

# The Impact of Derivatives on Financial Stability in Turkish Economy Evidence from the Istanbul Stock Exchange and TurkDEX

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## Abstract

This paper presents empirical evidence from the Turkish capital market by investigating the risk perception of the companies, their risk management policies and discusses the impact of derivatives on the financial stability in Turkish economy. It focuses on non-financial companies that play a vital role in foreign trade operations and have close relations with the banking industry. The results show that most of the companies give priority to currency risk, followed by commodity price risk. Surprisingly, they do not pay much attention to interest rate risk. There is also a close relationship between firm size and derivatives usage; large firms tend to use derivatives more. Furthermore, the analysis reveals that the exchange rate exposure is positively correlated with the firm leverage. Although the firms know Turkish Derivatives Exchange (TurkDEX) and are aware of derivative products, most of them are reluctant to use them because of the lack of education and experience, besides high transaction costs and volatile market conditions.

**Keywords:** financial stability, derivatives usage, risk management, non-financial firms, TurkDEX

**JEL Classifications:** E44, G3, G15.

## I. Introduction

The innovation in the financial markets can alter the stability of the economy and institutions and modify risks effectively run. Due to recent developments in the markets for financial derivatives, there are now risk management techniques and instruments available for the companies to deal with their risks very efficiently. In this respect, the growth in derivatives activity over the past thirty years has yielded substantial benefits to public and private institutions using these financial tools to hedge, speculate and in other ways modify the distribution of cash flows from operations significantly, at relatively low costs.

The derivatives today are an integral part of the corporate risk management system among the world's leading companies. Across geographic regions and industry sectors, the vast majority of the corporations rely on derivatives to hedge a range of risks to which they are exposed in the normal course of business. According to a survey held by the International Swaps and Derivatives Association (ISDA)<sup>1</sup> in 2003, 92 % of the world's 500 largest companies use derivatives to help managing their risks. Of the companies using derivatives, 92 % use them to manage interest rate risk, 85 % to manage currency risk, 25 % to manage commodity risk and 12 % to manage equity price risk. Nearly all of them aim to adjust the currency and interest rate sensitivity of corporate cash flows. This, in turn, implies that the dynamic development of derivatives markets is likely to have a potentially important impact on those channels of monetary policy transmission (Fehler, 2000).

The importance of derivative use by non-financial companies over the past decade has been shown in many studies<sup>2</sup>. Most of the survey results reveal that, while the percentage of firms using derivatives may not have changed between 1996 and 2005, there is a clear evidence that usage intensity by the firms has increased. Therefore, it is not surprising that a number of studies have been conducted to examine the use of derivatives by non-financial companies (focus of this paper). However, due to the lack of reported data on firms' use of derivatives, especially on non-financial firms, empirical research in this area has been limited to survey data.

This paper takes advantage of the availability of survey data on derivatives usage by non-financial Turkish companies to explore a number of issues. It contributes to the literature by providing empirical evidence on the relation between derivatives usage and Turkish non-financial firms listed in the Istanbul Stock Exchange as the large scaled Turkish companies are expected to be one of the main users of currency and interest rate contracts to hedge their risks. We first analyse the risk perception of non-financial companies and their risk management policies. We then explore the reasons of the companies for not using the Turkish Derivatives Exchange (TurkDEX) and derivative products. The remainder of the study is organized as follows. Section 2 provides information about the literature studies. Section 3 describes the data and the methodology. In Section 4, we discuss our empirical findings. The last Section concludes the study.

## II. Literature Review

Generally speaking, the literature suggests that firms with greater risk exposure use derivatives relatively more, confirming derivatives as an instrument in firms' hedging strategies. However, many of the past studies have used survey data, where continuous measures of derivatives usage were not available. Moreover, they found that firms have a greater chance of using derivatives if they have more growth opportunities. The following studies are worth to be mentioned.

Yanagida and Inui (1996) examined the derivatives usage among 2065 non-financial companies listed on Japanese securities market and discovered that the larger the company, the greater was the use of derivatives and the more varied the types used. The main aim of using derivatives market in this market was to avoid FX exposure, reduce financing costs and hedge cash flow risks.

Geczy, Minton and Schrand (1997) in their study find that firms with greater growth opportunities and tighter financial constraints are more likely to use derivatives to hedge cash flow variation.

Guay (1997) examined the role of derivative securities in a sample of firms that begins using derivatives and found that firms use derivatives for hedging purposes and the firm risk declines in the first year of derivatives use. The realized risk reduction varies across firms as a function of the expected benefits from hedging and the characteristics of the derivative position held.

Goldberg and Trites (1998) analyzed firm characteristics associated with adoption and then level of financial derivatives usage for US non-financial firms and found that they are positively

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<sup>1</sup> ISDA is the global trade association representing leading participants in the privately negotiated derivatives industry.

<sup>2</sup> Bodnar and Marston (1996), Bodnar, Hayt and Marston (1998), Hagelin and Alkeback (1999), Judge (2002), Bartram, Brown and Fehle (2004), Muller and Verschoor (2005).

associated with multi-nationality, variance of accounting return on assets and growth opportunities. Specifically, the interest-rate derivatives usage is also positively associated with debt levels.

Hagelin and Alkeback (1999) provided survey evidence on the use of derivatives among Swedish non-financial companies and found that the usage of derivatives was more common among larger than among smaller firms and the lack of knowledge about derivatives within the firm was the issue of most concern for financial directors.

Jalilvand, Switzer and Tang (2000) reported a survey of leading, non-financial Canadian firms and find that although most Canadian and European companies have written risk management policies, they are not integrated with financial/operating plans, contrary to the behaviour of the US risk managers.

Loderer and Pichler (2000) surveyed the currency risk management of Swiss industrial corporations and find that industrials do not quantify their currency risk exposure and use on-balance-sheet instruments to protect themselves before and after currency rates reach troublesome levels.

Mallin, Ow-Yong and Reynolds (2001) presented the results of a 1997 survey of derivatives used by 231 UK non-financial companies. They showed that derivatives usage to hedge financial price risk is well established among larger UK companies and supports the size effect phenomenon in other empirical studies. The study also revealed that the predominant issues of concern to UK financial directors are the lack of evaluation of risk of proposed derivative transactions and the level of transaction costs incurred.

Bodnar, Jong and Macrae (2002) examined the corporate risk management practices in the US and the Netherlands and find that institutional differences appear to have an important impact on risk management practices and derivatives used across the US and Dutch firms.

Janulka and Sam Nait (2003) investigated the foreign exchange risk management in Lithuanian companies and found that the wider use of derivatives is hindered by relatively high costs, lack of managers' knowledge, mistrust in banks and complicated accounting procedures.

Bartram, Brown and Fehle (2004) in their study present international evidence on the use of financial derivatives for a sample of 7319 non-financial firms from 50 countries and find that firm-specific factors associated with derivatives use are very similar across different countries. The size of the derivatives market in local currency and the level of risk in a firm's home country are the most important country-specific factors determining derivative usage. Finally, derivatives use is associated with higher firm value.

Muller and Verschoor (2005) investigating the foreign exchange risk practices of European companies find that, large firms benefit from the diversification of their foreign operations and are to a greater extent capable of implementing operational hedging strategies through derivatives. Further, they show that European firms mainly use foreign currency derivatives to hedge and not to speculate.

El-Masry (2006) focused on determining the reasons for using or not using derivatives for 401 UK non-financial companies and observed that larger firms are more likely to use derivatives than medium and smaller firms and derivatives usage is greatest among international firms. The results of the study also revealed that half of the firms do not use the derivative instruments because their exposure are not significant and costs of establishing and maintaining derivatives programmes exceed the expected benefits. The most important reason for using derivatives is hedging (managing) the volatility in cash flows.

Beside these studies mentioned above, there are also many studies discussing the risks arising out of the derivatives and their potential effect on the stability of the economy (Rapp, 1999; Bliss and Kaufman 2005). They offer a number of protections on the size and structure of the derivatives market that would lead to reduced systemic risk for the financial and non-financial institutions operating in both private and public sector.

Table 1 gives the summary of the survey results held by different academicians in derivatives usage for developed and emerging markets. It also provides international evidence on derivatives usage by giving the findings of major studies covering more 20 countries<sup>3</sup>.

**Table 1:** Derivatives Usage in the Developed and Emerging Markets

### Developed Markets

Country	Subject	References	Empirical Findings
U.S.	Non-financial firms	Goldberg and Tritschler (1998)	Derivatives usage is positively associated with multinationality, variance of accounting return on assets and growth opportunities. Specifically, the interest-rate derivatives usage is also positively associated with debt levels.
U.S.	Non-financial firms (425 large US corp)	Hentschel and Kothari (2001)	Many firms manage their exposures with large derivatives positions, but they display few measurable differences in risk compared to firms that do not use financial derivatives.
U.K.	Non-financial firms	Mallin, Ow-Yong and Reynolds (2001)	Derivatives usage to hedge financial price risk is well established among larger UK companies and supports the size effect phenomenon in other empirical studies.
U.K.	Non-financial firms	El-Masry (2006)	Larger firms are more likely to use derivatives than medium and smaller firms and derivatives usage is greatest among international firms. The results of the study also revealed that half of the firms do not use the derivative instruments because their exposure are not significant and costs of establishing and maintaining derivatives programmes exceed the expected benefits.
Germany	Non-financial firms	Bodnar&Gebhardt (1998)	FX derivatives usage is the most common followed closely by interest rate derivatives
Australia	Non-financial firms	Batten and Hettihewa (2003)	Larger and more internationally exposed firms are likely to have more frequent reporting of derivatives use, and are more likely to use swaps and options to manage risks than other types of firms.
Japan	Non-financial firms	Yanagida and Inui (1996)	The larger the company, the greater was the use of derivatives and the more varied the types used. The main aim of using derivatives in this market was to avoid FX exposure, reduce financing costs and hedge cash flow risks.
Norway	Non-financial firms	Borsum and Odegaard (2005)	Derivatives are the most common form of currency hedging. Derivatives usage is higher among larger companies. Companies with net income in FX use currency derivatives to a greater extent, whereas companies with net expenses in FX use currency contracts to a lesser extent
Sweden	Non-financial firms	Hagelin and Alkeback (1999)	The usage of derivatives was more common among larger than among smaller firms and the lack of knowledge about derivatives within the firm was the issue of most concern for financial directors.
Canada	Non-financial firms	Jalilvand, Switzer and Tang (2000)	Most Canadian and European companies have written risk management policies, and are not integrated with financial/operating plans, contrary to the behaviour of the US risk managers.
Switzerland	Non-financial firms	Loderer and Pichler (2000)	Swiss industrial corporations do not quantify their currency risk exposure and use on-balance-sheet instruments to protect themselves before and after currency rates reach troublesome levels.
Netherland	Non-financial firms	Bodnar, Jong and Macrae (2002)	Institutional differences appear to have an important impact on risk management practices and derivatives use across the US and Dutch firms.

<sup>3</sup> As the aim of this study is to cover the derivatives usage in non-financial firms, we do not include the academic studies held on the derivatives usage of banks in different countries into Table 1.

### Emerging Markets

Country	Subject	References	Empirical Findings
Estonia	Non-financial companies (200 firms)	Juhkam (2003)	The foreign exchange (ER) and interest rate (IR) risk was hedged only from time to time and selectively. Thus, ER and IR hedging is mostly speculative and profit-oriented.
Lithuania	Non-financial companies (28 firms)	Jonuska and Samenaite (2003)	Currency derivatives are not popular among exporting firms, despite their considerable currency exposure. Using FX derivatives is too costly and this is the most important reason for not using them.
Taiwan	Non-financial firms (285 listed companies)	Shu and Hsuan (2003)	Interest rate derivatives is the most commonly used instruments followed closely by currency derivatives. Most of the derivatives transactions take place in the organized exchanges. They are mainly used for hedging.
Slovenia	Non-financial firms (257 companies)	Berk (2005)	Slovenian firms consider currency risk as the most relevant, followed by interest rate risk, with commodity price risk having low relevance. FX relevance rises significantly with the size and share of foreign sales, but not significantly with leverage.
Turkey	Non-financial firms (118 listed companies)	Gungor, Yilmaz & Yilmaz (2006)	Turkish firms use mostly over the counter derivatives instruments, especially for hedging currency risk. The usage increases with the size of the company.

### International Evidence

Country	Subject	References	Empirical Findings
50 countries	Non-financial companies (7319 firms)	Bartram, Brown & Fehle (2004)	Firms operating in less developed countries with less liquid derivatives markets, are less likely to hedge. The size of derivatives market in local currency and the level of risk in a firm's home country are the most important country-specific factors determining derivatives usage.
European countries	Non-financial companies (471 European multinationals)	Muller and Verschoor (2005)	Large firms benefit from the diversification of their foreign operations and are to a greater extent capable of implementing operational hedging strategies through derivatives. European firms mainly use foreign currency derivatives to hedge and not to speculate.
ISDA survey	Non-financial companies (500 largest companies)	2003 Survey	92 % of the world's largest 500 companies use derivatives to hedge their risks, especially by employing interest rate and currency derivatives.

### III. Data and Methodology

In this study, we used the findings of two surveys held separately by the Capital Market Board and TurkDEX (jointly with RiskActive) to measure the risk awareness and perception of non-financial companies for the derivative instruments in the Turkish market.

The Turkish Capital Market Board (CMB) conducted a questionnaire survey in March 2005, covering 225 industrial and service sector companies operating in the Istanbul Stock Exchange (ISE). *Financial* companies (banks, brokerage houses, leasing companies, insurance firms and investment trusts) are excluded from the study. The survey consists of 17 questions. The participation to the survey was voluntary. Out of 225 companies, 118 firms participated to the survey, representing a 52.4 % participation ratio.

Among the 17 questions of the survey, a number of definitive questions are asked to assess the following issues concerning the risk structure of the companies listed on the Istanbul Stock Exchange.

- The ratio of the difference between the foreign currency (FX) assets and liabilities (open position) in the total assets.
- The ratio of the revenues in terms of foreign currency in the total sales.
- The ratio of the costs in terms of foreign currency in the total assets.

- The ratio of liabilities responsive to the changes in interest rates (IR) (after netted with the same type of assets) to total assets, separately for short and long term.

For interpreting the results of the survey properly, we also calculated a number of ratios for the participating companies to measure the effect of leverage (total debt to total assets), the share of exports (export sale to total sales) on the FX exposure of the firms (open position to total assets), similar to the methodology used by Muller and Verschoor (2005) and Gonenc, Buyukkara and Koyuncu (2005). The data is obtained from the ISE website. The ISE publishes financial statements of the firms with their footnotes. The firm level data regarding the level of export sale to total sales ratio and balance sheet foreign currency exposure by the year-end 2005 are gathered from the footnote 36 and 29, respectively. Unfortunately, there is no standardization on reporting of foreign currency positions in the ISE companies.

On the other side, the TurkDEX and RiskActive<sup>4</sup> conducted a questionnaire survey in March 2006, covering 450 Turkish firms to assess their general risk perception and awareness of derivative products and TurkDEX. The survey consists of 17 questions. The participation to the survey was voluntary. Out of 450 companies, 100 firms participated to the survey, representing a 22.2 % participation ratio. The relatively low participation ratio is particularly same with surveys held in some other countries<sup>5</sup>. While 24 of the responding firms are financial institutions, 76 of them are non-financial companies<sup>6</sup>. Among the 17 questions, a number of definitive questions are asked to assess the risk structure of the companies; i) The ratio of exports in total sales, ii) the ratio of imports in total purchases.

Most of the findings of the surveys are presented in tabular form in the next section so as to comment on them properly. As with other survey researches, however, a major limitation for both surveys is that responses might represent personnel opinions. We can not verify whether the opinions coincide with the actions.

## IV. Empirical Findings

### 4.1. An Overview of the Derivative Transactions in Turkish Financial Market

Although there has been derivative transactions in Turkish financial markets for years, the first organized derivatives Exchange, Turkish Derivatives Exchange (TurkDEX), begins operating in Izmir on February 4, 2005. The TurkDEX provides risk management tools for the Turkish economic agents in terms of currency (EURO and US Dollars), interest rate (Turkish Government bonds for 91 and 365 days, benchmark bonds), stock index (ISE 30 and 100 Indices) and commodity (gold, cotton and wheat) via futures contracts<sup>7</sup>. Table 2 shows the open interest, number of contracts and trading volumes in these contracts for the year-end 2005 and for the period of January-May 2006. The trading volume is almost TRY 3 billion by the end of year 2005 and shows a considerable increase in the first half of 2006.

As one may notice from Table 2, the most popular derivative contract of TurkDEX in 2005 was *currency futures* (90 % of the open interest and 76 % of the trading volume) followed by the *stock index futures* with a share of 22.5 %. However, this picture is reversed in the first half of the year 2006 (January-May) and the *stock index futures* contracts began to dominate the market with a share of 59 % compared to the *currency futures* (40 %). Trading in *interest rate futures* and *commodity futures* is relatively low. These facts may be interpreted that the financial and non-financial companies in the market mostly carry currency risk in their operations and they are not subject to high-level interest rate or commodity risk.

<sup>4</sup> RiskActive is a private company that provides risk management services to the firms.

<sup>5</sup> The participation ratio to the survey was 22 % in Slovenia, 35 % in Estonia, 37 % in Norway

<sup>6</sup> We excluded the financial firms from the analysis similar to the methodology used for CMB survey.

<sup>7</sup> Initially, the market started with trading in only futures contracts, but the trading of options is on the agenda for the following years.

**Table 2:** The Open Interest and the Trading Volume in TurkDEX Contracts

Type of Product	Open Interest	Volume (2005)(# of contracts)	Trading (2005) Volume (TRY)	Open Interest**	Trading (2006) Volume (TRY)**
<i>Currency Futures</i>	134,063	1,603,797	2,240,018,049	57,032	1,667,618,657
<i>Interest Rate Futures</i>	200	2,184	19,945,793	307	41,701,450
<i>Stock Index Futures</i>	5,890	164,931	658,743,565	22,873	2,466,559,712
<i>Commodity Futures*</i>	6	396	771,525	107	2,530,909
<b>Total</b>	<b>140,159</b>	<b>1,771,308</b>	<b>2,919,478,932</b>	<b>80,319</b>	<b>4,178,410,728</b>

\* The trading of gold futures contracts began by the beginning of March 2006.

\*\* As of May 31<sup>st</sup>, 2006

Source: TurkDEX

Here, one should note that there has been also an over-the-counter (OTC) derivatives market trading in Turkey. Banks provide forward or swap contracts to their customers or even trade them among themselves. The notional value of the derivative transactions held by the banking industry amounted to TRY 65.8 billion by the end of the year 2005<sup>8</sup>. This figure represents a 69.2 % increase in OTC derivative transactions through the banking industry, compared to the year-end figure of 2004. Although we do not know the details for these transactions, especially whether they have been executed with the bank customers or among banks themselves, the maturity structure of the transactions gives important clues for the non-financial firms' usage of derivative instruments.

When we refer to the composition of derivative financial instruments in Turkish Banking Industry, the *currency swaps* have the highest trading volume and share (49.2 %) within the total, followed by the *forward FX contracts* having a share of 22.1 %. The picture is striking as it shows that OTC foreign currency derivatives dominate the hedging transactions in the Turkish Banking Industry, whether the counterparties are the financial institutions or non-financial companies.

The Banking Regulation and Supervision Agency (BRSA) supervise currency exposure of the banks in Turkey very strictly, while there is no exact number for the currency exposure of non-financial firms. Banks are able to hedge their open position through off-balance sheet positions. The president of the BRSA declared that there is a negative USD 7.3 billion balance sheet exposure together with a positive USD 6.4 billion off-balance sheet (hedged) position in Turkish Banking industry as of May 12, 2006. This means that the banks carry only USD 950 million open position in the market<sup>9</sup>. Recently, the president of the CMB declared the currency exposure of the companies traded in the ISE as USD 9.1 billion<sup>10</sup>. Thus, we may say that overall the total currency exposure of the Turkish financial system reached to USD 16 billion, excluding off-balance sheet positions held by the banks.

The maturity structure of the derivative transactions that have considerable effect on the liquidity of the banking industry also provides important insights for the judgement of the non-financial firms' derivative usage. Other than *interest rate swaps*, the maturity structure of the remaining derivative transactions concentrate on maturities of *up to 1 month* (49 %) and *between 1-3 months* (22 %). In other words, they are executed on short-term maturities. Table 3 gives the maturity structure of derivative transactions held in Turkish Banking Industry by the end-of-the year 2005. The picture is not different from the year-end of 2004. This is critical for the non-financial companies, as the latter make most of their hedging transactions with local banks. Thus, this figure leads strong support to the fact that non-financial companies in Turkey behave short sight oriented in their risk management policies. This may stem from the fact that their currency risk is short-term sided. The only exemption for the maturity is the *interest rate swaps* at which derivative contracts having a maturity of more than 12 months are traded in the market. However, the share of *interest rate swaps* within the total derivative transactions is quite low (1.8 %).

<sup>8</sup> Turkish Banking Regulation and Supervision Agency, <<http://www.bddk.org.tr/>>

<sup>9</sup> Referans Newsletter, May 31st, 2006, by Erdal Sağlam

<sup>10</sup> Referans Newsletter, April 25th, 2006, by Kenan Sanli

**Table 3:** The Maturity Structure of Financial Derivative Transactions in Turkish Banking Industry (as of the year-end 2005)

<b>Financial Derivative Instruments Transactions</b>	<b>Up to1 Month</b>	<b>Between1-3 Months</b>	<b>Between3-6 Months</b>	<b>Between 6-12 Months</b>	<b>More than 12 Months</b>
Forward FX Purchase	4.265	1.006	660	866	26
Forward FX Sale	4.284	1.020	665	897	15
Currency Swap Purchase	7.998	3.747	1.180	1.373	1.764
Currency Swap Sale	7.913	3.851	1.152	1.447	2.090
Interest Rate Swap Purchase	3	8	36	149	1.002
Interest Rate Swap Sale	3	8	36	150	1.008
Other Purchases	3.435	1.851	1.535	115	98
Other Sales	4.540	3.096	1.867	585	86
<b>Total</b>	<b>32.441</b>	<b>14.587</b>	<b>7.131</b>	<b>5.582</b>	<b>6.089</b>
<b>Total (%)</b>	<b>0,4928</b>	<b>0,2216</b>	<b>0,1083</b>	<b>0,0848</b>	<b>0,0925</b>

Source: Banking Regulation and Supervision Agency (BRSA), December 2005 Monthly Bulletin.

Overall, the figures derived from the TurkDEX and BRSA reveal that the non-financial companies in Turkey mostly use *currency derivatives* to hedge their risks, which are mostly concentrated in the short-term. They, therefore, have to recycle or roll over their hedge positions in the long run. This finding may be important prior to evaluating the results of our empirical analysis.

#### 4.2. Capital Market Board Survey Results

The CMB survey results provide important evidence for the ISE listed companies' current risk structure and risk management policies. Before sharing the empirical results, it would be beneficial to look at the market capitalization and industry classification of the participating companies to the survey. While Table 4 depicts the distribution of the companies according to their market capitalization level, Table 5 gives the industrial classification for the sample. Most of the responding firms are within the range of TRY 100-500 million. Large firms having a market capitalization over TRY 100 million account to 61.85 %. This is important for the interpretation of the survey findings as more than half of the participating firms have representative feature for the large firm market behaviour.

**Table 4:** Market Capitalization of Participating Companies

<b>Market Capitalization</b>	<b>No. of Firms</b>	<b>Percentage (%)</b>
Below TRY 20 million	9	7.62
Between TRY 20-50 million	15	12.71
Between TRY 50-100 million	21	17.79
Between TRY 100-500 million	47	39.83
Above TRY 500 million	26	22.02

The participating firms have representative nature for the industries in which they operate. The representativeness ratio varies from one industry to another. Table 5 gives the industry classification of the ISE non-financial companies. The sample representativeness ratio is 45 % for the ISE-100 Index and 53 % for both the ISE Industrial and ISE Services Index.



**Table 5:** Industry Classification of Participating ISE Companies

Classification	No. of Companies	Representativeness Ratio
<b>Manufacturing Industry</b>		
<i>Food, Beverage and Tobacco</i>	12	0.50
<i>Textile, Wearing Apparel</i>	14	0.45
<i>Wood Products and Paper</i>	7	0.44
<i>Chemical</i>	12	0.52
<i>Non-Metallic Mineral Products</i>	11	0.44
<i>Basic Metal Industries</i>	8	0.62
<i>Fabricated Metal Products.</i>	18	0.72
<b>Services Industry</b>		
<i>Electricity</i>	1	0.25
<i>Transportation</i>	3	0.75
<i>Tourism</i>	1	0.20
<i>Wholesale and Retail Trade</i>	6	0.60
<i>Telecommunication</i>	1	1.00
<i>Sports</i>	2	0.50

The first risk assessed by the survey was the foreign currency risk. The derivatives play a vital role in managing foreign currency risks of the firms. The management of the balance sheet items (assets and liabilities) and the *sales revenues - production costs* associated from the operations of the company are the main determinants of the foreign currency risks. The proper management of these items directly affects the profitability and the long-term financial soundness of the entity.

In that context, to measure the currency risks of the firms, three different tools (one of them related with the balance sheet to measure the *stock risk* and two of them related with the income statements to measure the *flow risks*) were used. These are namely;

- 1) The *ratio of the difference* between the foreign currency (FX) assets and liabilities (open position) in the total assets
- 2) The *revenues* in terms of foreign currency
- 3) The *costs* in terms of foreign currency

The results are summarised in Table 6, 7 and 8 below.

The ratio of the difference between the foreign currency (FX) assets and liabilities in total assets (Table 6) shows that for 55.9 % of the companies, the foreign currency risk in the balance sheet is below 10 % and for 21.18 % of the companies, it is below 20 %. Only 5 companies are at critical position, having foreign currency risk to total assets ratio of 50-75 %. Among these 5 firms, 3 of them have a market capitalization of TRY 100-500 million and one of them over TRY 500 million.

**Table 6:** The Difference Between the Foreign Currency Assets and Liabilities

Group	No. of Firms	Percentage (%)
Below 10 %	66	55.93
Between 10 % and 20 %	25	21.18
Between 20 % and 50 %	22	18.64
Between 50 % and 75 %	5	4.20
Over 75 %	-	-

As to the ratio of the revenues in terms of foreign currency in total sales, out of 118 participants, 33 of them are exposed to currency risk over 50 %, while 25 of them are subject to FX risk within the range of 20-50 % (Table 7). Thus, the companies in the ISE should carefully manage their receivable collection policies. The same fact is also valid for the ratio of the costs in terms of foreign currency in total assets. For this item, 31.35 % of the companies are exposed to currency risk over 50 %, while 26.3 % of the companies to a FX risk of 20-50 % (Table 8). Thus, 60 % of the companies should manage their costs effectively and balance them with their revenues.

**Table 7:** The Revenues in Terms of Foreign Currency

Group	No. of Firms	Percentage (%)
Below 10 %	38	32.20
Between 10 % and 20 %	22	18.64
Between 20 % and 50 %	25	21.19
Between 50 % and 75 %	15	12.71
Over 75 %	18	15.25

**Table 8:** The Costs in Terms of Foreign Currency

Group	No. of Firms	Percentage (%)
Below 10 %	31	26.27
Between 10 % and 20 %	19	16.10
Between 20 % and 50 %	31	26.27
Between 50 % and 75 %	26	22.03
Over 75 %	11	9.32

The second risk that is assessed by the survey was the interest rate risk. The balance between the assets and liabilities of the company, which is responsive to the interest rate change, is crucial. Derivative contracts are useful tools to manage risks arising from the interest rate changes. To assess the interest rate risks of the companies, two questions were designed and directed to the participants to measure the ratio of their liabilities (netted) responsive to the changes in the interest rates both for the short and long-term period.

The netted short-term and long-term liabilities responsive to the changes in the interest rates are not critical for most of the firms and stay at low levels (mostly below 10 %). Critically, only 17.8 % of the companies are subject to the interest rate risk of 20-50 % in the short-term (Table 9-10).

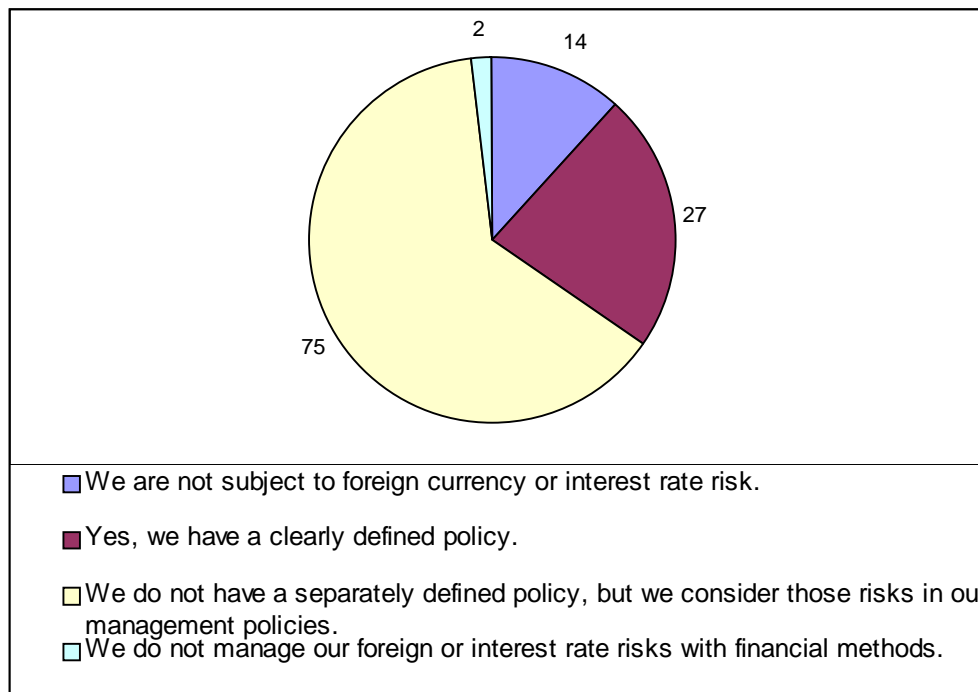
**Table 9:** Short-Term Liabilities Responsive to the Changes in the Interest Rates (Netted)

Group	No. of Firms	Percentage (%)
Below 10 %	81	68.70
Between 10 % and 20 %	16	13.56
Between 20 % and 50 %	21	17.80
Between 50 % and 75 %	-	-
Over 75 %	-	-

**Table 10:** Long-Term Liabilities Responsive to the Changes in the Interest Rates (Netted)

Group	No. of Firms	Percentage (%)
Below 10 %	96	81.36
Between 10 % and 20 %	13	11.02
Between 20 % and 50 %	8	6.78
Between 50 % and 75 %	-	-
Over 75 %	1	0.90

The results about the risk management policies of the companies reveal that 22.9 % of the ISE firms (27 firms) have a clearly defined risk management policy. On the other hand, 63.5 % of the companies (75 firms) do not have a separately defined policy, but consider those risks in their financial management strategies (Chart 1). This fact is similar to the reason found by Loderer and Pichler (2000) for Swiss industrial corporations not using derivatives. Interestingly, in the survey 11.9 % of the companies (14 firms) claim that they are not subject to neither foreign currency nor interest rate risk. Two companies stating that they do not manage their foreign currency and interest rate risk, have in fact moderate level of currency and long-term interest rate risk (between 20 % and 50 %). Therefore, the "No" answers for this question should be interpreted causally.

**Chart 1: Risk Management Policies of the ISE listed Companies**

Referring to the companies answering as “*we are not subject to FX or IR risk*”, it should be pointed out that for 12 of them, the ratio of the difference between the FX assets and liabilities in total assets and the ratio of FX revenues and costs in total sales is below 10 %. The same is true for the ratio of the liabilities responsive to the changes in the interest rate both in the short and long run. Thus, the companies’ answers may be considered plausible.

Another important finding of the study is that the company size matters in terms of responsiveness to the risks. The companies having larger market capitalization pursue clearly defined risk management policies and are more responsive to the risks (Table 11) than smaller firms. This findings generally confirms other researches held by Bodnar, Hayt and Marston (1995), Yanagida and Inui (1996), Goldberg and Triteschler (1998), Hagelin and Alkeback (1999), Bartram, Brown and Fehle (2004), El-Masry (2006) and are consistent with the extant theories. This is promising for the Turkish capital market functioning.

**Table 11: Relation Between the Company Size and Risk Management Policies**

Market Capitalization	No. of Firms	Percentage (%)
Below TRY 20 million	1	3.70
Between TRY 20-50 million	1	3.70
Between TRY 50-100 million	5	18.52
Between TRY 100-500 million	9	33.33
Above TRY 500 million	11	40.74

### ISE Companies in the TurkDEX

The CMB survey results reveal that *only* 7 companies have an account to trade at TurkDEX. Six of them have a market capitalization above TRY 50 million and carry foreign currency risk in several criteria. One of the companies has interest rate risk in the long term. This result is consistent with the findings of Bartram, Brown and Fehle (2004) study, stating that firms typically in less developed countries with less liquid derivatives markets are less likely to hedge. On the other hand, 26 responding firms (23.4 %) plan to open an account at TurkDEX. Among them, 22 companies have a market

capitalization above TRY 50 million and all of them bear some sort of currency risk to a certain extent at least in one of the criteria defined in the survey. Eight companies bear short-term interest rate risk.

Interestingly enough, 38 of the 85 companies responding that they do not need derivative products to hedge their risks, are found to bear some sort of foreign currency or interest rate risk at least in one of the criteria outlined in the survey.

The companies give several reasons for not using the TurkDEX, the sole organized derivatives market in Turkey. The most popular reason (35.2 %) is that the companies manage their risks by balancing their assets and liabilities rather than by using derivative transactions. Another reason is the familiarity with the forward transactions with banks rather than futures in the marketplace (16.6 %). They are reluctant to trade in TurkDEX because of the margin requirements<sup>11</sup> and transaction costs. Mallin, Ow-Yong and Reynolds (1997), El-Masry (2006) also find similar results in their studies for UK non-financial companies not using derivative instruments. Table 12 gives the reasons stated by the ISE companies for not trading at TurkDEX. Some of them find TurkDEX as immature and not deep enough. The public firms, on the other hand, have certain restrictions in using derivative products for risk management purposes.

Most of the ISE companies (26.2 %) prefer making forward agreements or other derivative transactions with banks to hedge their risks. This result is consistent with the findings of the study held by Yanagida and Inui (1996) on the non-financial companies listed on Japan's securities markets. Table 13 depicts the type of forward agreements traded with banks. The total value of the contracts for the year-end 2005 is over TRY 1 billion<sup>12</sup>. Five companies realized 70 % of this amount in 2005. Beside this, four companies trade derivatives in foreign exchanges<sup>13</sup>.

**Table 12:** The Reasons for not trading at TurkDEX<sup>14</sup>

Answer	No. of Firms	Percentage (%)
We manage our risks by balancing our assets and liabilities rather than derivative transactions.	57	35.19
We do not need, because the exchange rate and the interest rate are more stable and predictable compared to previous years.	47	29.01
We prefer forward agreements and other derivative instruments with banks.	27	16.67
We do not find the prices at TurkDEX realistic and we think that the market is not deep enough.	15	9.26
Our financial statements do not bear FX or IR risks.	7	4.32
Other	7	4.32
We would like to profit from the positive changes in the FX and IR and we are ready to bear the losses from the negative changes.	2	1.23

**Table 13:** Derivative Transactions with Banks

	No. of Firms	Percentage (%)
Only FX	19	61.2
Only IR	2	6.4
Both FX and IR	5	16.1
Parity transactions	1	3.2
Other	1	3.2

The answers in Table 12 such as “we do not need to trade at TurkDEX because the exchange rate and the interest rate are more stable and predictable compared to previous years” (29.1%) and “we would like to profit from the positive changes in the FX and IR and we are ready to bear the losses

<sup>11</sup> Many of the respondents considered the margin requirements as a transaction cost.

<sup>12</sup> Four of the companies did not give information about the type of agreements or instruments, and 10 of them did not give information about the value of their transactions.

<sup>13</sup> Three of them did not give information about the transactions and the exchanges. One of them has CBOT option contracts on corn and soybeans.

<sup>14</sup> It was a check box type question, so multiple answers were possible

from the negative changes" (1.2%) should be remarked cautiously to reveal the risk perception profile of the Turkish listed firms and may be the topic of another study.

### Leverage, Export to Total Sales and Open Position to Total Assets Ratio

Beside the analysis that we handle in the previous section, we additionally looked at the relationship among the firms' leverage, export sales to total sales ratio and open position to total assets ratio for the companies traded in the ISE to cover whether there is an overlap. Table 14 shows the results for the whole sample and for each industry.

Out of 118 firms analyzed in the CMB survey, 34 of them carry *excess position* in the market. The average for the firms carrying *excess position* and *open position* is 6.3 % and 26.5 %, respectively. Thus, most of the non-financial firms in the ISE own a considerable amount of open position to conduct their operations. We then refer to the leverage and export sales in total sales for each group. We detect that those firms carrying *excess position* have an average leverage ratio of 28.5 % and export sales to total sales ratio of 20.7 %. This is relatively low compared to those non-financial companies having *open position* in their balance sheet. The leverage and export sale to total sales ratio for them is 51.7 % and 26.1 %, respectively. Thus, we may conclude that the most of the high-leverage firms carry open position in their balance sheets. This result is consistent with the findings of Muller and Verschoor (2005).

The industrial distribution of the ISE companies also gives valuable information about the industry type of the companies carrying a high-level open position. Three industries seem to have both a high level of leverage and export sales to total sales ratio and at the same time carry high-level of open position. These are; *holding companies, wood products and paper industry and basic metal industry*.

**Table 14:** Leverage, Export Sales to Total Sales and Open Position to Total Assets Ratios

Industry Type	No. of Firms	Total Debt/Total Assets	Export Sales/Total Sales	Open Position/Total Assets
IT	6	0,45	0,02	0,05
Food, Beverage and Tobacco	12	0,47	0,23	-0,13
Services	3	0,56	0,15	-0,26
<b>Holding Companies</b>	<b>5</b>	<b>0,64</b>	<b>0,24</b>	<b>-0,46</b>
<b>Wood Products and Paper</b>	<b>7</b>	<b>0,36</b>	<b>0,24</b>	<b>-0,27</b>
Chemical	13	0,51	0,11	-0,22
<b>Basic Metal Industries</b>	<b>8</b>	<b>0,42</b>	<b>0,47</b>	<b>-0,37</b>
Fabricated Metal Products	19	0,47	0,31	-0,19
Non-metallic Mineral Products	11	0,25	0,25	-0,02
Textile, Wearing Apparel	13	0,35	0,48	-0,10
Tourism	2	0,30	0,00	-0,24
Wholesale and Retail Trade	5	0,77	0,04	-0,06
Transportation	4	0,50	0,49	-0,03
<b>Average</b>		<b>0,44</b>	<b>0,26</b>	<b>-0,16</b>
<b>Median</b>		<b>0,43</b>	<b>0,20</b>	<b>-0,06</b>

Source: Istanbul Stock Exchange

The open position figures are generally at acceptable levels other than for some companies that carry high level risk in their balance sheet. There are actually 5 companies whose open position is between 50 % and 100 % and 4 firms whose open position exceeds their balance sheet total in the ISE companies analyzed in this study. They should pay special care to the management of their open position so as not to have nightmare when the foreign currency market become volatile in the future.

### 4.3. TurkDEX Survey Results and its Implications

As like to CMB survey, the results of the TurkDEX questionnaire provide important evidence for the Turkish companies' risk perception and risk management policies in the market. Table 15 presents the distribution of the participating companies according to their total sales volume. The responding 70 non-financial companies are distributed unequally in grouping. Firms having a total sales volume of below USD 1 million and above USD 50 million account to 34.29 % within the total. This is important for the interpretation of the survey results as participating firms have representative feature for both the small and large size firm market behaviour<sup>15</sup>.

**Table 15:** Total Sales Volume of Participating Companies

Total Sales	No. of Firms	Percentage (%)
Below USD 1 million	24	34.29
Between USD 1-10 million	15	21.43
Between USD 10-50 million	7	10.00
Above USD 50 million	24	34.29

In the survey, 10 out of 76 non-financial firms do not give information for the industry in which they operate. The remaining 66 firms are distributed in different industries more or less equally. So they are representative for the whole economic activity (Table 16). One important point to be noted is that the participation ratio is high in automobile, textile and trade companies, which are believed to deal more with foreign trade activities. So they could be viewed as representative of the currency risk exposure in the market.

**Table 16:** Industry Classification of the Participating Companies

Group	No. of Firms	Percentage (%)
IT	5	7.6
Electricity	2	3.0
Services	5	7.6
Construction	4	6.1
Chemical	4	6.1
Mining	3	4.5
Automotive	7	10.6
Textile	6	9.1
Telecommunication	3	4.5
Trade	12	18.2
Transportation	2	3.0
Production	6	9.1
Other	7	10.6

The survey by TurkDEX mainly analyzes the risk perception of the participating firms and focuses on the foreign currency risk in particular. The management of the *sales revenues - production costs* associated from the operations of the company is the main determinant of the foreign currency risk in the market and directly affects the profitability of the entity. In that context, to measure the currency risk of the firms, three different tools are used. These are namely;

- 1) The *ratio of the export (FX revenues) to total sales*
- 2) The *ratio of the import (FX cost) to total purchases*
- 3) The *net exposure of the firms (Net balance of FX Revenues and FX Costs)*

The results are summarised in Table 17, 18 and 19 below.

<sup>15</sup> The sample of the TurkDEX survey is also not equally distributed geographically. 38 of the participating non-financial companies are from Istanbul, while 8 of them are from Ankara.

The ratio of export in total sales (Table 17) shows that while for 43.08 % of the responding companies, the foreign currency risk in the income statement is below 10 %, for 24.62 % of the companies it is above 50 %, at a critical level. This result confirms the CMB survey findings. Thus, the Turkish companies should carefully manage their receivable collection policies.

**Table 17:** The Ratio of Export (FX Revenues) in Total Sales

Group	No. of Firms	Percentage (%)
Below 10 %	28	43.08
Between 10 % and 19 %	10	15.38
Between 20 % and 49 %	11	16.92
Over 50 %	16	24.62

The same fact is also valid for the ratio of the import in total purchases. Out of 65 respondents, 28 of them are exposed to currency risk below 10 %, while 21 of them are subject to FX risk over 50 % (Table 18) in terms of FX costs. Thus, 32.3 % of the companies should manage their costs effectively and balance them with their revenues.

**Table 18:** The Ratio of Import (FX Costs) in Total Purchases

Group	No. of Firms	Percentage (%)
Below 10 %	28	43.08
Between 10 % and 19 %	7	10.77
Between 20 % and 49 %	9	13.85
Over 50 %	21	32.31

Out of these results, we also measure the net exposures of the firms in terms of the difference between the FX revenues and costs. Table 19 represents a cross-sectional analysis. Out of the 65 respondent firms, 38.46 % of them (25 companies) match their cash in-out flows and seem to have a zero net exposure<sup>16</sup>. The survey results also pointed out that there is a *“mismatch exposure”* for 30.77 % of the companies (20 firms). For the remaining 20 firms, the foreign assets are greater than the foreign liabilities, so there is still a *“mismatch position”* risk<sup>17</sup>.

However, it should be stated that we make certain assumption in this analysis. First, we assume that FX revenues and costs are all in the same currency, but in the real world the companies making foreign trade, especially exports, handle their transactions by using different currencies. Secondly, we also assume that total sales and total purchase figures are the same in this analysis. In real world, however, they are usually different from each other. So the findings should be interpreted causally.

**Table 19:** The Net Exposures of the Firms

FX Costs FX Revenues	Below 10 %	Between 10 % and 19 %	Between 20 % and 49 %	Over 50 %
Below 10 %	<b>15</b>	1	2	10
Between 10 % and 19 %	4	<b>2</b>	1	3
Between 20 % and 49 %	2	3	<b>3</b>	3
Over 50 %	7	1	3	<b>5</b>

After the currency risk analysis, we looked at the risk perception of the companies. Table 20 shows the risk priorities of the 76 responding firms. As one may notice, the currency risk comes at the first place. This finding is consistent with the survey results of the CMB survey and of many other academic studies. What is surprising is the fact that the participants ranked the interest rate risk at the

<sup>16</sup> The firms that have no mismatch (risk exposure) are shown in bold in Table 19.

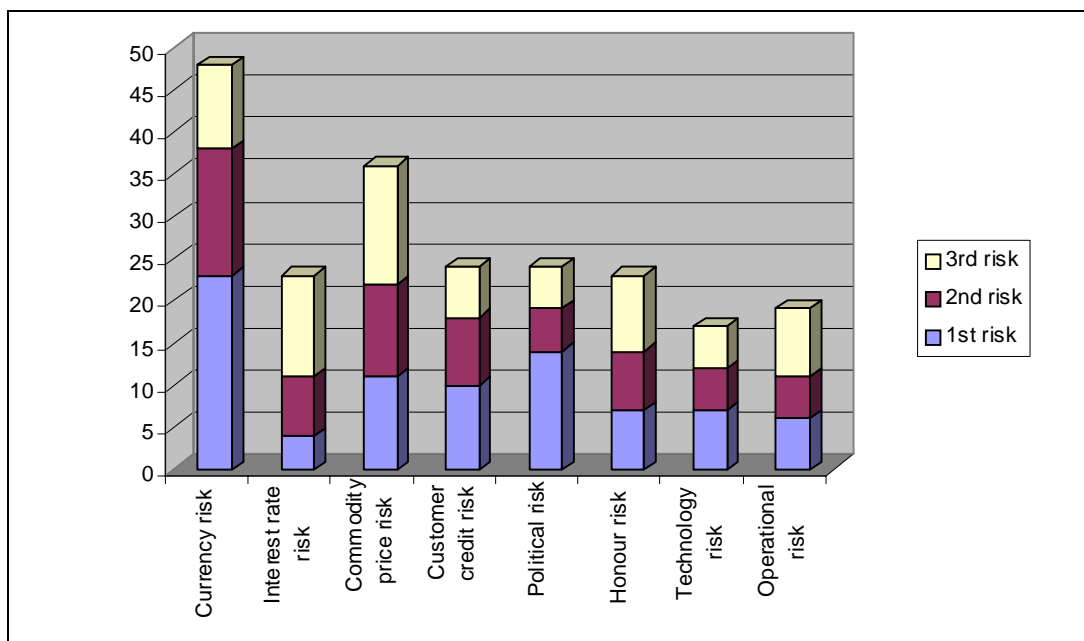
<sup>17</sup> When the FX revenues is lower than FX costs, we used the term *“mismatch exposure”*, when the FX revenues is greater than FX costs we used the term *“mismatch position”*.

fifth place. In other words, Turkish non-financial companies do not perceive the interest rate risk as a major risk. Chart 2 summarizes the results by risk type and number of respondent firms.

**Table 20:** Risk Priorities of the Participating Companies

Group	1 <sup>st</sup> risk	2 <sup>nd</sup> risk	3 <sup>rd</sup> risk	Total Point	Ranking
Currency risk	23	15	10	48	1
Interest rate risk	4	7	12	23	5
Commodity price risk	11	11	14	36	2
Customer credit risk	10	8	6	24	3
Political risk	14	5	5	24	4
Honour risk	7	7	9	23	6
Technology risk	7	5	5	17	8
Operational risk	6	5	8	19	7

**Chart 2:** Risk Priorities of Non-financial Firms



We also measured the risk perception of the companies in project planning and budgeting to see whether the perception differentiates from activity to activity. Their response matches the previous results (Table 21). They still consider the currency risk and commodity price risk at the first rank, while in this case they ranked the interest rate at the third place, which may be theoretically and practically acceptable.

**Table 21:** Risk Factors in Project Planning and Risk Budgeting

Answer	Yes	No	Ranking
Currency risk	48	28	1
Interest rate risk	35	41	3
Commodity price risk	48	28	2
Customer credit risk	30	46	5
Political risk	24	52	6
Honour risk	17	59	8
Technology risk	20	56	7
Operational risk	32	44	4
Other	8	68	9



When we refer to the sources of financial risks in non-financial companies, we get a somehow different picture. The companies ranked the liquidity risk at the first place, commodity price risk and FX parity risk at the second and third place. The interest risk is still ranked at the last places (Table 22).

**Table 22:** Sources of Financial Risks in Non-financial Companies

Answer	Yes	No	Ranking
Interest rate risk from forward sales	31	45	6
Currency risk for export receivables	30	46	7
Currency risk for import liabilities	35	41	4
Price risk for raw materials used in production	40	36	2
Parity risk from FX assets and liabilities mismatch	37	39	3
Interest rate risk from bank credits	32	44	5
Currency risk from bank credits	26	50	8
Liquidity risk	40	36	1
Other	13	63	9

We also analyzed the risk management policies in non-financial companies as like in the CMB survey. We interestingly find that although majority of the firms believe in risk management for their companies, only 50 % of them produce regular MIS reports for the senior management regarding their risk management activities and only 22.37 % of them use derivative products in their operations (Table 23). This is curious and need to be searched further, as it may affect the financial stability of the companies in micro and of the economy in macro level. When we analyse the size effect for these findings, we do not find strong evidence, different from the CMB survey result. Only 17 of 33 firms providing MIS reporting and 6 of 17 firms using derivatives belong to the large-size firm group as to the total sales volume.

Although 73.6 % of the responding companies know the TurkDEX and are aware of the derivative products, 65.8 % of them do not use them in their risk management. When we analyse the 50 firms not using derivatives, we cover that there have different reasons for not using derivative instruments (Table 24). Most of the firms state the lack of experience and education as well as the lack of expertise at the first place. The volatile market conditions and high transaction costs are ranked as the second and third reason. In fact, these findings are consistent with those of other academic studies held in UK, Estonia. Another interesting point in this study is that, 12 of 70 firms are not aware of availability of the derivative products in Turkey (Table 25).

**Table 23:** Risk Management Policy in Non-financial Companies

Group	Yes	No	N.A.
Do you believe in risk management for your company?	70	4	2
Do you think to establish a separate department in charge of Risk Management?	39	29	8
Do you provide MIS reports to the senior management for your companies' risk exposures?	33	38	5
Did you hear the Basel-II concept?	42	30	4
Do you know the effects of Basel-II for non-financial companies?	33	15	28
Do you use derivative products for your companies financial risk management?	17	50	9

N.A. = No answer.

**Table 24:** Reasons of Not Using Derivatives in Non-financial Companies

Answer	Yes	No	Ranking
Cost of the transactions is high	14	36	4
Lack of derivatives expertise	19	31	1
Lack of knowledge and education	19	31	2
Derivatives is gambling	4	46	8
We do not understand those products	11	39	5
We do not trust the accuracy of pricing models	11	39	6
Market is very volatile	16	34	3
Other	8	42	7

**Table 25:** TurkDEX Knowledge of Participating Companies

Answer	Yes	No	N.A.
Do you know TurkDEX?	56	12	8
Do you have knowledge about TurkDEX products?	45	12	18
Do you think that organized derivatives exchange is useful?	51	1	24
Do you believe that risk management is a value-added service for your company?	64	2	10

N.A. = No Answer.

### Common Points in CMB and TurkDEX Surveys

There are overwhelmingly some common points associated from the two surveys analyzed in this study. First of all, in both studies the responding firms place much importance to the currency risk and quite less importance to the short and long term interest rate risk. This risk perception may be because the interest rates has declined steadily over the last four years in Turkey and the companies engage heavily with foreign trade and there is a considerable growth in international trade activity.

A second important point is that, although the companies in both studies believe that they do more or less carry a certain amount of “*mismatch exposure*” (*open position*) or “*mismatch position*” (*excess position*) and are mostly aware of TurkDEX products, they slightly tend to use derivative instruments in their risk management. They even do not pursue an effective risk management policy or strategy in their companies. This is striking as it may cause potential problems for these companies, and may well affect the financial stability in the Turkish economy. The volatility experienced by the market players at the end of May 2006 is a clear signal for this fact. So, we think that the companies should urgently become customised and begin using derivative products in their risk management activities and should produce regular reports for their senior management.

The last but not the least important common point is that, the risk perception of the companies seems to base mostly on qualitative rather than systematic quantitative data. Therefore, they should establish a sound risk management department and employ well-educated, qualified personnel for handling risk management activities. Otherwise, they may confront financial stability problem in the near future.

## V. Conclusion

The remarkable spread in the use of derivatives, combined with celebrated large losses associated with their use, has made derivatives usage of considerable interest in the financial markets. Although derivatives can be used to hedge and to speculate in the market, most of the non-financial companies use them in an attempt to lessen or avoid unexpected revenue losses and restructure their balance sheet against foreign currency and interest rate mismatch.

This study examines the use of derivatives in non-financial companies in Turkish market by using the recent surveys conducted separately by the Capital Market Board (CMB) and Turkish Derivatives Exchange (TurkDEX), jointly with RiskActive. To our knowledge, this study is the first comprehensive examination of hedging practices in the Turkish capital market after the establishment of TurkDEX.

The first striking result of the study is the risk perception of the non-financial companies. Most of them give priority to currency risk and commodity price risk, which they believe affect their in-out cash flows. Surprisingly, they put little attention to the interest rate risk in their management. One reason may be high-level foreign currency loan used in the firms' leverage. As a matter of fact, the open position carried out by non-financial companies traded in the Istanbul Stock Exchange (ISE) is higher for those firms having high-level leverage, compared to those firms that have low-level leverage. Another reason may be the increasing foreign trade activities that they make in the international market. The average export sale to total sales ratio for the ISE companies that carry open position is 26.1 %.

Our findings support the size effect phenomena reported in other empirical studies for developed countries. There is a close relation between the company size and the usage of derivatives. While most of the large companies follow a sound risk management policy to manage their risks in the marketplace, some small companies believe that they do not need a separately defined policy to hedge their risks.

Although the non-financial companies are subject to currency risk and interest rate risk to a certain extent, the use of derivatives by those companies in organized market is not widespread. Rather, they prefer to manage their risks by balancing their assets and liabilities instead of derivative transactions. This is consistent with the experience of many emerging market countries. Interestingly, some firms do not find the derivatives necessary since the exchange rate and the interest rate are more stable and predictable compared to previous years. Moreover, the companies using derivatives tend to prefer forward agreements or other derivative instruments with banks in the over the counter (OTC) market. There is also roll-over risk for non-financial firms, as their trades are short-term sided either in the OTC market or in TurkDEX.

Another important observation in the study is that the value of open position for non-financial industry is indeterminate. The Banking Regulation and Supervision Agency (BRSA) supervises currency exposure of the banks in Turkey very strictly, while there is no exact number for the currency exposure of non-financial firms. It should be noted that the open position of non-financial firms is important for banking industry and directly or indirectly affects the financial stability of the whole economy. An independent institution should be appointed to monitor and supervise this risk.

Among the reasons for not trading in the TurkDEX, the participating companies in both surveys state the immature nature of the market and the transaction costs, besides the lack of managers' knowledge and experience notified by the regulatory authorities. Similar reasons are also mentioned in academic studies held for non-financial companies in the UK, Sweden, and Lithuania. This actually suggests a lower level of sophistication and liquidity in these countries' derivatives market.

To summarize, the most important finding of the study is the fact that non-financial firms are not really aware of the risk exposure. Therefore, the impact of derivatives on the financial statements and economic performance of non-financial firms could not be ignored. Even, the derivatives will dominate the landscape in a bigger way in the future especially with the application of Basel-II regulatory standards in the international financial markets. Those that remain uninformed about the effect of derivatives on earnings and cash flow will find themselves losing ground. The Turkish private firms are no exemption in this context. Thus, the risks of the non-financial firms in Turkey should be carefully and professionally managed by the use of derivatives so as to prevent the potential destructive effects of market volatility on financial stability of the companies at micro and of the economy at macro level.

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