.024)
Leverage Ratio	2.735*** (0.334)	2.849*** (0.341)	2.599*** (0.336)	2.498*** (0.351)	2.404*** (0.320)	2.429*** (0.327)
D <sub>MacroPrud</sub>		0.213** (0.083)	0.219*** (0.082)	0.197** (0.084)	0.172** (0.087)	0.187** (0.089)
D <sub>MacroPrud</sub> * Leverage Ratio		-0.862*** (0.289)	-0.700** (0.287)	-0.673** (0.292)	-0.661** (0.297)	-0.704** (0.302)
Ln(Assets)			0.173** (0.084)	0.184** (0.085)	0.256** (0.101)	0.307*** (0.115)
Ln(Age)			-1.884*** (0.395)	-1.896*** (0.392)	2.107*** (0.378)	2.065*** (0.382)
Liquidity Ratio (Cash/Total Assets)				0.008 (0.020)	0.004 (0.020)	0.002 (0.022)
Fixed Assets				-0.681** (0.310)	-0.702** (0.316)	-0.681** (0.334)
Sales Growth (previous period, adjusted)					-0.061 (0.216)	-0.090 (0.224)
Growth in Stocks						-0.060 (0.058)
Firm Fixed Effect	yes	yes	yes	yes	yes	yes
Observations	10,987	10,987	10,987	10,987	9,826	9,599

To conclude, in response to large scale quantitative easing policies in advanced economies and excessively volatile cross-border capital flows, many emerging countries, including Turkey, have implemented measures to support financial stability. Turkey has devised a new policy mix that incorporates financial stability as a complementary policy objective. In this note, we find using firm-level data is effective in the new policy framework to reduce the strength of financial amplification for Turkey.

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## IV.5. Derivative Usage of Real Sector Firms in Turkey and Financial Risk Management

Due to the extensive amounts of foreign exchange debt and the large open FX position of Turkish real sector firms, monitoring the financial risks possesses a great importance for overall financial stability. In this sense, one critical issue which should be paid attention to is the derivative transactions of firms. Nevertheless, the derivative operations of firms in Turkey did not get its deserved attention in current studies and the number of academic works related with this issue is very limited. One of the principal reasons behind the ignorance of this important concept by the literature is stringent accessibility to the available data about derivative usage. In the meantime, a wide literature on this issue has already accumulated in several countries where derivatives are an important part of the financial markets. The existing literature in those countries mainly focuses on the determinants of derivative usage by firms (Howton and Perfect, 1998; Jalilvand, 2009 and Coutinho, Sheng and Lora, 2012).

This special topic summarizes the analyses of Alper et al. (2014) which deal with the transactions of firms in the financial derivatives market. This study provides a descriptive analysis on the insights of firms' derivative transactions utilizing an extensive distinguishing dataset. This study also presents the motivations of firms to use derivative instruments and examine whether they are able to hedge their FX risk.

### Operations of Firms in Derivative Markets

The information provided by this study is based on the CBRT database which contains nearly 3 million transactions made by firms operating with the Turkish banking sector in Turkey. While some multinational companies doing business in Turkey conduct derivative operations with banks outside of Turkey<sup>16</sup>, the number of these companies is very limited. Hence,

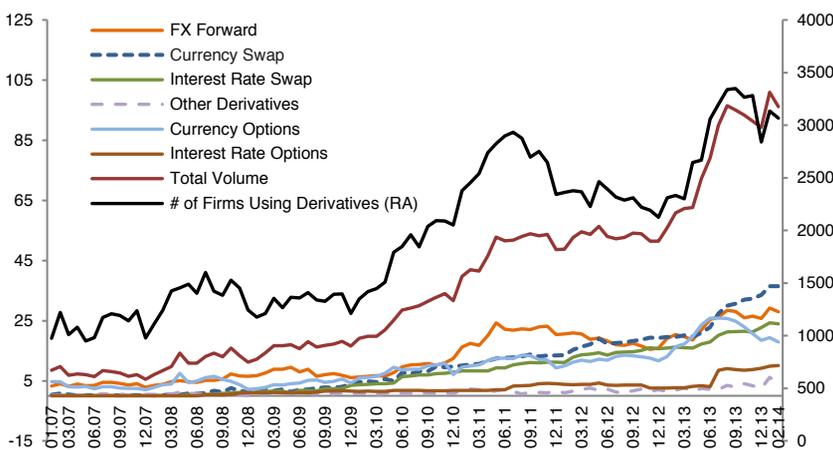
<sup>16</sup> In a conversation with a multinational firm operating in Turkey, the firm executive stated that they did not just consider the net position of their branch in Turkey but the overall position of whole company in conducting derivative transactions.

the dataset represents the entire derivative transactions of firms operating in Turkey.

Chart IV.5.1 clearly shows that the volume of derivative transactions by firms and number of firms engaging in these transactions have substantially increased since 2007. The Figure also shows that firms utilize various types of derivative instruments. The total volume of derivative operations reached 96.2 billion TL and currency derivatives constituted approximately 60 percent of this volume. Forwards comprise half of the entire volume among the currency derivatives. Interest-rate derivatives form 35 percent of the derivatives market and interest rate swaps possesses the highest share. When currency and interest-rate derivatives are considered together, the shares of swap, option and forward transactions are 37.7, 29.1 and 29, respectively. In addition to these derivative instruments, firms rarely use derivatives based on equity or commodity transactions and the volume of these transactions is very small (Chart IV.5.2 and Table IV.5.1).

**Chart IV.5.1.**

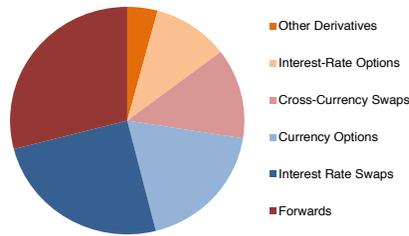
Volume of Firms' Derivative Transactions, Billion TL



Source: BRSA-CBRT

**Chart IV.5.2**

Firms' Derivative Transactions, by Type, as of February 2014

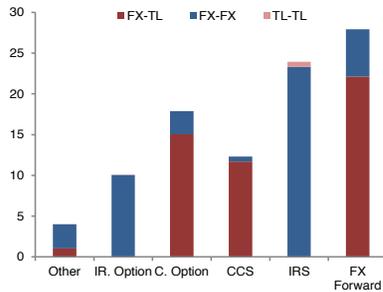


Source: BRSA-CBRT

An investigation of derivatives by their currency denominations reveals that FX-FX derivatives, which require FX payment in exchange for another FX currency, form 47 percent and FX-TL derivatives, which require TL buy/sell in exchange for FX sell / buy, form 52 percent of the total volume of derivatives. The remaining 1 percent is TL-TL transactions and these are mostly interest rate swaps. In relation to the currency derivatives, FX-TL instruments possess the 95, 84 and 79 percent of swap, currency options and forward transactions, respectively (Chart IV.5.3).

**Chart IV.5.3**

Firms' Derivative Transactions, by Currency, as of February 2014



Source: BRSA-CBRT

**Table IV.5.1.**

Firms' Derivative Transactions, as of February 2014

Derivative Transactions, by Type	Million TL	Percentage
FX Forward	27,926	29
Interest Rate Swap	23,950	24.9
Cross Currency Swap	12,316	12.8
Currency Options (Seller)	12,785	13.3
Currency Options (Buyer)	5,089	5.3
Interest Rate Options (Seller)	3,623	3.8
Interest Rate Options (Buyer)	6,475	6.7
Other Derivatives	4,021	4.2
<b>Total Volume</b>	<b>96,186</b>	<b>100</b>

Source: BRSA-CBRT

### Why Do Firms Use Derivative Contracts?

The CBRT database on derivative instruments provides useful information about the firms engaging in these transactions. Nevertheless, determining the objectives of the firms in using derivative instruments requires extra knowledge about the balance sheets of firms. This part first examines the expectations on the objectives of firms in using each instrument. Later, each expectation will be tested and its validity will be confirmed analyzing the CBRT sector balance sheets database. The CBRT dataset on firm balance sheets contains 9469 firms; these firms constitute almost half of the net sales of the entire sector. Hence, this dataset is sufficient to represent all real

sector firms in Turkey<sup>17</sup>. The firms in this dataset were matched with the firms in the derivatives dataset, and the unmatched firms are assumed to be inactive in derivative markets. The derivative transactions volume of matched firms is calculated as 23.1 billion TL (Table IV.5.2).

**Table IV.5.2.**

Derivative Transactions of Firms Analyzed and Exporters, as of February 2014, Billion TL

	All Firms	Exporters
FX Long Position	8.8	8.1
FX Short Position	15.1	13.5
FX Net Position	-6.3	-5.4
<b>Total Outstanding</b>	<b>23.1</b>	<b>21.6</b>

The initial expectation is that the firms using currency derivatives do not to hedge their FX debts. Firms hold FX credits due to their cheaper interest margins, but hedging these credits brings extra costs for firms. Thus, the cost advantage of FX credits against TL credits disappears. Otherwise, there will be an arbitrage opportunity in favor of FX credits. FX credits of firms generally have very long maturities; however, the maturity of derivative transactions is realized in less than 12 months. This maturity mismatch indicates that firms do not hedge their FX debt with derivatives, since using short term contracts for long-term debts is not an appropriate hedging activity. This prediction might be justified via an analysis whose results are depicted in Tables IV.5.3 and IV.5.4. In the former Table, the firms are divided into 10 percent quantiles according to their ratio of FX debt / Net Sales. While the first quantile represents the firms having this ratio less than 0.1, the last quantile represents firms having the same ratio greater than 1. Since large numbers of firms accumulated in the first 10 percent, this quantile is further divided into 2 percent quantiles in Table IV.5.3.

It is explicit from both tables that as the FX debt share increases, there is no increase in the number of firms using derivatives. On the contrary, the share of firms using derivatives is larger in the groups having lowest FX debt / Net Sales ratio. Furthermore, as the last columns suggest, the net positions

**Table IV.5.3.**

FX Debt and Derivative Usage of Firms

FX Debt / Net Sales (%)	# of Firms	# of Firms Using Derivatives	Share of Firms Using Derivatives (%)	Net Derivative Position / FX Debt (%)
0-10	2157	332	15.39	0.00
11-20	85	10	11.76	0.00
21-30	49	4	8.16	0.00
31-40	15	3	20.00	0.00
41-100	33	3	9.00	0.00
>100	65	4	6.15	0.00

**Table IV.5.4**

FX Debt and Derivative Usage of Firms

FX Debt / Net Sales (%)	# of Firms	# of Firms Using Derivatives	Share of Firms Using Derivatives (%)	Net Derivative Position / FX Debt (%)
0-2	1498	228	15.22	0.00
2-4	339	70	20.65	0.00
4-6	154	20	12.99	0.00
6-8	98	6	6.12	0.00
8-10	68	0	0.00	0.00

17 The net sales of the firms in the dataset amounted to 1025 billion TL in 2013 and this corresponds to the 65 percent of Turkey's annual GDP. Additionally, these firms have 1012 billion TL worth of asset size and 197 billion TL worth of exports

taken by derivatives cover almost zero percent of their FX debt burden, which is more evidence that firms do not hedge their FX debt via derivatives.

By forward and option transactions, firms are expected to take an FX long position for their payments resulting from imports and an FX short position for their export receivables to guard against FX volatility risk. In addition to exporters, the Turkish firms having operations abroad and extra ordinary FX cash inflows<sup>18</sup> are expected to take a short position in derivative transactions for exchanging these FX revenues to TL. FX-FX forward and currency option transactions are expected to be conducted generally by firms whose import currency denomination is different from the exports and firms having a large foreign trade volume.

Consistent with these expectations, the analysis using the firms' balance sheet items reveals that firms basically use forwards and options to hedge FX-denominated import, export or extraordinary cash flows. As illustrated in Table IV.5.2, firms were in a net FX short position in derivative transactions as of February 2014. An examination of firms in a net short position shows that 325 out of 399 firms are exporters and 5.4 billion out of 6.3 billion TL worth of net total short position belongs to exporting firms. This is strong evidence that exporting firms hedge FX risk emanating from their FX export receivables. The fact that a large portion of net short position in real sector derivative transactions is made by the exporters indicates that a net short position in derivative operations is not a source of risk; on the contrary, a protection against FX risks.

Table IV.5.5 divides exporting firms into ten percent quantiles by their export / net sales ratio. The other columns indicate the number of firms in each quantile, the share of firms that are with net short position in derivative transactions, and the share of the net short position to total position taken (short plus long). The table depicts that as the export shares rise,

<sup>18</sup> In order to test the validity of this argument, a large firm was interviewed about their high volume of net short position made mainly by currency options. The firm stated that they used these swap contracts in order to exchange their FX cash flows resulting from the sale of a subsidiary to TL.

both the number of firms with net short position and the share of the net short position increase. In other words, the behavior of taking the net short position tends to intensify as firms export more. This supports the expectation that firms a taking short position in option and forwards aim to hedge the FX risks on their export earnings.

**Table IV.5.5.**

Distribution of Net Position of Exporters

Exports / FX Debt (%)	# of Firms	# of Firms Having FX Short Position/ # of Firms Having FX Position (%)	FX Short Position/ Total FX Position (%)
0-10	1965	57.14	50.73
11-20	563	70	68.06
21-30	337	64.86	71.01
31-40	306	73.53	85.44
41-50	269	88.89	79
51-60	166	75.76	91.67
61-70	174	95	83.33
71-80	158	95.24	99.69
81-90	194	86.21	71.43
91-100	349	97.5	96.15

The FX-FX currency options and forwards display their volume as 7.1 billion dollars as of February 2014. In these FX-FX contracts, 90 percent of firms took a short position in Euro and a long position in Dollars. In the Turkish economy, nearly 70 percent of imports are made in USD, and 50 percent of export revenues are in Euro. Hence, firms having USD denominated costs and Euro incomes engage in these types of FX-FX contracts to hedge against FX risks. Furthermore, the currency swap transactions which significantly rose after the second half of 2013 are not used for speculative or hedging purposes (Chart IV.5.1). This rise mainly stemmed from the disclosure by firms of TL deposits as currency swaps due to some arrangements and arbitrage opportunities provided by banks (Box II.1.1). The net FX position of firms did not change in these transactions and the shifts in balance-sheet items equalized the TL deposit position before the transaction.

Besides currency swaps, interest rate swaps have recently been a prevailing derivative instrument whose volume reached 23.5 billion TL. The firms are expected to use this instrument to exchange their floating rate debts with fixed rate debts to guard against interest rate risk. The FX credits of Turkish firms mostly have long maturities and floating interest rate costs. Hence it should also be expected that firms using these instruments have large FX credits; the maturity of these swap contracts are very long. The currency swaps used by Turkish firms have very long maturities. Interest rate options are used for similar objectives like swaps and these interest rate options possess long maturities as well. Table IV.5.6 presents a comparison of the structure and some features of FX debts held by the firms using currency swaps with all firms in the dataset. Consistent with the previous expectations, interest rate swap users have much larger FX debt than the sample average. Furthermore, the share of the long maturity FX loans of swap users in total FX debt is much higher than the average of all firms. Hence, this also proves that firms revert to interest rate swap and option contracts to hedge their long maturity FX debts against interest and currency risks.

**Table IV.5.6.**

Volume of Interest Rate Swaps and FX Debt Structure of Firms

	Firms Having IRS	All Firms
# of Firms	47	9469
Total FX Debt / Total Assets	44%	18%
Long Term FX Debt / Total FX Debt	67%	54%
Average Amount of FX Debt	229.8 Million TL	18 Million TL
Average Amount of Short Term FX Debt	23.4 Million TL	3.7 Million TL
Average Amount of Medium Term FX Debt	51.0 Million TL	4.8 Million TL
Average Amount of Long Term FX Debt	155.3 Million TL	10.2 Million TL

Moreover, firms may take extra risks with derivatives by using them for speculative purposes. If the speculative use of these instruments is widespread, this would mean that the overall fragility of firms is higher than that implied by on-balance-sheet risks. In this sense, the prevalence of speculative motives in using derivatives should be investigated. Among all derivatives, currency options are considered to be the most speculative instrument which could gain very high profits but could also cause limitless losses. Currency options can be highly leveraged by taking a huge FX short position. In the dataset, distinguishing between speculative and protective use of options is very hard. However, the prior analyses on forwards and options indicate that the short position in derivatives is significantly related to

export earnings. Additionally, some non-exporting firms using options declared in an interview that they used options to hedge their out-of-ordinary FX cash flows against FX risks. In that vein, it would be wrong to assume that the net FX derivative short position of non-exporting firms stems from the speculative use of options.

In the last part of the study, a scenario analysis that measures the durability of firms against FX risks is made by considering both on and off balance sheet positions.

### Kur Riski Analizi

An indicator "FX Risk" is created to measure the durability against FX risk. This indicator is calculated as the proportion of the amount exposed to depreciation in TL to the firm profits. Since the data set does not contain the import values, imports are proxied by the imports/GDP ratio. The formula for the FX risk indicator is as follows:

$$\text{FX Risk}^{19} = \left( \frac{\text{FX Debt} - \text{Exports} + \text{Net Sales} * 0.32}{\text{Profits}} \right) \times 0.25$$

This risk indicator basically measures the cost of the rising burden of the FX debt net of export earnings in proportion to the profits of firms after 25 percent depreciation<sup>20</sup>. Hence, the small indicator values represent the less risky firms; the firms with higher values are riskier.

In Tables IV.5.7 and IV.5.8, firms are divided into quantiles according to the estimates FX risk indicator. For instance, the first row represents firms whose FX risk is between 0 and 0.1 and the second row indicates between 0.1 and 0.2. The last

<sup>19</sup> 0.32 represents the annual imports / GDP ratio in the first quarter of 2014 in Turkey. Since data of import spending is not available in firm balance sheets, import variable is proxied via net sales times 0.32.

<sup>20</sup> A similar risk analysis is conducted in 2014-II Inflation Report. In that analysis, exchange rate risk is calculated as the FX debt / Export ratio and firms are classified as high, medium and low risky firms according to values taken by this ratio..

row indicates negative FX risk. The last column represents the proportion of net derivative position of firms to total FX debt in each quantile. This ratio is calculated taking the weighted average of each firm's ratio by their asset size. This display exhibits what portion of FX debts of firms is hedged due to net position taken via derivatives. In the first quantile, the share of firms using derivatives is 6.8 percent, in the second quantile the share is 3.1 percent and in others it is 5 percent on average. Since there are many firms in the first group, this group is divided into 2 percent quantiles in Table IV.5.8. In these 2 percent quantiles, the share of derivative users is around 5-7 percent. This indicates that a very limited number of firms use derivatives and the volume does not increase as the prospective loss increases. Moreover, the net position / FX debt ratios are almost zero in all firms, which indicates that firms do not hedge their FX debts via derivatives.

Another crucial result from this analysis is that after 25 percent depreciation in TL, a majority of firms will lose at most 10 percent of their profits. The Tables demonstrate that 5729 firms will lose at most 10 percent of their profits, and 3338 firms will lose at most 2 percent. Therefore, the balance sheets and profit levels of firms indicate resilience against FX shocks.

**Table IV.5.7.**  
FX Risk and Derivative Usage of Firms

FX Risk	# of Firms	# of Firms Using Derivatives	Share of Firms Using Derivatives (%)	Net Derivative Position / FX Debt (%)
0-10	5729	394	6.88	0
11-20	446	14	3.14	0
21-30	154	8	5.19	0
31-40	67	6	8.96	0
41-100	112	4	3.57	0
Negative	2743	158	5.76	0.01

**Table IV.5.8.**  
FX Risk and Derivative Usage of Firms

FX Risk	# of Firms	# of Firms Using Derivatives	Share of Firms Using Derivatives (%)	Net Derivative Position / FX Debt (%)
0-2	3338	209	6.26	0.00
2-4	1178	85	7.22	0.00
4-6	578	30	5.19	0.00
6-8	318	17	5.35	0.00
8-10	213	4	1.88	0.00

The derivative usage by real sector firms in Turkey has been steadily increasing and these derivative transactions are made to hedge against different kinds of financial risks. The important question discussed in this study is how the FX open positions of firms, measured by on-balance-sheet items, can be analyzed with off-balance-sheet transactions. The analyses in this study imply that off-balance-sheet short positions are mainly related to the on-balance-sheet FX positions or FX cash flows. Accordingly, being in a net short position in derivative transactions should not be regarded as a negative factor for balance sheet fragilities for firms. Conversely, firms are in net long position in derivative operations since these net derivative short non-exporting positions are made mostly by exporting firms. This net position is most likely made to hedge against the FX import payments or short-term FX debts rather than medium or long-term FX credits. In this sense, claiming that firms' derivative transactions have favorable impacts on on-balance-sheet FX open positions would not be a wrong assumption.

Finally, the scenario analysis results suggest that, considering the exports, imports, FX debts, derivative transactions together, the profit levels of firms are able to tolerate the possible losses due to a prospective 25 percent TL depreciation. There are few firms that could lose more than 50 percent of their profits after a possible depreciation.

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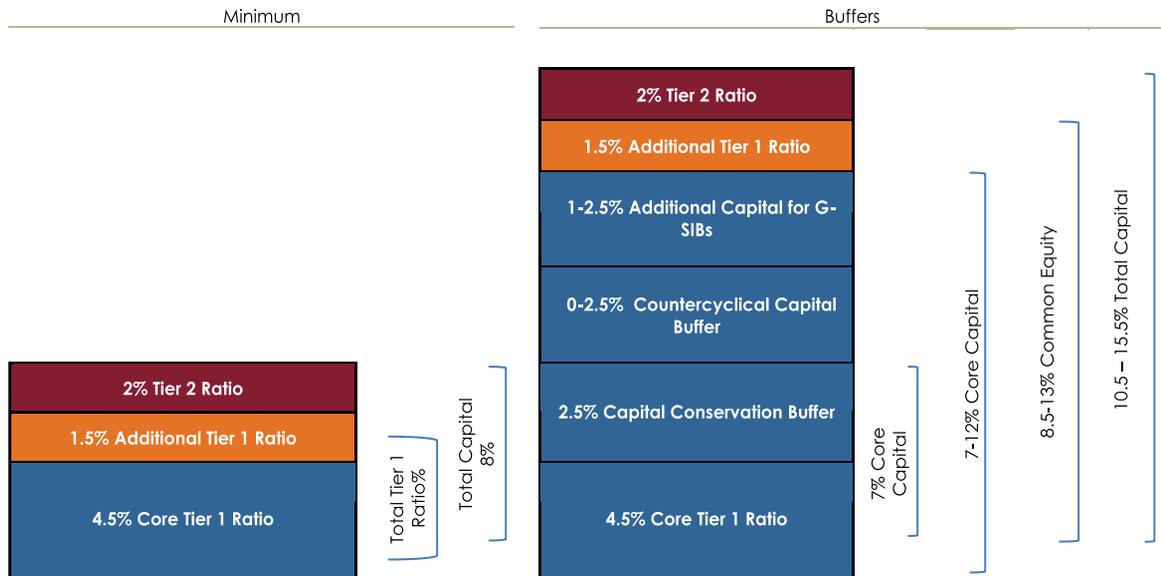
## IV.6. Global Financial Reform Developments

After the global financial crisis, with the aim of decreasing vulnerabilities to shocks in the financial system, a reform agenda was formed at the 2009 G20 Pittsburgh Summit. In this regard, the Financial Stability Board (FSB), the Basel Committee on Banking Supervision (BCBS), the International Association of Insurance Supervisors (IAIS) and the International Organization of Securities Commission (IOSCO) are making regulations to increase the resiliency of the banking sector, to take actions against risks from shadow banking and too big to fail institutions and to improve over-the-counter (OTC) derivatives markets. Global financial reforms are planned to be completed until the Brisbane Summit which will be headed by Australia.

### Basel III Regulations

Making the banking sector more resilient is the key target of the Basel III regulations. The BCBS issued regulations on the capital adequacy ratio in 2010, December. The capital adequacy regulations aim to strengthen the quantity and quality of capital. Within this framework, the minimum core tier 1<sup>21</sup> ratio having the highest loss absorbing capacity and total tier 1 ratio were assigned 4.5% and 6%, respectively. The total minimum capital adequacy ratio was unchanged with 8%. Moreover, the capital conservation buffer was introduced at 2.5% that adds extra capital composed of common equity tier 1 (CET1). In addition, the countercyclical capital buffer that varies between 0% and 2.5% was created (Table IV.6.1). This buffer ensures that banking sector capital requirements take account of the rapid credit boom and prevent it from being a risk factor. All of these regulations gradually have entered into force since 2013.

21 Core Tier 1 consists of paid-in capital, share premium, profits on cancellation of common stocks, reserves, recognized in equity earnings, net profit and retained earnings, provisions for estimated risks, affiliates, bonus shares acquired from subsidiaries and jointly controlled entities.

**Table IV.6.1.** Basel III Minimum Capital Adequacy Ratios and Buffers (Percentage of Risk Weighted Assets)

The leverage ratio, another issue examined within the context of Basel III was published in 2014, January. This ratio will limit the indebtedness of the banks and support the risk-based capital adequacy ratio. The leverage ratio is calculated by dividing common equity into the balance sheet and off balance sheet items without any risk weight applicable and is estimated to be minimum 3%. It is expected to become effective in 2018.

The BCBS has conducted Regulatory Consistency Assessment Program (RCAP) studies to assess the level of compliance with these regulations. The review has been completed for six countries so far. Our country's RCAP report is expected to be released in March 2016. Capital adequacy regulations operate in all member states, although studies on liquidity and leverage ratios continue.

In our country, the final version of capital, leverage and liquidity coverage ratio regulations has been published. Regulations of leverage and the liquidity adequacy will be applied in 2015.

## Ending Too Big To Fail

The institutions which are too big to fail are important for global financial stability because of their complex structures and interconnectedness with other financial institutions. For this reason, the resolvability of global systemically important financial institutions (G-SIFI) without affecting the financial system and without support of tax-payers is gaining importance. Therefore, as an initial step, methodologies to identify global systemically important banks (G-SIB), domestic systemically important banks (D-SIB) and global systemically important insurers (G-SII) are published. On the other hand, work on the methodology to identify systemically important non-bank non-insurer (NBNI) global systemically important financial institutions is going on.

According to the framework that was first published in 2011 and then updated in 2013 by the BCBS, global systemically important banks are assessed based on twelve indicators which are defined under size, cross-jurisdictional activity, interconnectedness, substitutability and complexity categories. The list of global systemically important banks are updated and published in November each year. There are 29 G-SIBs on the list which was announced on November 2013. The additional loss absorbency requirement changing between 0-2.5 % will be phased-in between 1 January 2016 and year end 2018, becoming fully effective on 1 January 2019 for these banks. Moreover, the BCBS published a framework for dealing with domestic systemically important banks on October of 2012 as guidance for authorities. This methodology overlaps with G-SIB methodology to a great extent except that, cross-jurisdictional activity is not within the indicators. In addition, 9 global systemically important insurers have been identified according to the G-SII framework introduced by IAIS. The work on the assessment of systemic importance of reinsurance companies is ongoing. An international capital requirement standard for insurance companies does not exist. Therefore, IAIS is working to develop a basic capital requirement which will be finalized at the end of 2014. This ratio will be used as an additional loss absorbency requirement for systemically important insurers. IAIS is also working on a risk-based and more comprehensive

capital adequacy standard which will replace the basic capital requirement which is expected to be completed by 2015.

While the additional loss absorbency requirement and effective banking supervision aim to decrease the probability of default of systemically important financial institutions, with effective resolution regimes it is aimed to resolve these institutions without creating risk in the financial system and imposing a cost to tax-payers. FSB published Key Attributes of Effective Resolution Regimes in 2011 to which countries should be compatible by 2015. Crisis management groups have been formed in which home and host authorities of systemically important financial institutions are represented. The work on forming recovery and resolution plans for these banks is ongoing. Write-off and conversion into equity (bail-in) of debt instruments given to the resolution authority is one of the outstanding principles of effective resolution regimes. To guarantee that financial institutions have these types of debt instruments in their balance sheets, work is being conducted on forming gone concern loss absorbing capacity (GLAC). The FSB is working on determining qualifying criteria for GLAC instruments and the amount of GLAC requirement. The other important principle of effective resolution regimes is cross-border recognition of resolution activities. In the current framework, creditors may ask to close contracts without considering the maturity of debts of financial institutions which enter into resolution, which cause a deepening in financial conditions. At this juncture, it is important to give contractual or statutory rights to authorities to guarantee temporary stay of especially derivative positions. In the forthcoming period, peer review on supervision of G-SIFIs will begin.

Additional to these studies, to enable continuity of core banking activities, to increase supervision effectiveness and to group risky activities separately, structural banking reforms have been initiated in some countries. With these reforms, work is continuing to separate deposit and investment banking activities. The scope of reforms is formed with the Volcker Rule in America, the Likaanen Report in the European Union and the Vickers Report in the United Kingdom. The FSB, IMF and OECD

has sent a questionnaire to gather information on national jurisdictions' planned or implemented structural banking reforms, as well as observed or expected effects in other jurisdictions' domestic markets of such reforms. According to the results of this questionnaire, it is planned to take necessary actions for negative impacts of banking reforms.

Although there aren't any systemically important financial institutions in our country, the subsidiaries of these institutions are operating. On the other hand, the work on identification of domestic systemically important banks continues.

### Shadow Banking Reforms

Shadow banking is defined as credit intermediation activities outside of the regular banking system. The size of the shadow banking sector has reached about 70 trillion U.S. dollars; this amount is half of the banking system size. The shadow banking system contributes to financial deepening, but may yield some risks to financial stability. The shadow banking system, which is not subject to as tight regulation as banks are, engage in maturity transformation activities and is exposed to liquidity risk and risks arising from high leverage. The less regulated framework of shadow banking causes the sources of regular banking system to shift to shadow banking. Therefore, the FSB has founded 5 workstreams to regulate and supervise shadow banking entities and they maintain their studies.

One of the purposes of the regulations for shadow banking is to mitigate spillover effects between shadow banking and regular banking activities. These studies cover the framework of large exposures, banks' equity investments in funds and shadow banking-banking consolidation. Large exposures regulation was published to mitigate risks on banks arising from shadow banking activities. Banks are to be protected from big losses arising from counterparty defaults with the introduction of the large exposures framework. Large exposures is defined as 10 percent of Tier 1 capital by tightening the previous statement which is 10 percent of total capital. The

large exposure standard includes a general limit applied to all of a bank's exposures to a single counterparty, which is set at 25% of a bank's Tier 1 capital. This limit has been defined at 15% of Tier 1 capital for G-SIBs. In addition, banks' equity investments in funds regulations were published in December 2013. The equity investments are intended to ensure that the banks which invest highly leveraged funds hold higher capital. Also, a draft regulation is expected to be published for the consolidation framework between the banking and the shadow banking system by the end of 2014, making the activities of shadow banking subject to regular banking regulations.

The runs from money market funds (MMFs) in adverse market conditions are another risk factor in shadow banking. The current constant net asset value system triggers runs from MMFs. In such a case, investors who sell prior fund shares recover their money while others cannot. In order to prevent this, policy recommendations which convert constant net asset value to variable net asset value was published in 2012. The peer review on this issue which began in March 2014 is expected to be completed in April 2015.

Other shadow banking activities (other than MMFs) are divided into five economic activities and defined as collective investment vehicles, loan provision that is dependent on short term funding, intermediation of market activities that is dependent on short term funding, facilitation of credit creation and securitization based credit intermediation and policy recommendations for these areas are published. Activity based assessment is used more than entity based assessment in the determination process of other shadow banking activities. The regulatory framework was published in August 2013 for the determined activities. The information sharing process, which was developed in order to reach regulatory consistency across jurisdictions and to determine which regulations is used for which activities, will begin in May.

Securitization activities have had a negative impact on the occurrence and spread of risks during the global crisis stage. In November 2012, the IOSCO published standards to mitigate risks arising from securitization and to standardize and make the process of securitization transparent; the peer review process has begun. Organizations engaged in securitization activities are obliged to execute retention requirements which make organizations engaged in securitization hold some portion of securitized asset. Also, disclosure requirements were extended to increase transparency in securitization activities.

The regulatory framework for securities financing transactions (SFTs) which is used for funding purposes from banking to shadow banking entities was published in August 2013. The studies on the determination of haircuts to be applied for collaterals used in SFTs continue. Under the proposed regulations, government securities are outside of the haircut framework meaning that 0 percent haircut is applied to them. On the other hand, there are some ongoing discussions to expand the haircut framework to cover non-bank to non-bank financing and government securities. The regulations which cover haircut framework for SFTs is expected to be published in October.

**Table IV.6.2**

## Shadow Banking Working Group Activities and Progress Level

Work Streams	Regulations	Progress
	Large Exposures (BCBS)	Final version is published in April 2014. Implementation will begin in 2019.
Spillover Effect Between Regular and Shadow Banking	Banks' equity investments in funds (BCBS)	Final version is published in December 2013. Implementation will begin in 2017.
	Banking-Shadow Banking Consolidation (BCBS)	Draft publication until the end of 2014.
Money Market Funds (MMFs)	Avoidance of runs (IOSCO)	Final version is published in October 2012.
Other Shadow Banking	Classification based on economical functions and regulation proposals (FSB)	Final version is published in August 2013.
	Information Sharing (FSB)	Process will begin in May 2014.
Securitization	Reduction of risks (IOSCO)	Final version is published in November 2012.
Securities Financing Transactions (SFTs)	Regulatory Framework (FSB)	Final version is published in August 2013.
	Minimum Haircut Framework (FSB)	Is expected to be published in October 2014.

### OTC Derivatives Market Reforms

The regulations on OTC derivatives markets improve transparency in derivatives markets, mitigate systemic risk and protect against market abuse. Work on regulating these markets are performed under the title of reporting OTC derivative transactions to TRs, clearing through central counterparties (CCPs) where appropriate, requiring higher capital and margin for non-centrally cleared derivatives, and trading all standardized OTC derivative contracts on exchanges or electronic trading platforms. Although at the Pittsburg G-20 Leaders Summit, the reforms were to be finalized in 2012, they are behind schedule. However, significant progress has been achieved and work continues.

According to the seventh progress report on OTC derivatives market reforms, the most progress has been observed in reporting to TRs (Chart IV.6.1). On the other hand, various options for aggregating the data reported to TRs globally and sharing the data among countries are being studied. The feasibility study that analyzes the feasibility of options for data aggregation and assesses the legal and technical issues is expected to be published by the end of May. Jurisdictions continue to work on central clearing of OTC derivative transactions. Currently, countries with developed derivatives markets clear their derivative transactions centrally. However, when transactions are cleared through CCPs, risks concentrate on these entities. Therefore, the risk management of CCPs becomes an important issue. CCPs are expected to be compatible with the principles for financial market infrastructures (FMIs) published in 2012. Whether jurisdictions have completed the process of adopting the legislation and other policies implementing the principles for FMIs will be assessed in June 2014 and whether the adopted measures are complete and consistent with the principles will be assessed in the third quarter of 2014.

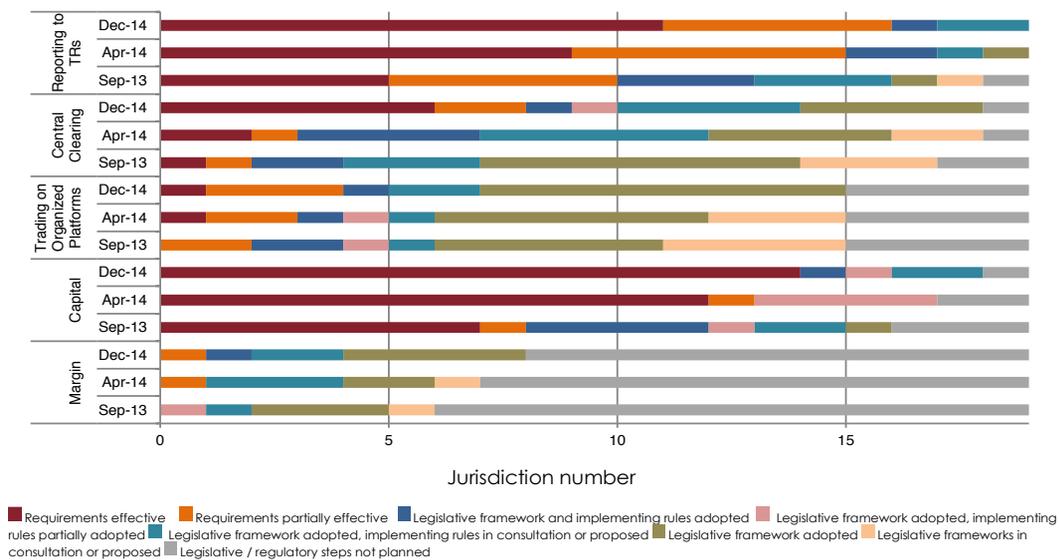
Standards on capital requirements for centrally and non-centrally cleared derivative transactions have been finalized. In this context, a new standard method with higher risk sensitivity for the calculation of counterparty credit risk has been developed and will be implemented in 2017. With the use of this

method, there has been a change in the calculation of capital requirements for transactions cleared through qualified CCPs<sup>22</sup>. Capital requirements for transactions cleared through CCPs will take effect in 2017. Moreover, with the credit value adjustment method, which was introduced under Basel III and considers the changes in the risk premia of the counterparty, higher capital is now required for non-centrally cleared derivative transactions.

The final rules for margin requirements for non-centrally cleared derivative contracts were published in 2013. To mitigate systemic risk and promote central clearing, there have been two types of margins: the initial and variation margins; minimum haircuts have been identified in the rules. The variation margin will take effect in December 2015. The initial margin will be implemented gradually starting from December 2015 to 2019. Moreover, there has been limited progress for trading standardized contracts on exchanges or electronic trading platforms.

Chart IV.6.1

OTC Derivatives Market Reforms Progress



Source: FSB OTC Derivatives Market Reforms 7<sup>th</sup> progress Report

22 CCPs which are compatible with CPSS-IO스코 principles for FMs published in 2012 are called qualifying CCPs.

Restrictions due the national regulations in cross border transactions, different implementation times in jurisdictions and differences in market structures have led to uncertainty about the regulations to which OTC derivative transactions will be subject. It is important that cross border issues have been solved during the legislation of regulations in jurisdictions. A report related to the process of jurisdictions for comparing regulations and deciding equivalence of regulations to solve cross border issues will be published in September 2014. It is expected that the work related to methods for solving remaining cross border implementation issues in OTC derivative transactions will be finalized in November.

As a member of the G20 countries, Turkey is committed to implementing the derivative market reforms, and work in this area continues. The Central Clearing and Settlement Regulation was published and a draft regulation related to the implementation of central clearing in OTC derivatives markets is expected to be published in 2015. Moreover, regulations for reporting to trade repositories will be finalized in 2014 and will take effect in 2015.

## IV.7. Financial Infrastructure

**Financial market infrastructures play a key role in smooth functioning of the economy and financial markets, sustaining and developing financial stability.** In addition to the financial crisis, new financial methods and instruments emerging from developing technology and increasing international trade developed the need for comprehensive regulation and supervision in the financial area. In this context, international cooperation in developing principles and standards regarding the financial sector and financial market infrastructures and countries' review of applications and regulations in this area became compulsory. The central banks have started to monitor financial market infrastructures more closely with the objective of achieving financial stability. Parallel to global developments in this area, the CBRT accelerated its studies regarding financial infrastructure institutions, especially payment systems.

**Due to the contribution of an effective working payment system to financial stability, central banks undertake roles as operator, regulator, leader and overseer in this area.** Any problem stemming from payment and securities settlement systems and starting at a certain part of the financial system could threaten financial stability by spreading to other areas. Safely and efficiently working payment and securities settlement systems is one of the most important factors of successful implementation of monetary policies and well-functioning financial systems.

Among the CBRT's fundamental duties as stated in Article 4-I-f of the Law on the Central Bank of the Republic of Turkey No.1211, are to regulate the volume and circulation of the Turkish Lira, to establish payment, securities transfer and settlement systems, to ensure the uninterrupted operation and oversight of the systems established and to be established and to make the necessary regulations, to determine the methods and instruments including electronic environment that shall be used for payments. Accordingly, the "**Law on Payment and Security Settlement Systems, Payment Services and Electronic Monetary Institutions**", which is prepared under the CBRT's

responsibility by considering the need to regulate the payments area and strengthen legal infrastructure, in order to set a legal framework in accordance with the European Union Acquis, international standards and applications, was enacted by publication in the Official Gazette No. 28690 of 27 June 2013.

The Law No. 6493 regulates payment and securities settlement systems, payment services and electronic money institutions. The Law draws the framework of issues like functioning of the systems, oversight of the systems and the finality of settlement, by allowing non-bank actors to participate in the payments area, enhancing competition and financial inclusion in this area is aimed. Within the scope of the Law, the CBRT undertakes the responsibility of preparing secondary legislations regarding payment and securities settlement systems within a year of the Law's enactment. Secondary legislations are envisaged to come into force by the end of June 2014.

On the other hand, to ensure smooth settlement of transactions processed within payment and securities settlement systems, protective provisions are introduced with Article 10 of the Law No. 6493 and in accordance with Article 11, authorizing the CBRT to designate the systems which will be subject to relevant provisions. In this framework, the systems which will be subject to provisions in Article 10 of the Law are designated by the CBRT; the relevant announcement was published in the Official Gazette No. 28946 of 19 March 2014 and on the CBRT's website.

The payment and securities settlement systems functioning in Turkey are composed of: the Central Bank of the Republic of Turkey Electronic Funds Transfer (EFT) System, through which real-time settlement of transactions in Turkish lira is carried out between banks and between customers; the Central Bank of Republic of Turkey Electronic Securities Transfer and Settlement (ESTS) System, through which dematerialized and real-time transfer and settlement of securities are carried out in an electronic platform; the Interbank Cheque Clearing Houses Center (ICH), where clearing of cheques between banks is realized; the Interbank Card Center (ICC), where clearing of

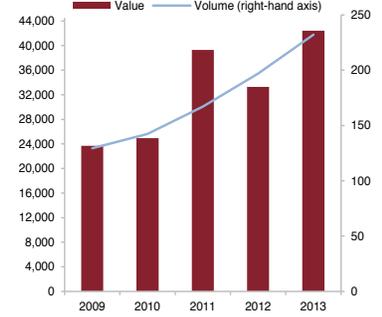
card-based payments is realized; the Istanbul Settlement and Custody Bank Inc. (Takasbank), where clearing and settlement of products traded at the Borsa İstanbul are carried out; and the Central Securities Depository of Turkey (MKK).

The EFT system, which is owned and operated by the CBRT, is a systemically important electronic payment system that operates under the principle of Real Time Gross Settlement-RTGS and realizes Turkish Lira payments. On the other hand, the ESTS system works in an integrated manner with the EFT and allows participants to realize transfer and settlement of securities with the Delivery versus Payment (DvP) principle. The number of participants in the EFT and ESTS systems was 48 and 49, respectively, as of May 2014.

The EFT system reached a dual structure through functional separation on December 7, 2012, as the “Turkish Lira transfer system between customers” which focuses on low-value customer payments and “the Turkish Lira transfer system between banks” where interbank high-value market payments are realized. Both the transaction value and the transaction number increased in 2013. In 2013, the annual transaction value in the EFT system increased by 27.5 percent reaching TL 42,418 billion, while the number of transactions increased by 17.7 percent reaching 232 million when compared to the previous year (Chart IV.7.1).

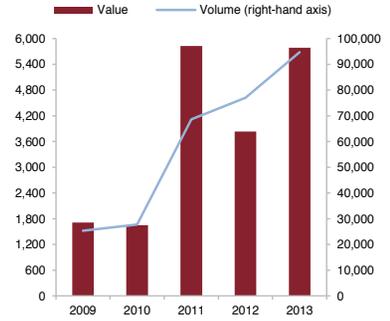
The ESTS2 system, which was developed by the CBRT and taken into service in July 2013, has been provided to reach a more flexible, modern and efficient structure. The ESTS2 system works in an integrated manner with the EFT system and allows participants to realize their transfer of funds and securities simultaneously with the Delivery versus Payment (DvP) principle. In 2013, the value of DvP transactions at ESTS2 system increased by 51 percent reaching TL 5,787 billion and the number of transactions increased by 23 percent reaching 94,752 (Chart IV.7.2).

**Chart IV.7.1.**  
Volume and Value of the Annual Transactions in the EFT System<sup>(1)</sup> (TL Billion, Million)



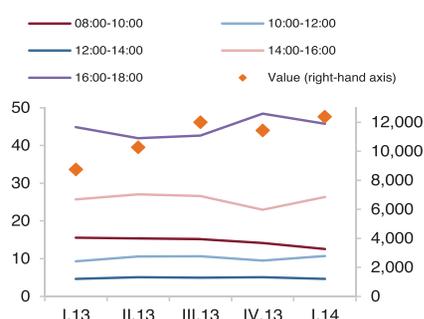
(1) The EFT System incorporates both Turkish lira transfer system between banks and Turkish lira transfer system between customers  
Source: CBRT

**Chart IV.7.2.**  
Volume and Value of the Annual DvP<sup>1</sup> Transactions in the ESTS System (TL Billion, Number)



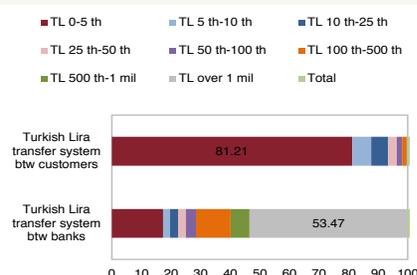
(1) DvP: Delivery versus Payment  
Source: CBRT

**Chart IV.7.3.**  
Break Down of Payments by Hours and Value of Transactions in the EFT System (Percent, Billion TL)<sup>1)</sup>



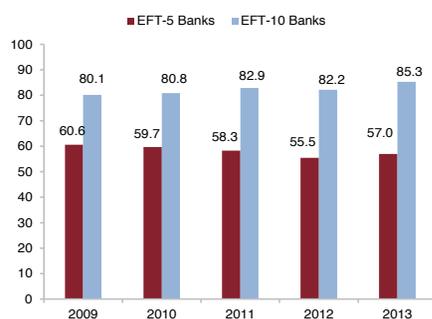
(1) The EFT System incorporates both Turkish lira transfer system between banks and Turkish lira transfer system between customers  
Source: CBRT

**Chart IV.7.4.**  
Break Down of Value of Transactions in the CBRT Payment Systems



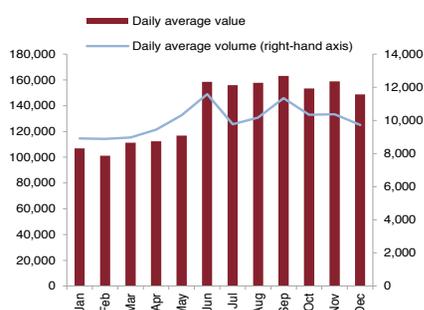
Source: CBRT

**Chart IV.7.5.**  
Concentration ratio in EFT System<sup>1)</sup> (Percent)



(1) CBRT transactions are excluded. The EFT System incorporates both Turkish lira transfer system between banks and Turkish lira transfer system between customers  
Source: CBRT

**Chart IV.7.6.**  
Daily Averages of the Volume and Value of Transactions within the Turkish Lira Transfer System Between Banks (Number, Million TL)



Source: CBRT

In 2013, as expected and in accordance with the aim, high-value and time-critical payments were realized in the Turkish Lira transfer system between banks, while low-value retail payments were realized in Turkish Lira transfer system between customers (Chart IV.7.4). Of the total amount of transactions conducted via the Turkish Lira transfer system between customers, 81.2 percent were composed of transactions of TL 5,000 and lower, while 53.5 percent of the total amount of transactions conducted via the Turkish Lira transfer system between banks were composed of transactions of TL 1 million and higher.

The share of the top five banks conducting the highest number of transactions in the CBRT EFT system increased from 55.5 to 57 percent, while the share of the first ten banks increased from 82.2 to 85.3 percent in 2013 (Chart IV.7.5).

In 2013, the daily average number of transactions was 9,972 and the daily average value of transactions was TL 136.76 billion within the Turkish Lira transfer system between banks, while the daily average number of transactions was 918,294 and the daily average value of transactions was TL 32.91 billion within the Turkish Lira transfer system between customers (Chart IV.7.6 and Chart IV.7.7).

Cheque clearing operations are carried out by the Interbank Clearing Houses Center (ICH) and the subsidiary clearing houses of the ICH under the oversight of the CBRT. The ICH, serving as a systemically important payment system, allows for the collection of cheques used widely in Turkey by different banks and thus decreases the money transfer movements as well as mitigates risks pertaining to money movements. By the end of 2013, the ICH had 41 member banks; out of these 41 banks, 4 were engaged in cheque clearing with physical presentation, whereas the remaining 37 were engaged in electronic cheque clearing without physical presentation.

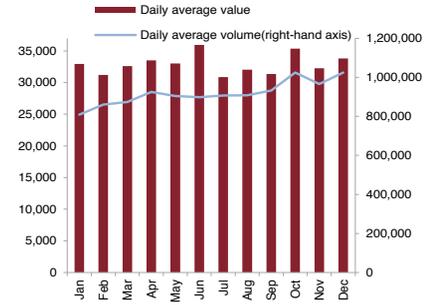
As of end 2013, the ratio of cheque volumes that was processed through the ICH to the GDP was approximately 24 percent. It is of great importance to employ fast and safe

infrastructures as well as to follow recent progress in technical hardware and software in a cheque clearing process that has such a high transaction volume.

**An analysis of the developments in the value and the volume of the cheques processed in the ICH shows that the rising trend of value since 2010 has been continuing, but the total volume of the cheques decreased in 2013 compared to the previous year.** The volume of the cheques which was 18.5 million in 2012 decreased by 7 percent to 17.2 million in 2013. In the given period, the value of the cheques increased by 10.4 percent and reached TL 349.9 billion (Chart IV.7.8). Accordingly, the average value per cheque, which was TL 17,137 in 2012, increased by 18.8 percent and reached TL 20,351 in 2013.

**Chart IV.7.7.**

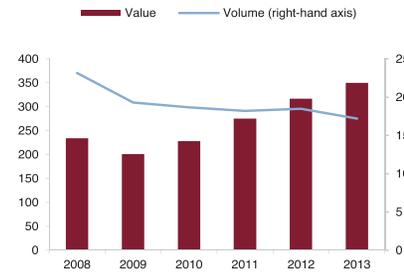
Daily Averages of the Volume and Value of Transactions within the Turkish Lira Transfer System Between Customers (Number, Million TL)



Source: CBRT

**Chart IV.7.8**

Volume and Value of the Cheques Processed in ICH (TL Billion, Million)



Source: CBRT

**Table IV.7.1** Distribution of the Number of Cheques Subject to Clearing by Value Tranches<sup>1</sup>

		TL 2,000 and below	TL 2,001-5,000	TL 5,001-10,000	TL 10,001-50,000	TL 50,001 and over
2009	TOTAL	5,976,435	7,349,054	4,119,649	3,609,740	516,811
	Cumulative Sum	5,976,435	13,325,489	17,445,138	21,054,878	21,571,689
	%	27.7	34.1	19.1	16.7	2.4
	Cumulative %	27.7	61.8	80.9	97.6	100
2010	TOTAL	4,514,432	6,820,043	4,096,030	3,747,536	609,976
	Cumulative Sum	4,514,432	11,334,475	15,430,505	19,178,041	19,788,017
	%	22.8	34.5	20.7	18.9	3.1
	Cumulative %	22.8	57.3	78	96.9	100
2011	TOTAL	3,015,125	6,213,519	4,360,484	4,617,123	844,014
	Cumulative Sum	3,015,125	9,228,644	13,589,128	18,206,251	19,050,265
	%	15.8	32.6	22.9	24.2	4.4
	Cumulative %	15.8	48.4	71.3	95.6	100
2012	TOTAL	2,293,110	6,001,317	4,786,831	5,586,134	1,063,299
	Cumulative Sum	2,293,110	8,294,427	13,081,258	18,667,392	19,730,691
	%	11.6	30.4	24.3	28.3	5.4
	Cumulative %	11.6	42	66.3	94.6	100
2013	TOTAL	1,534,022	5,019,588	4,567,462	5,883,415	1,203,369
	Cumulative Sum	1,534,022	6,553,610	11,121,072	17,004,487	18,207,856
	%	8.4	27.6	25.1	32.3	6.6
	Cumulative %	8.4	36	61.1	93.4	100

Source: ICH

<sup>1</sup> Fractional cheque amounts, matching to the upper limit of the value tranches, are not included. The total number of cheques indicates the number of cheques presented to ICH before they are returned.

**The share of low-value cheques has declined gradually.**

While the ratios of cheques presented to the ICH with a value of below TL 5,000 and TL 10,000 to the total value of cheques presented in 2012 were 42.0 percent and 66.3 percent, respectively, in 2013 these ratios became 36.0 and 61.1 percent.

An analysis of trends of the last 5 years indicates that the decline in the number of cheques below TL 10,000 presented to the ICH became higher than that in the total number of cheques. While the number of cheques below TL 10,000 decreased by 36.2 percent in the 2009-2013 period, the total number of cheques decreased by 15.6 percent in the same period. This decline in low-value cheques is attributed to the increase in the use of credit cards, mainly online banking and the electronic funds transfer system (Table IV.7.1).

**Since the cheque clearing system operates based on the multilateral netting method, the participants' liquidity requirement arising from their cheque transactions declines.**

In the cheque clearing system, the debit and credit positions of participants are determined by multilateral netting following the finalization of the provision operations. In 2013, the netting ratio of transactions conducted via the cheque clearing system was 80.8 percent and the liquidity requirement decreased TL 282.6 billion (Table IV.7.2).

Bank cards and credit cards, which have significant roles in payment instruments, have been used widely for shopping and money withdrawal purposes. The upward trend of card usage in shopping continues in parallel with banks' promotion campaigns and new fields of usage emerged thanks to technological and internet related advancements.

**Table IV.7.2 Cheque Clearing System-Netting Ratio**

	2009	2010	2011	2012	2013
Netting Ratio (%)	80.4	83.1	81.3	82.9	80.8
Transaction Volume (Billion TL)	200.8	228	275.4	316.7	349.9
Liquidity Saving (Billion TL)	161.4	189.4	223.9	262.8	282.6

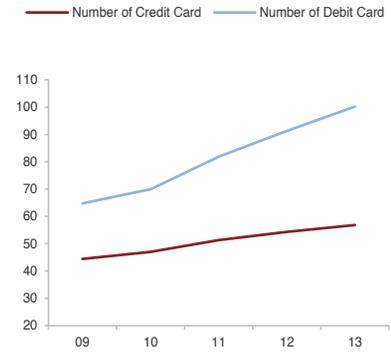
The upward trend in debit and credit card usage continued in 2013. The growth rate of the number of credit cards, which was 9.3 percent in 2011 and decreased to 8.2 percent in 2012, continued to decelerate and decreased to 4.5 percent in 2013, so the number of credit cards was 56.8 million by the end of the year. Similarly, the growth rate of the number of debit cards, which was 17.1 percent in 2011 and decreased to 11.5 percent in 2012, continued to decrease and became 9.8 percent in 2013; the number of debit cards reached 100.2 million by the end of the year (Chart IV.7.9). Depending on the upward trend in the number of debit and credit cards in Turkey, the number of point of sale (POS) devices and automated teller machines (ATM) has also increased. In 2013, the number of POS devices increased by 7.5 percent reaching 2.3 million and the number of ATMs increased by 15.6 percent reaching 42 thousand (Chart IV.7.10).

In 2013, the number of transactions carried out with credit cards increased by 8.4 percent year over year to 2.7 billion while the value of these transactions increased by 17.3 percent reaching TL 423.9 billion. There is a downward trend in the growth rate of both number and value of credit card transactions. In 2013, 96.7 percent of the total number and 91.2 percent of the total amount of credit card transactions were recorded for shopping purposes (Chart IV.7.11).

BRSA's regulation on limiting the number of installments in credit card payments, which came into effect on 1 February 2014, has caused a decrease in the number of installment payments in shopping transactions. This regulation also encourages the use of credit cards as a payment, rather than as a borrowing instrument.

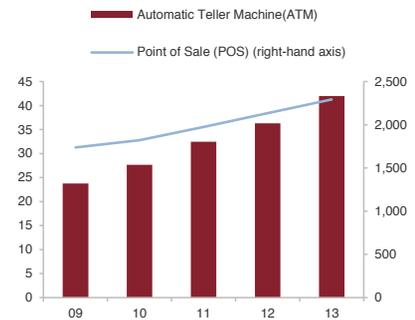
An analysis of debit card usage levels reveals that in 2013, the number of transactions carried out with bank cards increased by 15.4 percent reaching 1.5 billion, while the value of transactions carried out with bank cards increased by 17 percent reaching TL 363.8 billion. In 2013, the growth rate of both the number and value of bank card transactions decreased with respect to the previous year. While the ratios

**Chart IV.7.9**  
Numbers of Debit and Credit Cards  
(Millions)



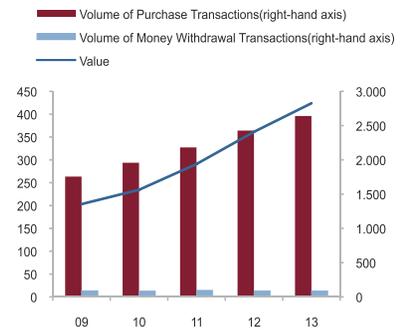
Source: CBRT

**Chart IV.7.10**  
Numbers of ATM and POS  
(Thousands)



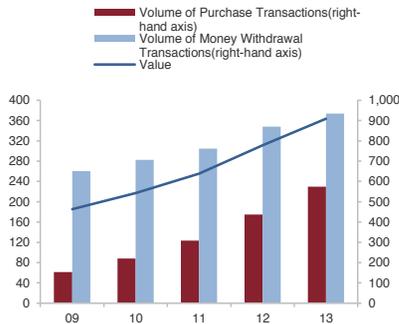
Source: CBRT

**Chart IV.7.11**  
Volume and Value of Credit Card Transactions<sup>1</sup>  
(TL Billion, Millions)



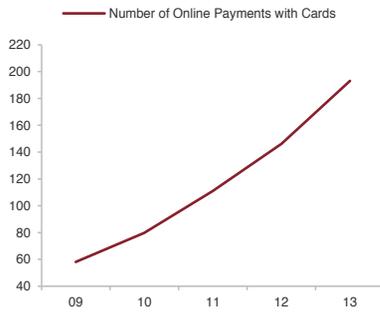
(1) Credit cards issued in Turkey and used in Turkey and abroad  
Source: ICC

**Chart IV.7.12**  
Volume and Value of Debit Card Transactions<sup>1</sup>  
(TL Billion, Millions)



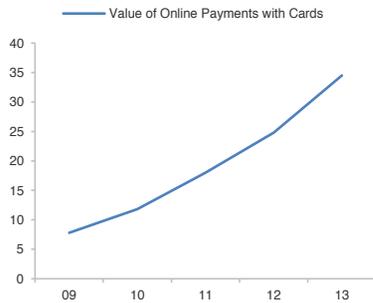
(2) Credit cards issued in Turkey and used in Turkey and abroad  
Source: ICC

**Chart IV.7.13**  
Number of Online Payments with Cards<sup>1</sup>  
(Millions)



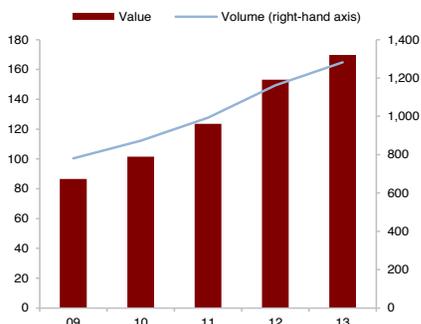
(1) Cards issued in Turkey and used in internet in Turkey and abroad  
Source: ICC

**Chart IV.7.14**  
Value of Online Payments with Cards<sup>2</sup>  
(TL Billion)



(1) Cards issued in Turkey and used in internet in Turkey and abroad  
Source: ICC

**Chart IV.7.15**  
Volume and Value of Credit Cards Processed in the Card Clearing System  
(TL Billion, Millions)



Source: ICC

of debit card transactions for shopping to the total number and value of debit card transactions were 33.5 percent and 5.3 percent in 2012, these ratios became 38.1 and 6.1 percent respectively in 2013 (Chart IV.7.12). Bank cards have also been preferred for shopping, especially low value shopping.

The increasing use of the internet and e-commerce has become one of the reasons driving the use of payment cards in Turkey. In 2013, while the number of domestic and cross border payments with domestic cards increased by 32 percent reaching 193 million, the value of these payments increased by 39.1 percent reaching TL 34.5 billion (Chart IV.7.13 and Chart IV.7.14).

The number of transactions subject to the credit card clearing, which posted an annual increase of 17.1 percent in 2012, increased by 10.3 percent in 2013 and became 1,281.6 million. Meanwhile, the annual growth rate of the value of transactions subject to credit card clearing, which was 23.9 percent in 2012, decreased to 10.8 percent and the total value of transactions became TL 169.7 billion in 2013 (Chart IV.7.15). The number of transactions subject to debit card clearing, which rose by 29.5 percent in 2012, increased by 31.1 percent reaching 393.3 million in 2013. The value of transactions subject to debit card clearing increased by 23 percent reaching TL 18.9 billion in 2013 (Chart IV.7.16).

The card clearing system operates on the basis of multilateral netting method, therefore reduces the participants' liquidity requirements arising from card transactions. In 2013, the netting ratio of credit card transactions realized through the system was 74.1 percent and the liquidity saving related to credit card transactions was TL 125.7 billion. On the other hand, for debit card transactions the netting ratio was 77.1 percent and the liquidity saving was TL 14.6 billion (Table IV.7.3).

The ratio of credit card transactions subject to clearing to the total value of credit card transactions, which is expected to fall parallel to the increased use of credit cards in the

issuer bank's own POS devices, was 42.4 percent in 2012 and decreased to 40 percent in 2013. (Chart IV.7.17)

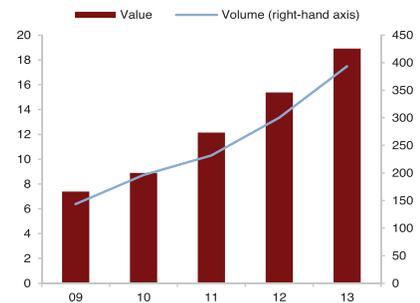
Takasbank plays a critical role in ensuring the smooth functioning of capital market transactions. The clearing and settlement of transactions traded at the Equity Market, the Emerging Companies Market, the Debt Securities Market and the Futures and Options Market operating under Borsa Istanbul are carried out by Takasbank and MKK.

Takasbank guarantees the fulfillment of transactions in various markets by acting as a buyer to sellers and as a seller to buyers among the parties of financial contracts listed in these markets and thus functions as a Central Counterparty (CCP) for those markets. Takasbank is currently acting as CCP for the transactions processed at the Takasbank Money Market (TMM), which ensures that the brokerage houses and banks with short-term liquidity needs or surpluses come together, and the Futures and Options Market, in which equity based futures and option contracts are traded at Borsa Istanbul.

In 2013, the total value of transactions carried out at the Takasbank regarding Borsa Istanbul's Equity Market and the Emerging Companies Market was TL 814.99 billion. As a result of multilateral netting, only TL 58.70 billion net cash transfer occurred for those transactions and TL 756.29 billion liquidity saving was achieved. The increase observed since 2008 in the total value of transactions processed at the Equity Market and the Emerging Companies Market of Borsa Istanbul, reverted to a decrease in 2012. Compared to the previous year, the total value of transactions carried out at these markets increased by 31 percent in 2013 (Chart IV.7.18).

Takasbank has an important role in financial markets due to these functions and provides "Cash Credit Facility" and "TMM" services to its participants to ensure the smooth functioning of the system and to prevent contagion of the problem to other participants via the system in case of temporary liquidity shortages of participants.

**Chart IV.7.16**  
Volume and Value of Debit Cards Processed in the Card Clearing System  
(TL Billion, Millions)



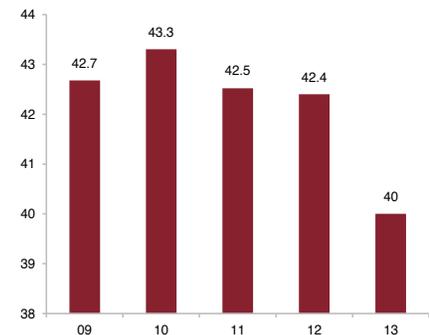
Source: ICC

**Table IV.7.3**  
Card Clearing and Settlement System/  
Netting Ratio (Percent)

	09	10	11	12	13
<b>Credit Card Clearing and Settlement</b>					
Netting Ratio, (%)	78.1	77.4	75.3	74.9	74.08
Transaction Volume (Billion TL)	86.6	101.4	123.6	153.1	169.7
Liquidity Saved (Billion TL)	67.6	78.5	93.1	114.7	125.7
<b>Debit Card Clearing and Settlement</b>					
Netting Ratio, (%)	65.1	76.6	78	76.3	77.1
Transaction Volume (Billion TL)	7.4	8.9	12.1	15.4	18.9
Liquidity Saved (Billion TL)	4.8	6.8	9.5	11.7	14.6

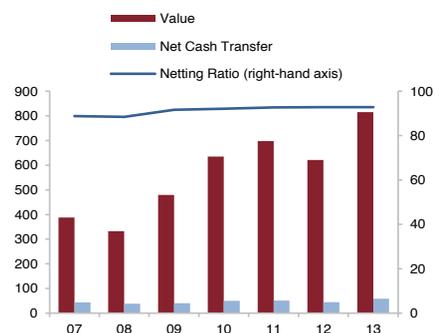
Source: ICC

**Chart IV.7.17**  
Ratio of the Value of Credit Card Transactions Subject to Clearing Process to the Total Value of Credit Card Transactions (Percent)



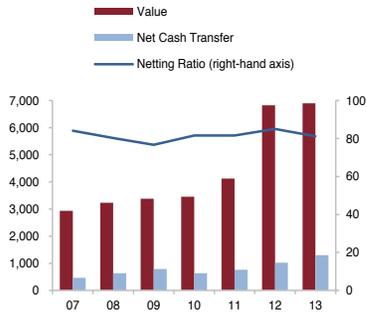
Source: ICC

**Chart IV.7.18**  
Transactions Carried out at Borsa Istanbul's Equity Market and Emerging Companies Market  
(Billion TL, Percent)



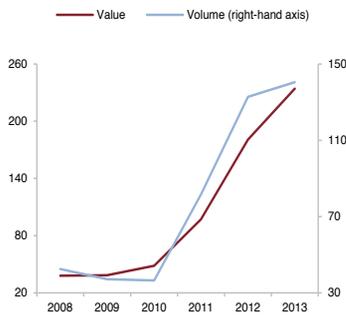
Source: Takasbank

**Chart IV.7.19**  
Transactions Carried out at Borsa İstanbul's Debt Securities Market  
(Billion TL, Percent)



Source: Takasbank

**Chart IV.7.20**  
TMM Transaction Value and Volume  
(Billion TL, Thousand)



Source: Takasbank

Within the context of “Cash Credit Facility”, Takasbank provides credits -generally with overnight maturities- against collateral and within the limits previously determined by Takasbank to its participants. In 2013, a credit line was allocated to 7 brokerage houses for the first time and a credit line of 52 institutions which consists of 37 brokerage houses and 15 banks was reviewed.

Takasbank Securities Lending Market Directive and Code of Practice related to this Directive were published and Takasbank has provided central counterparty services in the Securities Lending Market since September 2, 2013. Furthermore, the Directive on Borsa İstanbul Futures and Options Market was approved by the Capital Markets Board on December 13, 2013, and in this context Takasbank started to provide central counterparty services in the Borsa İstanbul Futures and Options Market in the first quarter of 2014.

Transactions at the TMM, which plays a crucial role in the liquidity management of brokerage houses that cannot participate in the CBRT's Liquidity Management Facilities, has reached the highest value in 2013 ever since the start of operations in the market. In 2013, the transactions at the TMM, which was TL 180.8 billion value in 2012, increased by 29 percent reaching TL 234 billion value and 140.4 thousand volume. (Chart IV.7.20).

The increase in the transactions at the TMM mainly stems from the transactions conducted by TMM participants with respect to the liquidity conditions in markets as well as the increase in the number and transaction volume of investment funds and trusts, on behalf of which transactions are realized through the TMM. The share of investment funds and trusts, in the sum of the total transaction volume at the TMM increased by 37 percent reaching TL 175 billion in 2013. The number of investment funds and trusts making transactions at the TMM increased by 12 percent reaching 529 in 2013.

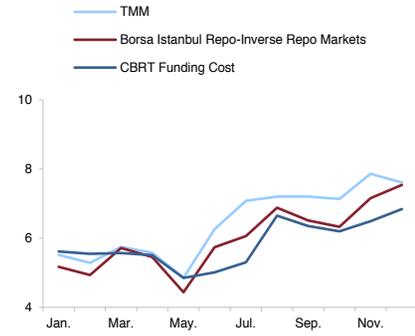
The competitive structure observed in interest rates of the

TMM and other markets during 2012 remained until May, 2013. However, after that date the TMM daily weighted average interest rates tended to diverge from the CBRT funding cost and Borsa İstanbul Repo-Inverse Repo Markets' interest rates due to the volatility of the risk premium.

The Central Registry Agency (MKK) is the central securities depository within the scope of the Capital Market Law and responsible for the central custody and dematerialization of capital market instruments, as well as electronically monitoring these instruments and the rights attached on them on an ownership basis. Currently, stocks traded on Borsa İstanbul, exchange traded funds, mutual funds, government debt securities, private sector debt securities, asset backed securities and sukuk are electronically monitored by the MKK. The clearing and settlement of capital market instruments traded on Borsa İstanbul is performed through the integrated system established between Takasbank and the MKK. Therefore, for uninterrupted and smooth settlement of these transactions, the Takasbank and MKK's systems have to operate in a coordinated manner. Additionally, the transactions of capital market instruments, which aren't traded on Borsa İstanbul are conducted between accounts opened at the MKK on a beneficial ownership basis through participants. In this context, in addition to being a central securities depository within the scope of the Capital Market Law, the MKK is regarded as a system operator within the scope of The Law No. 6493 on Payment and Securities Settlement Systems, Payment Services and Electronic Money Institutions due to the securities settlement system it owns and operates.

By year end 2013, there were 511 billion TL worth stocks belonging to 1.1 million investors and 183 billion TL worth government debt securities belonging to 24,476 investors in the custodian accounts of the MKK (Table IV.7.4).

**Chart IV.7.21**  
Interest Rates at TMM-Interest Rates on Other Markets  
(Daily Weighted Averages, 2013, Percent)



Source: Takasbank

**Table IV.7.4**  
Market Value of Securities in Custodian Accounts of MKK and the Number of Investors <sup>1</sup>

Capital Market Instruments	Market Value	Number of Investors <sup>2</sup>
Stocks <sup>3</sup>	511 billion TL	1,116,537
Government Debt Securities	183 billion TL	24,476
Mutual Funds	30.9 billion TL	2,766,512
Private Sector Debt Securities	36 billion TL	166,571
Exchange Traded Funds	183 million TL	3,956
Structured Products	12 million TL	3,306
Other Securities	2.9 billion TL	2,611
<b>Total</b>	<b>765 Billion TL</b>	<b>3,617,815</b>

(1) By year end 2013.

(2) Since any investor can own more than one type of capital market instrument, the sum of the number of investors based on the type of the instrument may not be equal to the total number of investors.

(3) The value of equities that are traded on Borsa İstanbul is 195 billion TL, whereas the value of equities that aren't traded on Borsa İstanbul is 316 billion TL.

Source: MKK

## IV.8. Steps Taken Towards Financial Stability

This chapter discusses the arrangements concerning financial stability introduced by the CBRT and the BRSA since the last Report dated November 2013.

Since the last Report, CBRT made the following regulations related to reserve requirements.

With the amendment dated December 25, 2013 in the **Communiqué on Reserve Requirements** to become effective as of January 17, 2014, a new approach has been adopted for the calculation of reserve base in order to simplify the structure of reserve requirements that are used as a monetary and macroprudential policy tool. Accordingly, instead of deducting specified items from the total domestic liabilities, only the items subject to reserve requirements will directly be taken into account while calculating liabilities subject to reserve requirements. Thus, immaterial items, which do not have a direct impact on the monetary policy but reduce the efficiency of the operational processes, have been excluded from reserve requirements coverage. At the same time, in light of the latest developments in global markets and with a view to supporting financial stability by ensuring a more effective functioning of the reserve options mechanism working as an automatic stabilizer, the reserve option coefficients for foreign exchange reserves held for Turkish lira required reserves have been increased by 0.4 for each of the last four tranches.

Besides, in the Inflation Report 2014-I, it has been announced that should the uncertainties and the heightening of the risk premium last for a long time, the economy may face a significant slowdown through the confidence and balance sheet channels and should such a risk materialize, the CBRT will pursue a stabilizing policy by using its policy instruments to reduce the intermediation costs of the banks. In this respect, with the amendment dated March 26, 2014 in the Communiqué on Reserve Requirements, remuneration of reserve requirements has been regulated in order to use as a policy tool, if needed.

On the other hand, In the Tenth Development Plan including the period of 2014-2018, published in the Official Gazette dated July 6, 2013, it is aimed to increase domestic savings which are the most reliable and permanent financing source, orienting these increasing savings towards productive investments and prevent wastage to ensure a high and stable growth dynamic. Hence, BRSA, which was specified as the institution responsible for keeping the increase in consumer loans under control with macro prudential measures and increasing the share of commercial loans within total loans by differentiating loan costs as well as other encouraging or deterrent measures, has been introduced several measures since the last quarter of 2013.

In this context, the legislative amendments made by BRSA in October 8, 2013 and explained comprehensively in the previous Report are summarized below:

**With the amendments concerning provision legislation,** loans granted via overdraft accounts dependent on saving accounts belonging to natural persons and loans granted to natural persons via credit cards in cash or for purchase of goods and services have been included within the scope of consumer loans. Furthermore, for the banks that have loan portfolio above the limits in the legislation, automobile loans, loans granted to natural persons via overdraft accounts and credit cards have also been included in the increased application in general provision ratios regarding consumer loans except for housing loans. Finally, general provision ratios are decreased for export and SME loans.

**With the amendments concerning capital adequacy legislation,** risk weights applied to loans granted via credit cards in cash or for purchase of goods and services and other consumer loans except for housing loans have been increased. Additionally, within the scope of the Communiqué on Credit Risk Reduction Techniques, the export credit insurance policies provided from Export Credit Bank of Turkey are identified as a risk reducing collateral and these policies are taken into account as warranties ensured by the Central Government of the Turkish Republic.

**With the amendments concerning credit cards legislation,** the minimum payment amount has been gradually increased for the credit cards with limit up to TL 15,000 and with limit from TL 15,000 to 20,000. It has also been regulated that total credit card limit acquired from credit card issuing institutions can not exceed the four fold of the income of credit card customer and the credit card limit can not be increased for the existing credit cards with limit over four fold of the income. Moreover, when minimum payment amount is not paid three times successively in a calendar year, the credit card is closed to cash withdrawal and goods and services purchase and its limit can not be increased until all of the debt due is paid.

For the same purposes, other regulations made by BRSA since the previous Report are as follows:

With the amendment dated December 24, 2013 in the **Regulation on Accounting Applications and Financial Tables of Financial Leasing, Factoring and Consumer Financing Companies**, the general provision application of financing companies for the consumer loans except automobile and housing loans has been changed, in parallel with the application of banks. According to the new regulation, the exception for the automobile loans has been removed and thus, financing companies have to allocate general provision for the automobile loans, as in the other consumer loans except housing loans. This regulation has been effective on the date of publication and with a provisional clause that has been added to the regulation on February 7, 2014, the automobile loans granted before December 24, 2013 have been exempted from this application.

With the amendment dated December 31, 2013 in the **Regulation on Bank Cards and Credit Cards**, installment period for the goods and services purchase and cash withdrawal via credit cards, including installment of debt in exchange for a specified fee after purchasing and postponement of installment payments, has been restricted up to nine months. In addition, installment for the expenditures of telecommunication, jewelry, food and fuel is not been allowed. This regulation has been

effective on February 1, 2014. As a solution to some problems in the implementation of this regulation, with an amendment dated May 13, 2014 and took effect on the date of publication, installment for the gift cards, gifts cheques or any other products that do not include tangible goods and services purchase is not allowed, and installment prohibition is not applied to corporate credit cards, but general installment restriction, which is maximum nine months, is applicable to corporate credit cards.

With the amendments dated December 31, 2013 in the **Regulation on Credit Operations of Banks and Regulation on Procedures and Principles for Establishment and Operations of Financial Leasing, Factoring and Consumer Financing Companies**, it has been regulated that the maturity of automobile and automobile-warranted loans can not exceed 36 months and the maturity of other consumer loans except mortgage loans and other housing loans can not exceed 48 months. In addition, for the automobile and automobile-warranted loans extended or financial leasing transactions made for passenger car purchases, if the final billing value is TL 50,000 or below, loan amount can not exceed 70 percent of the billing value; if the final billing value is above TL 50,000, loan amount can not exceed 70 percent for the part of TL 50,000 of the billing value, and 50 percent for the part of above TL 50,000 of the billing value. Maturity restriction for consumer loans has been effective on the date of publication and loan to value ratio for automobile loans has been effective on February 1, 2014. These amendments are not applied to the loans extended before the publication of the Regulations and the restructured loans.

On the other hand, the regulations made by BRSA in the context of compliance to Basel III about own funds, capital adequacy, capital conservation and countercyclical capital buffers, and leverage have been explained in detail in the previous Report. For the same purpose, **The Measurement of Liquidity Coverage Ratio of Banks** has been published on March 21, 2014 and effective as of January 1, 2014. This regulation aims banks to have an adequate high-quality liquid assets in their balance sheet to meet the net cash outflow in 30 days, especially during periods of stress. Liquidity Coverage Ratio is calculated by dividing stock of high-quality liquid assets by net cash outflows. High-quality liquid assets include the assets that can be measured easily and certainly, used as a reliable source of liquidity even in stress conditions, not be pledged to secure or collateralise any transaction, have no legal or operational restriction to use, sell, transfer or liquidate. Net cash outflow is the amount of total cash outflows that exceed total cash inflows. Liquidity coverage ratio is calculated both on consolidated and unconsolidated basis, and in terms of both total and foreign exchange. Liquidity coverage ratio does not have a legal minimum for the first year, but will have a gradual transition period beginning from January 1, 2015 until Basel III being effective on April 1, 2019 where the ratio will not be less than 100 percent for total ratio and 80 percent for foreign exchange ratio.

Besides, with the Law on Consumer Protection published on November 28, 2013, any type of fee, commission and charge collected from consumers in exchange for the products and services offered by banks, other financial institutions extending consumer loans and card issuing institutions will be regulated by BRSA, with the consent of the Undersecretariat of Customs and Trade.