



## RESEARCH NOTES IN ECONOMICS

### Micro Level Evidence on Foreign Exchange Liability and the Exchange Rate Risk in Turkish Corporate Sector\*

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**Abstract:** In Turkey, households are not allowed to hold foreign currency (FX) debts and FX open position in the financial sector is limited by regulations. However, non-financial firms can hold FX denominated debts under some restrictions. This study tends to explore the related risks for holding FX debt within a micro perspective by using a firm level datasets. We find that firms in the dataset, which account for a significant amount of economic activity in Turkey, adopt some internal mechanisms to avoid the currency risk. First of all, firms with small size and high currency risk have reduced their liability dollarization ratios and extended the maturity of FX debt in recent years. In addition, findings suggest that firms with limited export revenues and having higher FX denominated debt obtain higher FX profits, which compensate a significant amount of their FX financial expenditures. Meanwhile, FX pricing of domestic sales in some sectors, which are not classified under export revenues, implies a lower currency risk of firms than perceived.

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## 1. Introduction

Limited availability of Turkish lira-denominated funds with long-term maturity in the financial system and the high course of “external finance premium” in Turkey have driven firms to borrow in foreign currency (FX) particularly starting late 1990s.<sup>1</sup> The ratios of FX-denominated debt to total liabilities (liability dollarization) of particularly large and exporter firms have increased over time even though there has been a decline in overall liability dollarization after introduction of flexible exchange rate regime in early 2000s (Alp, 2013).<sup>2</sup>

As a result of the liability dollarization, total FX-denominated debts of non-financial firms in Turkey are above their FX-denominated assets. The FX net short positions (macro position) of these firms reached USD 178.5 billion by the end of 2014.<sup>3</sup> Such a currency mismatch may raise concerns about the balance sheets effects due to volatility in capital flows and exchange rates. These in return may cause a decline in firms’ profitability in the first stage and eventually deterioration in investment appetite. However, such a mismatch may also ease the financial constraints of firms by serving the facility of borrowing in FX at longer maturity and allow these firms to grow at higher rates in normal times. In fact, Alp and Yalçın (2015) and Karamollaoğlu and Yalçın (2015) estimate a robust positive association between liability dollarization of non-financial firms and their activity (total sales and exports) in Turkey.

This study provides some micro indicators produced from the balance sheets, income statements and FX liabilities of more than 9 thousand non-financial firms which are available in Central Bank of the Republic of Turkey Sectoral Company Accounts (the CBRT Company Accounts) and Banks Association of Turkey Risk Centre (BAT) databases. In view of these data, we show that most firms do not borrow in FX and a significant portion of FX borrowers are naturally hedged. However, firms without or limited export revenues borrow in FX, which constitute to one third of the total FX debt of all firms in the dataset. Nevertheless, results reveal that these firms obtain a higher average net FX profits than other firms and they are more inclined towards holding cash. Moreover, at the sectoral level, most of the sectors with relatively higher debt dollarization ratios seem to have activities not classified as exports but generating revenues through FX-linked pricing in the domestic market. As evidenced by the

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<sup>1</sup> The average firm profitability (potential to generate internal resources) in Turkey is lower than that in similar countries (Özmen et al. 2012). This restricts the firms’ ability to invest by exploiting their internal resources, and resulting in the need to borrow in order to grow. The average indebtedness of the Turkish corporate sector is observed to be high (the total debts to total liabilities ratio is above 50 percent) (Özlü and Yalçın, 2012).

<sup>2</sup> The liability dollarization ratio of the private sector in Turkey (including households) is below the ratios of many emerging economies (particularly Central and Eastern Europe countries) (Zettelmeyer et al. 2010). Individuals or households in Turkey are not allowed to borrow in FX, which secures low levels of total private sector liability dollarization compared to that of non-financial firms, and warrants hedging for the households against the exchange rate risk.

<sup>3</sup> Note that this net short position is only about USD 6 billion for short term liabilities. That is, macro data suggest that non-financial firms are largely hedged in short term.

current dataset, the currency risk of non-financial firms in Turkey might be lower than what macro aggregates imply.<sup>4</sup>

In the following section of the study, we provide a short discussion on the data used in the analysis. The third section reveals statistical indicators that may contribute to the risk analysis of non-financial firms in Turkey. Accordingly, indicators are generated considering whether the firms possess natural hedge or not as well as the size of their FX-denominated debt. Evaluations on firms without FX-denominated revenues (or not appeared on their balance sheets, though being available) and having large amounts of FX-denominated debts are given particular importance. The conclusion section presents a summary of findings and general assessments.

## 2. Data and Indicators

The CBRT Company Accounts is the most comprehensive database regarding financial data of non-financial firms in Turkey. It includes information on balance sheet and income statement items, sub-sectoral activity, establishment date, number of employees, provinces operated in and the legal status. About a half of the firms operate in the manufacturing industry. It mostly includes small and medium-sized enterprises, yet covers almost all large firms operating in Turkey. Our estimations suggest that, basing on data of 2011, these firms hold 58.2 percent of total sales, 72.5 percent of exports and 40 percent of FX-denominated debts at the end of 2013. Around 75 percent of employment with 10 or more employees in the manufacturing industry is fulfilled by firms included in this dataset. In fact, these firms cover a significant portion of aggregate economic activity. The dataset does not constitute a sample with regard to sampling standards, yet firms included in the dataset are of great weight in total activities, which renders the representative power of this analysis high.

Based on the scale criteria regarding the scale recommended by BACH (The Bank of Harmonized Data on Company Accounts), the data set mostly includes small and medium-sized enterprises, yet covers a sizeable portion of large firms operating in Turkey. The distribution of firms covered in the data set in terms of scale and manufacturing and vs. non-manufacturing structure is given in Table 1.<sup>5</sup>

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<sup>4</sup> Data regarding the firms' balance sheets and income statements are available up to 2012 while FX-denominated debts are available up to 2013, and the charts and evaluations below are based thereon.

<sup>5</sup> Firms are scaled according to the "asset size" criterion for construction firms and holding companies that display great differences in net sales among years, while for firms in the rest of sectors, the "net sales" criterion applies. According to the net sales criterion, firms having net sales below Euro 10 million in 2012 are classified as small scale, those having net sales from Euro 10 million to Euro 50 million are medium size, while those having net sales above Euro 50 million are large scale. According to the asset size criterion, firms with total assets less than Euro 10 million in 2012 are small scale, those with total assets between Euro 10 million and Euro 43 million are medium scale, and firms with total assets larger than Euro 43 million are large scale.

Table 2 displays the percentage distribution of firms based on whether firms have FX-denominated debt by their export ratio (export/sales) tranches or not. As about 45 percent of firms does not have exports revenues, firms are divided into export ratio tranches of 10 percent starting from 50 percent. In the analyzed period, it is seen that having FX-denominated debt is common among firms ranking high in export ratio tranches. However, there has been a decline in the share of firms having FX debt across export share ratio tranches over time. For example, 85 percent of the firms in the highest tranche held some FX-denominated debt in 2002, whereas it declined to 76 percent in 2013. On the other hand, the percentage of firms with FX-denominated debt is lower among firms in the lower export ratio tranches. This ratio decreased faster in these firms than those ranking among high export ratio tranches in the 2002-2013. However, the ratio of holding FX-denominated debt by firms without exports displayed a limited rise in this period.

Table 1: Scale Distribution of Firms in the Dataset (2012, Percent)

	Small	Medium	Large
<b>Manufacturing Industry</b>	43.7	36.8	19.4
<b>Non-Manufacturing</b>	52.2	13.8	34.1

Source: CBRT Sectoral Balance Sheets

Table 2. Distribution of Firms Based on Liability Dollarization and Export Ratios (Percent)

	Non-exporting	Export Ratio Tranches					
		(0, 50]	(50, 60]	(60, 70]	(70, 80]	(80, 90]	(90,100]
<b>2002</b>							
<b>Dollarization &gt; 0</b>	27.5	50.1	63.7	71.6	80.4	84.1	85.3
<b>Dollarization = 0</b>	72.5	49.9	36.3	28.4	19.6	15.9	14.7
<b>Number of Firms</b>	2133	2055	838	838	838	838	837
<b>2013</b>							
<b>Dollarization &gt; 0</b>	29.8	35.0	36.2	49.5	62.8	73.5	76.3
<b>Dollarization = 0</b>	70.2	65.0	63.8	50.5	37.2	26.5	23.7
<b>Number of Firms</b>	4055	571	925	925	925	925	925
<b>Difference (2013-2002)</b>							
<b>Dollarization &gt; 0</b>	2.3	-15.1	-27.5	-22.1	-17.6	-10.6	-9.0

Source: CBRT Sectoral Balance sheets

For a facilitated follow-up of the variables used in the analysis, definitions and explanations thereof are exhibited in Table 2.

Table 3: Variables and Definitions used in Analysis

Variable	Definition	Source
Liability Dollarization Ratio	FX Cash Debt/Total Cash Liabilities (%)	BAT
FX Debt-Exports Ratio (Exchange Rate Risk Ratio)	FX Cash Debt/Exports	BAT and CBRT Balance sheets
Maturity Structure of FX Liability	Long-term FX Cash Liabilities/Total FX Cash Liabilities (%)	BAT
Net Profit Margin	After-Tax Net Profit-Loss/ Sales (%)	CBRT Sectoral Balance Sheets
Net FX Transactions Profit Margin	Net FX Transactions Profit / Sales (%)	CBRT Company Accounts
FX-denominated Financial Expenditure Margin	Dollarization Ratio*Financial Expenditures/ Sales (%)	BAT and CBRT Balance sheets
Net FX Transactions Profit-FX- Denominated Financial Expenditures Ratio (Coverage Ratio)	Net FX Transactions Profit / (Dollarization Ratio*Financial Expenditures) (%)	BAT and CBRT Sectoral Balance sheets
Current Ratio	Current Assets / Short term Liabilities (%)	CBRT Company Accounts
Cash Ratio	(Liquid Assets + Real Estates) / Short term Liabilities (%)	CBRT Company Accounts
Asset Profitability	Net Profit of the Period / Total Assets (%)	CBRT Company Accounts

### 3. Dollarization of Liabilities and Exchange Rate Risk in Firms: Statistical Observations

#### 3.1. Exchange Rate Risk Indicators and Evaluations on Time Series

As underlined in the introduction section, non-financial firms have liability dollarization in Turkey, yet the related ratio declined remarkably following the crisis in 2001. The average maturity of FX-denominated debts got extended in this period. The comprehensive reforms introduced after the 2001 crisis have been effective in these two developments. Adoption of the flexible exchange rate regime, regulations associated with policy independence of the Central Bank of Turkey, enforcement of fiscal discipline and providing the banking sector with a strong capital structure are among these reforms, which contributed to strong disinflation and de-dollarization processes.<sup>6</sup>

Following the enforcement of the flexible exchange rate regime in 2002 in Turkey, firms with limited FX-denominated revenues began to hold lower FX-denominated liabilities

<sup>6</sup> Eichengreen and Hausmann (1999) associate the way to evade dollarization with the enforcement of reforms to enhance the capabilities of policy-making authorities in independence, transparency, reliability.

compared to their total liabilities in order to hedge against exchange rate fluctuations, and thus the fragilities of firms regarding the exchange rate risk posted a decline to some extent (Özmen and Yalçın, 2007; Alp and Yalçın, 2015). In other words, the flexible exchange rate regime is believed to stimulate the firms' motives for hedging the exchange rate risk.<sup>7</sup> In fact, as a result of improvements in the financial position of firms between 2001 and 2008, Alp and Yalçın (2015) estimates that the adverse effect of the exchange rate shock in the 2008-2009 crisis on firms' balance sheets and growth performances proved to be more limited than that of the crisis in 2001, despite an apparent fall in the external demand in 2009.

In this study, the ratio of FX-denominated debt to exports is used as the main criterion to evaluate the exchange rate riskiness of firms. The literature contains studies suggesting that exporter firms can borrow in FX to eliminate their financial constraints and therefore can compensate for the negative effects of exchange rate shocks as long as there is no excessive borrowing (Claessens et al. 2000; Claessens et al. 2012; Bougheas et al. 2012). In this respect, we use the mentioned variable in the analysis as it reflects the operational hedging capacity of firms against the currency risk. A high FX-denominated debt to exports ratio implies that FX-denominated revenues fall short of offsetting FX-denominated debts, thus lacking of "natural hedging" mechanism against exchange rate shocks. The average of FX-denominated debt to exports ratio is considered as the exchange rate risk indicator and firms are classified into 3 groups (risk groups) based on this ratio.<sup>8</sup>

In the first group, the firms with no exports and with FX-denominated debt exceeding 5 percent of their gross sales are referred as 'high-risk'. In the second group, firms with positive export revenues but their FX debts exceeding three times of their exports are called 'medium-risk'. In the third group, firms having FX debts less than three times of their exports as well as those without exports and their FX-denominated debts being equal to or less than 5 percent of sales are classified as 'low-risk'.<sup>9</sup>

In order to evaluate the possible risks caused by the FX-denominated debts of firms, some statistical analyses are carried out for the period of 2006-2013. Firstly, the distribution of firm numbers and their FX debts for the year of 2013 by risk groups and firm scales are shown in Chart 1 and Chart 2, respectively.<sup>10</sup> Firms that are referred to as high-risk have a

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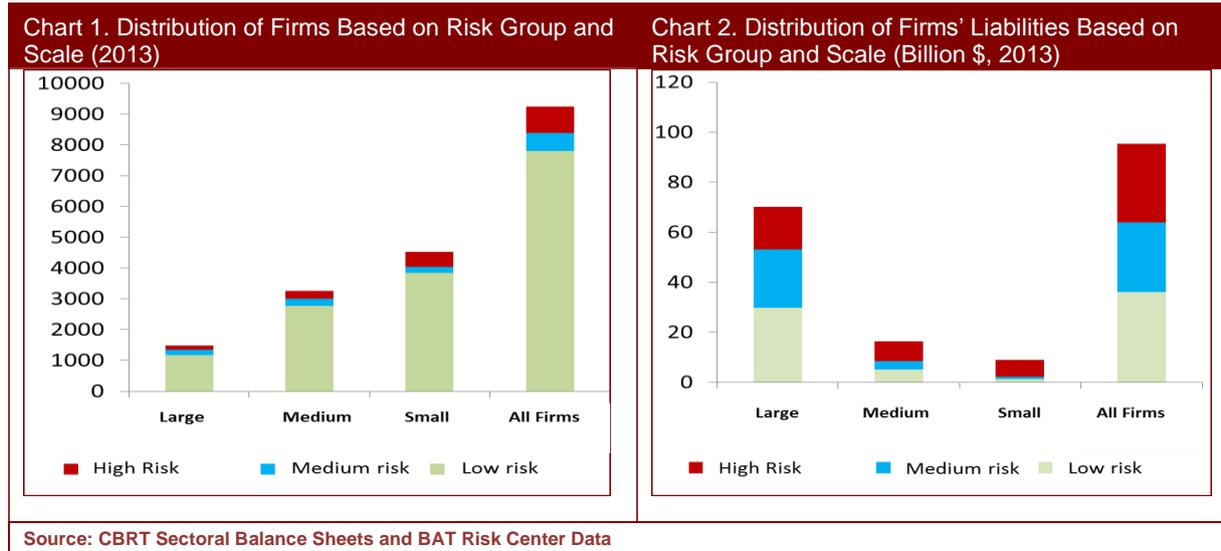
<sup>7</sup> In a cross country analysis, Kamil (2012) shows that upon the adoption of flexible exchange rate regime following fixed and/or administered regimes, firms lower their shares of FX liabilities, use the export revenues more systematically and hold FX-denominated assets more than normal, thus lower their FX short positions.

<sup>8</sup> As the dataset does not include 2013 export data, those belonging to 2012 are used.

<sup>9</sup> Regarding the medium-risky group, it is assumed that the average maturities of firms' FX liabilities is three years, thus firms' exports for three years correspond to their FX debts and when this ratio is larger than 3, firms bear more risk. On the other hand, not having export revenues but having FX-denominated debt larger than 5 percent of sales is picked as a risk factor by authors.

<sup>10</sup> Firms are scaled according to the "asset size" criterion for construction firms and holding companies that display great differences in net sales among years, while for firms in the rest of sectors, the "net sales" criterion applies. According to the net sales criterion, firms having net sales below Euro 10

limited share in terms of numbers (13 percent), yet the sum of FX debts of these firms are estimated to hold around one thirds of total FX-denominated debts. Moreover, about a half of the FX debts of firms in the high-risk group belong to SMEs, while most of these have long maturities as displayed in Chart 8 below.<sup>11</sup> As expected, total FX debt of small scale firms is relatively low. However, these firms are mostly included in the high-risk group.



Secondly, to evaluate the exchange rate risk of firms, the course of sales-weighted liability dollarization and FX-denominated debt-export ratios by firm scales are exhibited in Chart 3 and Chart 4, respectively. In the period of 2006-2013, the sales-weighted liability dollarization ratio receded from 55.1 percent to 44.3 percent. Particularly following the reforms, the decline in the ratio of firms' average liability dollarization ratio has decelerated in recent years due to large firms. Furthermore, liability dollarization ratios of medium and small scale firms continued to fall after the crisis in 2009. The fall in the liability dollarization ratios of these firms is attributed to the enhanced access to Turkish lira denominated loans following the crisis in 2009 and their avoidance from the exchange rate risk.<sup>12</sup>

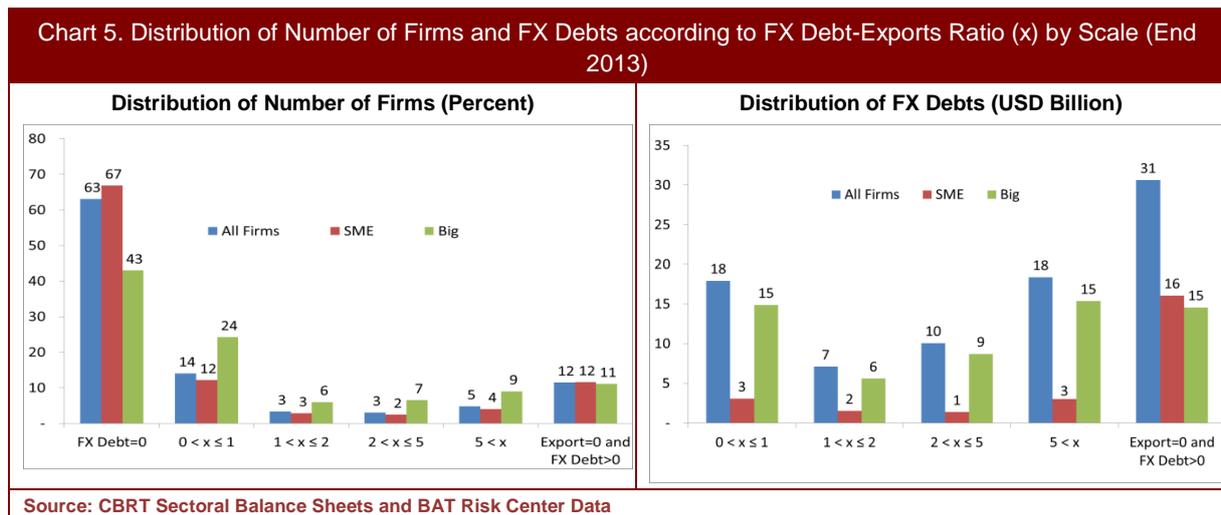
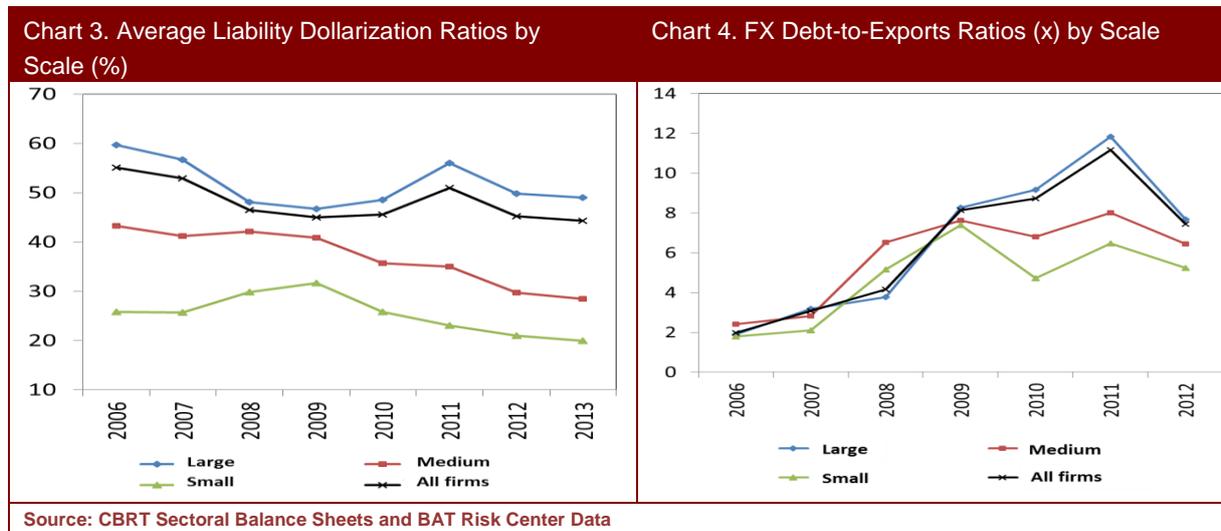
On the other hand, FX-denominated debt to export ratios by scales showed a rise in the period of 2006-2009. Taking the average of all firms reveals that FX-denominated debts were two times of exports in 2006, but this rate showed an increase and reached eight folds in

million in 2012 are classified as small scale, those having net sales from Euro 10 million to Euro 50 million are medium size, while those having net sales above Euro 50 million are large scale. According to the asset size criterion, firms with total assets less than Euro 10 million in 2012 are small scale, those with total assets between Euro 10 million and Euro 43 million are medium scale, and firms with total assets larger than Euro 43 million are large scale.

<sup>11</sup> Özmen and Yalçın (2007) suggests that also due to the flexible exchange rate regime enforced after the crisis in 2001, dollarization ratios of firms exposed to the exchange rate risk, particularly the SMEs witnessed sizeable declines.

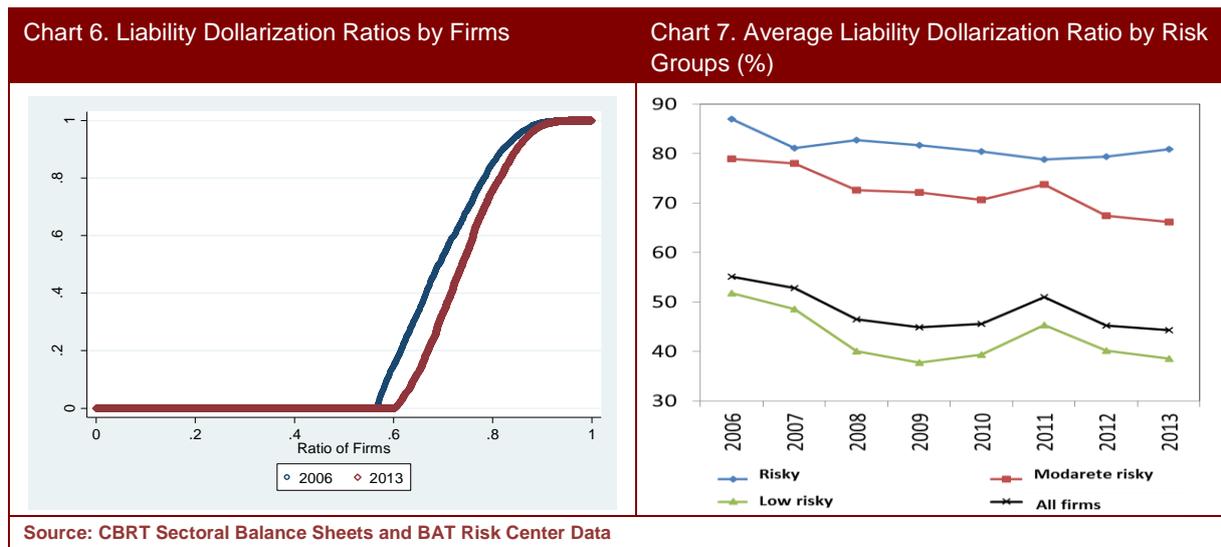
<sup>12</sup> However, as also underlined above, the amendment to the exchange rate regime in 2009 facilitated the firms' access to FX financing. The amendment to Decree No.32 in made in 2009 allowed firms with no FX revenues to borrow FX loans from resident banks provided that the loan is not below USD 5 million and maturity is longer than 1 year.

2012 (Chart 4). This signals some deterioration in the exchange rate riskiness of firms particularly in the period of 2006-2009. Nevertheless, this rate exhibited a flat course for medium and small scale firms after 2009. This finding suggests that following the crisis in 2009, due to various supply and demand-side factors as well, these firms acted more cautiously in taking exchange rate risk compared to the period of 2006-2009.<sup>13</sup> The distribution of firm numbers and FX debts according to FX debt-exports ratios (x) by scale is given in Figure 5. Firms without exports but with FX debts account for 12 percent of all firms in the dataset.

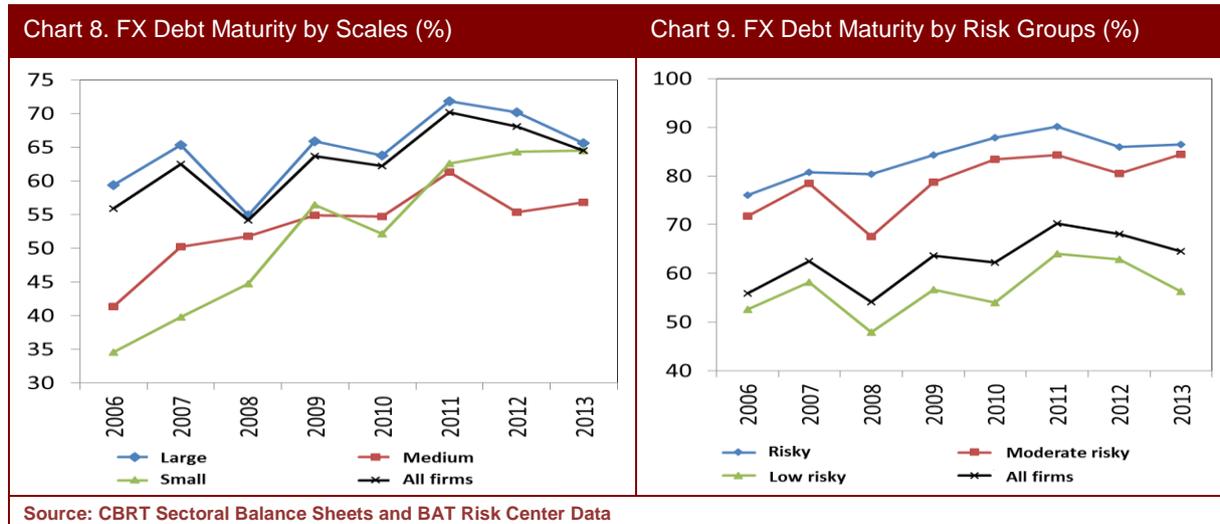


<sup>13</sup> The highest 1 percentile of FX-denominated liability-export ratios is considered as outliers and thus excluded in these figures.

Chart 6 shows firms' liability dollarization ratios for 2006 and 2013. It reveals that in terms of percentage fewer firms had FX debts in 2013 than in 2006 and the number of firms with higher liability dollarization ratios was smaller. Average sales-weighted liability dollarization ratios by risk groups are shown in Chart 7. As anticipated, liability dollarization ratios increase with riskiness. Because of having FX debts, high-risk firms without natural hedge become vulnerable to the depreciation of domestic currency.

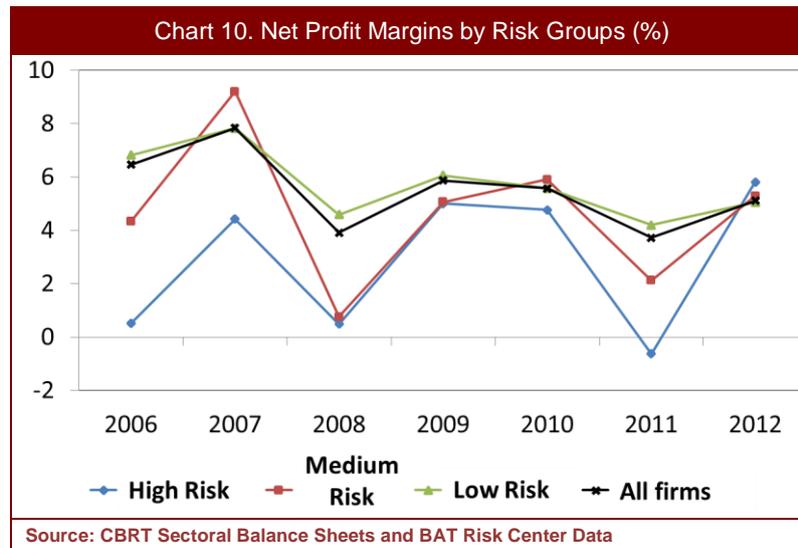


Thirdly, the maturity of the FX debt is often considered as a variable in assessing the currency risk in the related literature. To this end, Chart 8 and Chart 9 show the maturity of the FX debt (long-term FX debt to total FX debt ratio) by firm scale and risk groups, respectively. Accordingly, the share of long-term FX debt (with an original maturity of more than one year) in total FX debt increased in the analyzed period. Although there is a monotonic relationship between firm scale and maturity length at the start of the given period, small-scale firms have been able to borrow more loans with longer maturity in recent years. As a result, the share of long-term FX debt was up 30 points between 2006 and 2013 to 64.5 percent for these firms. This evidence suggests that small-scale firms that are expected to be more financially-fragile are increasingly able to borrow more long-term loans in time, limiting the adverse impact of any short-term exchange rate volatility on these firms.



FX debts are mostly long-term for the firms in high-risk group and the share of their long-term debts is calculated to have increased from 76.1 percent in 2006 to 86.4 percent in 2013. However, the maturity of FX debts is shorter for firms in the low-risk group (Chart 9). These findings show that firms are largely immune to any short-term exchange rate volatility, and thus the negative effects on the FX debt service can be restrained to a great extent. On the other hand, the maturity of FX debts somewhat shortened between 2011 and 2013 due to large firms and low-risk firms. Since this shortening is seen in firms with assumingly less currency risk, it is considered as a factor alleviating concerns. And this is consistent with the increasing prominence of modernization-maintenance investments that could be completed in a shorter period thanks to the slowdown in fixed capital investments (CBRT, 2014).

Despite the decline in the liability dollarization ratio and the increase in the FX debt maturity, firms' profit margins might fall after exchange rate shocks because of the sustained net FX short position of firms. In fact, when the Turkish lira depreciated in 2008 and 2011, the net profit margins of firms susceptible to currency risk (net profit/sales) decreased (Chart 10). One of the reasons behind falling profit margins in times of exchange rate shocks is the rise in financial expenditures. These periods are also marked by rising borrowing costs of domestic currency denominated credit. Therefore, a surge in financial expenditures can be the result of not only an exchange rate shock-driven appreciation of an FX denominated debt service in terms of the domestic currency but also an increase in the costs of domestic currency debts. The profit margins of high-risky firms are calculated to be lower and more volatile than other firm groups.



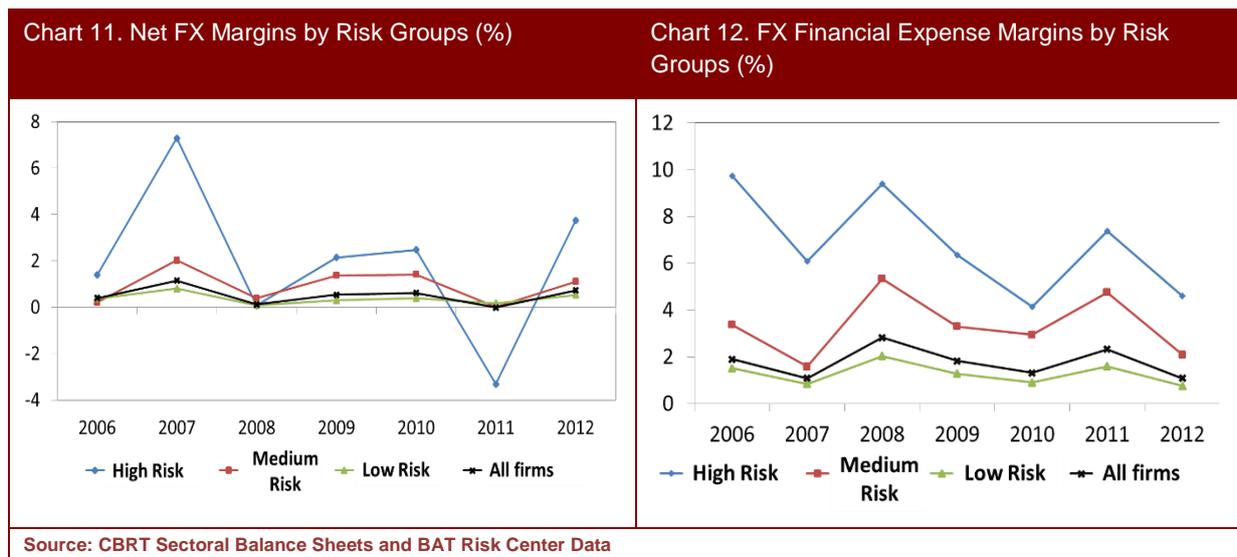
The abovementioned currency risk susceptibility indicators are calculated based on firms' export data. It is important to take into account two major factors that interact in opposite directions in order to evaluate currency risk. Firstly, the export data in the income statements tables of firms do not contain domestic sales priced in FX. This suggests that firms' currency risks may be evaluated higher by the above indicators than what they actually are. For instance, prices of products relying mostly on imported inputs (construction, energy, chemical and oil products) are generally quoted in FX in the domestic market but the accounting of sales might be in domestic currency. Similarly, services such as hotel room, etc. in the upper segments of the tourism industry are frequently quoted in FX but are not booked under export in the financial tables as the balance sheets are quoted in domestic currency. Therefore, depending solely on indicators based on official export data would be misleading in analysing the currency risk of firms producing or selling such products or services. Secondly, the direct use of imported inputs or the widespread use of inputs quoted in FX in the domestic market might cause the above currency risk indicators to misperceive this risk as lower than they actually imply.

To this end, the currency risk analysis has been enriched by generating new currency risk indicators. First of all, we use FX profits and losses from the firm's income statement, which mostly rise from trade credits or debts and revaluation of FX-denominated liabilities and assets. Secondly, we included the financial expenses reflecting costs of both domestic currency debts and FX debts, again from the income statement.<sup>14</sup>

<sup>14</sup> The estimation for the financing expense of the FX debt is obtained by multiplying the total financing expense by the liability dollarization ratio.

Chart 11 shows the course of average sales-weighted net FX margins (net FX profit/gross sales) over time by risk groups. On average, firms made net FX profits during 2006-2012 while the Turkish lira depreciations caused the net FX profits to fall in 2008 and 2011. Although high-risk firms made net FX losses in 2011, which, however, were more than offset by the net FX profits in the remaining years. In fact, on average, FX margins are calculated to be 1.82, 0.97 and 0.39 percent for high-risk, medium-risk and low-risk firms, respectively, during 2006-2012. Accordingly, average FX margins seem to be higher in high-risk firms than other risk groups despite the exchange rate volatility during the analyzed period.

Chart 12, on the other hand, shows the course of average sales-weighted FX financial expense margins (debt dollarization ratio\*financial expenses/gross sales) on the basis of risk groups over the period. Seemingly, financial expense margins increase with firm riskiness. For instance, the FX financial expense margins of high-risk firms are measured to be 5.3 points higher than low-risk firms based on periodic averages. Yet, the FX financial expense margins of high-risk firms have declined dramatically in recent years. For instance, the average FX financial expense margins of high-risk firms went down from 9.7 percent in 2006 to 4.6 percent in 2012. Although the financial expense margins of high-risk and medium-risk firms are high, the contribution to average financial expense margins from all firms is found to be minimal (0.5 points). The fall in financial expense margins despite rising debt ratios of high-risk firms in this period indicates that cheaper financial sources became increasingly more available, which is a positive development regarding the riskiness of firms.

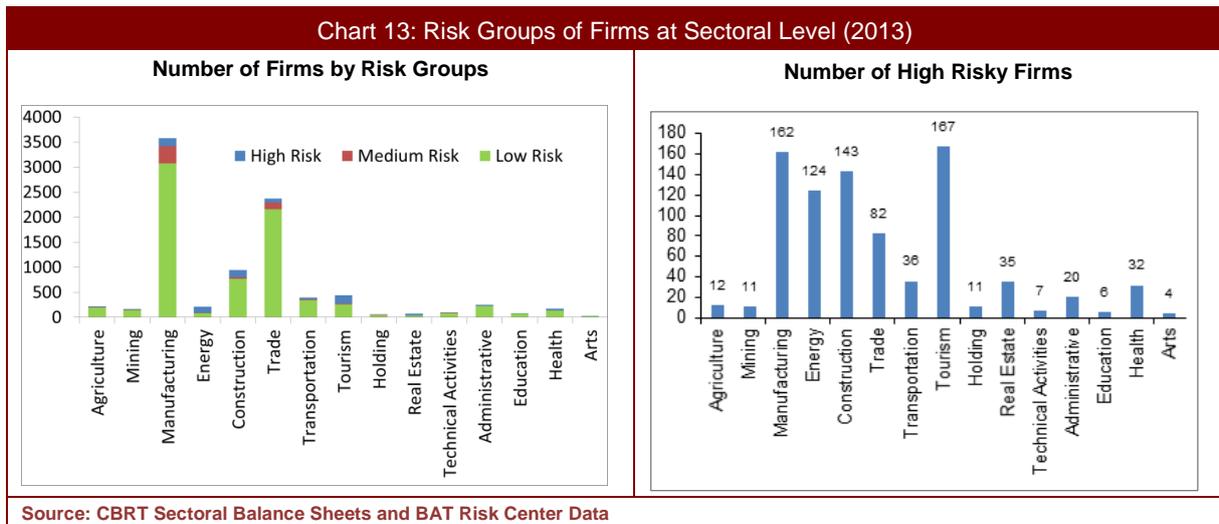


In our estimations, it is found that firms with high FX debt and therefore large FX financial expenses make more net FX profits as a result of the appreciation of domestic currency. In

fact, there is a positive correlation between the dollarization rate weighted financial expenses and net FX profits (0.29). This correlation is notably higher in high-risk firms (0.89). These findings suggest that high-risk firms were inclined toward balancing off their FX debt related financial expenses by possessing FX assets and making exchange rate-driven net FX profits through purchases of goods and services. This view is also supported by the information that 53.8 percent of high-risk firms in 2013 had net FX profits which were higher than the half of their financial expenses. However, normally deemed positive, this mechanism is considered to be ineffective in times of significant exchange rate depreciations. In fact, during the exchange rate shocks of 2008 and 2011, the net FX profits of high-risk firms dropped markedly while their financial expenses increased, thus worsening their profitability.

### 3.2. Currency Risk Assessments at Sectoral Level

The number of firms by risk groups and sectors are shown in Chart 13. Accordingly, high-risk firms operate mostly in tourism, manufacturing, energy, construction and trade sectors. At the sectoral level, net FX profits of sectors with high FX debts appear to be higher, too (Chart 14). Prices in the energy sector are quoted on a par with international energy prices, and therefore the currency risk is closely related to the price adjustments in the sector. For instance, natural gas distributors basically determine prices in accordance with exchange rate movements and thus the currency risk is largely contained. However, there are also products and services whose prices are administered by the government and therefore exchange rate movements are not automatically reflected in this sector. Meanwhile, in the construction sector, prices of raw materials are mostly quoted in FX, which causes final prices to be linked to FX to a certain degree. Moreover, as large construction firms operate with partners and affiliates abroad, which are usually financed by the headquarters, but cannot integrate their international revenues into their local balance sheets because of their separate legal status, their currency risk might be lower than it actually is. Likewise, the rise in tourism revenues and the common FX-denomination of prices, particularly in hotels, are considered to have restricted the currency risk attributed to the tourism activity. On the other hand, many exporters with net FX short position often consider their final goods and raw materials inventories as collateral to their currency risks (CBRT, 2014).



For a detailed analysis of the currency risk of firms, in addition to the above risk groups, the ratio of net FX profits to the FX debt-weighted financial expenses (the coverage ratio) has been calculated. A lower ratio indicates that firms might be subject to some FX debt-driven fragility. Accordingly, the average of the coverage ratio in high-risk firms is higher than 50 percent while it exceeds this average for firms operating in sectors such as energy, transport, professional activity, tourism, healthcare and culture (Chart 15). In this context, high-risky firms whose coverage ratios below 50 percent have been analyzed more in detail. Based on the data from balance sheets of 2012, there are 396 firms in total that can be classified under the “highest-risk group” in 2013, most of which are operating in manufacturing (80), tourism (74), construction (68), trade (49) and energy (40). The coverage ratios calculated for the highest-risk firms support the analysis above. In other words, there is a positive correlation between the dollarization ratios of firms and their coverage ratios. Looking at the highest-risk firms, these results imply that firms tend to avoid the currency risk at sectoral level, too.

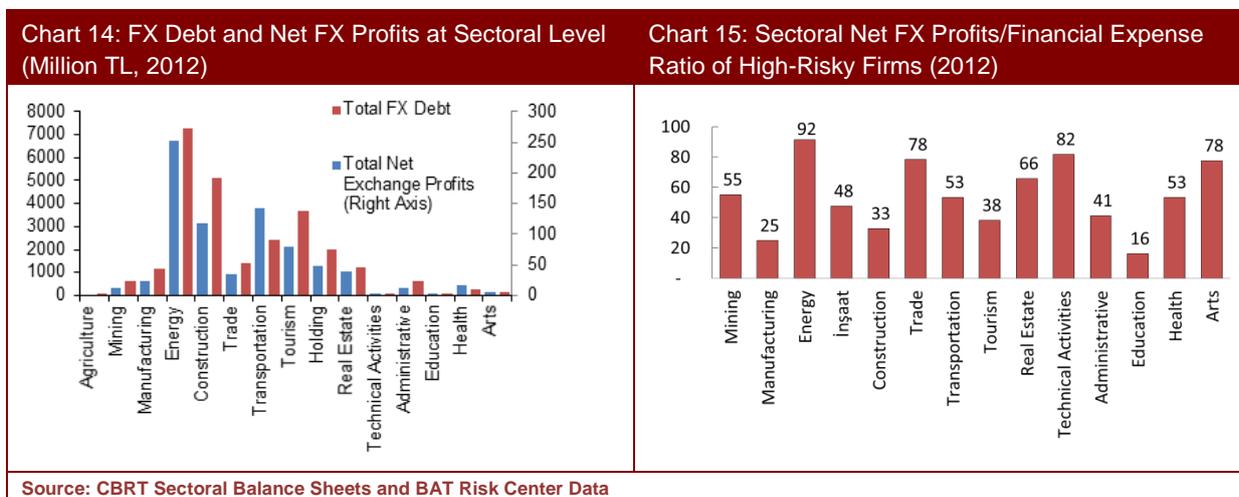
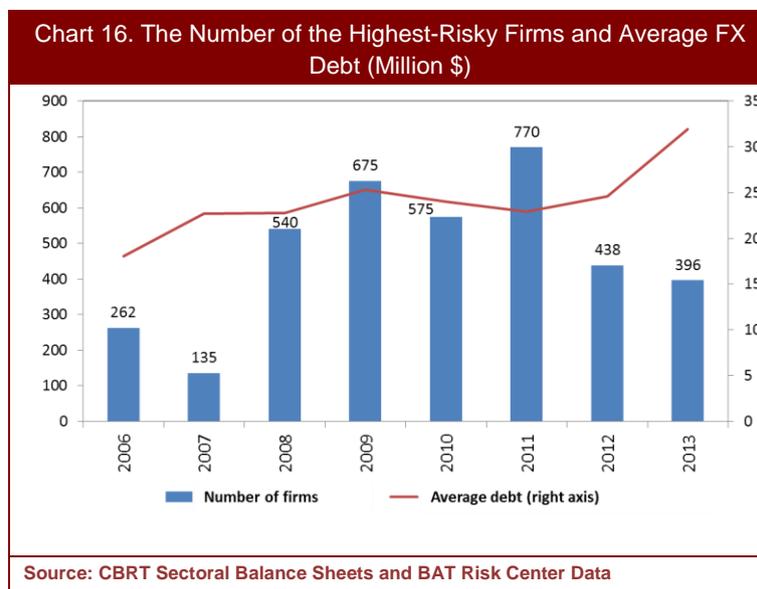


Table 4 shows average figures for the total asset-weighted average current, cash and profitability ratios of highest-risk firms and FX debt amounts. Accordingly, the liquidity ratios of highest-risk firms seem close to those of low-risk firms. However, the profitability ratio of this group is lower than in other groups. Moreover, the average FX debt is 31.9 million USD for highest-risk firms, almost all of which is long-term.

Chart 16 shows the number of highest-risk firms and the course of their average FX debt in time. In line with the Turkish lira depreciation in 2009 and 2011, an increasing number of firms shifted toward the highest-risk group in 2009 and 2011, but despite the exchange rate rise depreciation in 2013, the number of highest-risk firms decreased. Meanwhile, their average FX debt increased notably in 2013.

	Current Ratio (2012)	Cash Ratio (2012)	Asset Profitability (% , 2012)	FX Debt (Arithmetic mean, 2013, Million \$)
Highest-risky	3.33	1.24	2.04	31.9
High-risky	2.68	0.89	3.30	30.7
Medium-risky	1.92	0.54	3.79	38.5
Low-risky	3.62	1.48	4.27	6.5

Source: CBRT Sectoral Balance Sheets and BAT Risk Center Data



#### 4. Conclusion and Assessments

In this study, by using a firm level dataset of non-financial firms in Turkey, we show that 87 percent of firms in the dataset either do not borrow in FX or are naturally hedged with export revenues. However, firms without or limited export revenues borrow significantly in FX, which constitute to one third of the total FX debt of all firms in the dataset. From the first impression, these firms are vulnerable to currency risk. However, a closer look at the data reveals that firms in this so-called 'high-risk' group and with high FX debt obtain a higher average net FX profits than other firms. We find that high-risk firms with a lower net FX profits-to-FX financial expenses ratio are more inclined towards holding cash. Moreover, at the sectoral level, most of the sectors with relatively higher debt dollarization ratios seem to have activities not classified as exports but generating revenues through FX-linked pricing in the domestic market. As evidenced by the current dataset, the currency risk of non-financial firms in Turkey might be lower than what macro aggregates imply.

The findings above show that the currency risk of non-financial firms can be better estimated through a firm-level analysis. For instance, firms take into consideration the position of their owners when they assess their currency risks. In addition, firms tend to take into account not only the current period but also the period ahead with regard to their currency risks. In fact, although firms with a net FX short position made losses in recent years when the Turkish lira depreciated significantly, they made profits out of exchange rate movements in the long run. Thus, we believe that negative effects of exchange rate level changes or its volatility are more pronounced on investment and production decisions of firms rather than on their balance sheets.

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