FOREIGN EXCHANGE RISK AND FINANCIAL PERFORMANCE: THE CASE OF TURKEY

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Abstract

The purpose of this study is to investigate the magnitude of foreign exchange open positions of manufacturing and service sector companies, to determine the effect of open positions on companies' financial performance and to find out the factors that contribute to the firms' tendency of keeping short foreign exchange position. The analysis conducted on 30 firms for the period spanning from the third quarter of 2012 to the second quarter of 2015 showed that operating profitability of the firms with short foreign exchange position was lower than operating profitability of firms with long foreign exchange position. The performed ANOVA test indicated that companies with short foreign exchange positions were able to increase their overall profitability to the same level as companies with long foreign exchange positions in periods when local currency was overvalued, but exposed to serious losses in periods of local currency devaluation. Applied regression analysis revealed that companies which had short foreign exchange position in the present period had higher liquidity and asset efficiency and lower overall profitability than companies with long foreign exchange position in the previous period.

Keywords: Short FX Position, Hedging, Financial Performance, Relative Purchasing Power Parity
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I. INTRODUCTION

Many studies have documented that macroeconomic factors do not always conform to fundamental values. These imbalances have important strategy implications for companies which are

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among the most important actors of economic life. An important macroeconomic factor which is known to deviate very frequently from the expected balance is the foreign exchange rate, which indicates the relative currency's value between countries. Imbalances in foreign exchange rates are measured in accordance with deviations in relative purchasing power parity. Essentially, an exchange rate represents the changing level of the price of one nation's currency when compared with another nation's currency. Both academicians and governmental authorities agree that companies tend to keep open positions in order to gain from present and expected local currency overvaluations.

In line with this tendency, the scope of this study is to identify the reasons for, as well as the consequences of, high foreign currency exposure among Turkish real sector companies. In addition, the primary purpose of the study is to identify the reasons for and the scope of foreign exchange risks, as well as the effects of these risks on the profitability of corporations.

In a world of high globalization and severe competition, floating exchange rate regime is an important risk factor for emerging market companies as the fluctuations in the value of local currency against hard currencies have important effects on firms' financial performance. The present study aims to contribute to existing literature by showing the risks associated with short foreign exchange positions which will have important strategy implications for the management.

The remainder of the study is organized as follows. Section 2 delineates the general theoretical background of the study. Hypotheses are explained in Section 3. Section 4 conveys the data and variables used in this study. The analysis and related results are presented in Section 5. The final section summarizes the main findings of the study and concludes.

II. LITERATURE REVIEW

Foreign exchange risk represents the changes in a company's income and expenses or in general cash flow that are caused by an unexpected change in exchange rates. In other words, it expresses unexpected changes in fiscal values (business assets, resources, income, expenses, cash flows and company value in the future) that are vulnerable to exchange rate effects The reasons for exchange rate risk are differences in the economic development of countries that use different currencies, the development level of financial markets, the political stability of a country, the expectations of people who take action in the financial markets and accidental factors. (Habibnia, 2013).

According to Dufey and Srinivasulu (1983) there are three types of foreign exchange risk for businesses operating on an international scope which are transformational risk, transactional risk and

economic risk. Transformational risk which also called accounting risk is the risk caused by the conversion of foreign currencies to each other. It also identified as an accounting risk. The effect of changes in foreign exchange rates on the economic value of business is expressed in economic risk. Transactional risk on the other hand can be defined as "the probability of loss and gain because of exchange rate fluctuations' effect on expected cash flows." In other words, transactional risk is the risk that is caused by variations between exchange rates on the transaction date and contract date for futures in types of foreign currency (Christoffersen 2012), (Guay & Kothari, 2003).

Currency risk management aims to reduce the negative impact of currency fluctuations and is commonly associated with financial hedging of exchange rate exposure. Hedging is a kind of investment activity that seeks to protect against future price risks. It reduces the risk of unfavorable exchange rate movements by taking an offsetting position (Bekaert & Hodrick, 2009).

Foreign exchange rate is an important macroeconomic factor which is known to deviate very frequently from the expected balance. As there are various determinants in the market that affect exchange rates positively or negatively, it is not possible to accurately judge the future level of exchange rates. Still, there are some methods that help to predict the future exchange rates among which relative purchasing power parity is the most widely used one. Relative purchasing power parity predicts the relationship between the two countries' relative inflation rates and the change in the exchange rate of their currencies. It suggests that the rate of growth in the exchange rate offsets the differential between the rate of growth in home and foreign price (Rogoff, 1996).

The mentioned relationship is formulated as follows:

$$\frac{S_t}{S_{t-1}} = \frac{P_t^*/P_{t-1}^*}{P_t/P_{t-1}}$$

where St is the spot rate in Foreign Currency/Domestic Currency and Pt is the price level in period t (foreign values are marked by an asterisk).

Still, much of the empirical studies show that markets converge to the relative purchasing power equilibrium with a time lag. It is documented in many academic studies that in the short run exchange rates deviate extensively from the balance. Over the last years, international capital flows in the form of portfolio investments have been considered the principal source of purchasing power disparities. Fund suppliers invest in capital market securities of another country as portfolio investments by undertaking all political and economic risk to achieve high returns in the form of interest and dividend income (Aliber, 1976).

It is known that to improve financial performance by exploiting disparities in foreign exchange rates, emerging market firms tend to take short foreign exchange positions. In the literature, however, there are very few empirical studies which investigate the relationship between foreign exchange risks and financial performance. Hallgren (2006) investigated how foreign exchange risk is managed in Swedish mid-level corporations and concluded that mid-sized companies perceive exchange risk as the most critical risk to consider in international trade. Runo (2013) investigated the relationship between foreign exchange risk and financial performance of oil companies in Kenya. He concluded that foreign exchange risk in the Kenyan oil sector is a strong determinant of profitability, and if not properly managed it can affect the overall performance of a company. Diffu (2011) conducted a similar study on the Kenyan airline industry and found that foreign exchange risk is a major determinant of a company's profitability. In a study about Turkey, Kesriyeli & Yiğit (2005) found that firms generally rely on foreign currency and short-term debt instruments which make them vulnerable to both exchange rate and interest rate risks through currency and maturity mismatches and furthermore they rarely use derivative instruments to cover their open positions.

III.   HYPOTHESES

As mentioned in the literature review section, real sector companies tend to keep open foreign exchange positions to gain from temporary imbalances in foreign exchange rates caused by governmental policies and short-term capital movements. The primary goal of companies that hold open foreign exchange positions is to increase financial performance. Hence, the first hypothesis is formulated as follows:

H1: The financial performance of companies taking foreign exchange risk is different than the financial performance of the companies that are not subject to foreign exchange risk.

Companies with low operating profitability take some risks to increase their after-tax returns. Given the expectations regarding relative purchasing power disparity, foreign exchange risk is the most widely used instrument to increase after-tax returns. Companies take an open position to realize substantial foreign exchange gains in periods of disparity when local currency is overvalued, and they incur substantial losses in periods when markets adjust themselves. From this premises emerge the second and third hypotheses of the study:

H2: Companies that take foreign exchange risk create lower operating profitability and higher after-tax returns than companies that are not subject to foreign exchange risk in periods of local currency overvaluation.

H3: Companies that take foreign exchange risk incur lower operating profitability and lower after-tax returns than companies that are not subject to foreign exchange risk in periods of local currency undervaluation.

It has been documented that companies follow their financial performance indicators very carefully and design their strategies accordingly. As risk-taking in the foreign exchange market is an important corporate policy the fourth hypothesis is formulated as follows:

H4: There is a negative relationship between open positions and previous period's financial performance.

IV.   DATA AND VARIABLES

To accomplish the purposes of this study, a set of firm specific variables and a set of macroeconomic variables were employed. The macroeconomic variables aimed to measure deviations from equilibrium foreign exchange rate measured with relative purchasing parity formula. To apply the formula, Turkish producer price index data obtained from Turkish State Statistics Institute, US producer price index data obtained from United States Department of Labor and the period end buying USD/TL rate by Central Bank of Turkey were employed.

Firm specific variables consisted of financial performance indicators and foreign exchange risk measure. Financial performance was measured according to four main dimensions which are liquidity, efficiency, leverage and profitability. Liquidity ratios indicate the power to pay short-term debts of the company on time. In the context of this study liquidity was measured with current ratio calculated by dividing current assets by short term liabilities. Leverage ratios aim to measure the level of indebtedness of companies. This dimension was measured with debt ratio which was defined as total liabilities divided by total assets. Efficiency ratios evaluate how efficiently the company manages its business. The asset turnover measured as net sales divided by total assets was the single efficiency measure of the study. The level of profitability is generally measured according to total funds invested in the company. In the context of this study profitability was measured with three variables. The first, return on assets 1 (ROA1) defined as net income divided by total assets was a proxy for total profitability of the company. The second return on assets 2 (ROA2) defined as operating income after taxes divided by net sales aimed to measure the profitability at operating level. The last measure was return on equity defined as net income divided by total equity and aimed to measure the profitability level of the shareholders (Brealey, Stewart & Allan 2013).

Foreign exchange risk is defined as the difference between foreign exchange denominated financial and commercial assets and foreign exchange denominated liabilities. The use of derivatives for hedging can enhance the capability of the companies to control their foreign exchange risk exposure. Hence, this study used non-hedged short position figures which were adjusted for derivatives. Firms are considered to have foreign exchange risk when foreign exchange denominated liabilities exceeded foreign exchange denominated assets. To determine the relative magnitude of the long and short positions, the ratio of foreign exchange position to total assets was employed. The single control variable of the study was size which was measured with natural logarithm of sales. The variables and measurement criteria are summarized at Table I.

Table I. Independent Variables

VARIABLES	ABBREVIATION	MEASUREMENT
Debt Ratio	DR	Total Liabilities / Total Assets
Current Ratio	CR	Current Assets/Short-term Liabilities
Return On Assets 1	ROA1	Net Income / Total Assets
Asset Efficiency	AE	Net Sales / Total Assets
Return On Equity	ROE	Net Income / Total Equitiy
Return On Assets 2	ROA2	(EBIT -Tax) / Total Assets
Size	LNS	Ln Sales (Net Sales)
Open Position Ratio	OPR	(FX Liabilities-FX Assets) / Total Assets

To test the hypotheses of this study, manufacturing and service sector companies that are listed on the first 100 list of Borsa İstanbul were selected. The final sample consisted of 30 companies; 20 of which were manufacturing and 10 of which were service industry firms respectively. The analysis period contains 12 quarters, beginning from the third quarter of 2012 and ending with the second quarter of 2015. Data for financial position indicators were calculated from quarterly financial tables, and data for open positions were obtained from financial statement footnotes provided through the Public Information Platform (KAP) website.

V.   ANALYSIS AND FINDINGS

The descriptive statistics of financial performance indicators and open position ratios calculated for 12 subperiods from the beginning of the third quarter of 2012 to the end of the second quarter of 2015 are presented at Table II.

Table II. Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
DR	61%	18%	22%	121%
CR	144%	63%	39%	409%
AE	0,35	0,24	0,06	2,06
ROA1	2%	5%	-17%	34%
ROA2	-2%	8%	-69%	28%
ROE	-1%	87%	-1625%	223%
OPR	-8%	14%	-51%	40%

The applied ANOVA test demonstrated that were no statistically significant differences between financial performance indicators and open position ratios across sub-periods. The results are presented at Table III.

Table III. Sub Period Differences

	mean	f value
DR	0,6079	0,3225
CR	1,4443	0,4279
AE	0,3547	0,3226
ROA1	0,0236	0,5045
ROA2	-0,0157	0,5117
ROE	-0,0102	1,0050
OPR	-0,0809	0,1583

As there were no statistically significant differences between variables across sub-periods, the observations were analyzed together for the reminder of the analysis. The final sample consisted of 360 observations.

Among the 30 companies in the sample, 26 had open positions, while the remaining 4 did not have any foreign exchange risk for all sub-periods in the analysis. In addition, only 12 of the 26 carried foreign exchange risk for all sub-periods.

The first hypothesis, which states that the financial performance of companies taking foreign exchange risk is different than the financial performance of companies that are not subject to foreign exchange risk, was tested with ANOVA. The results are presented at Table IV.

Table IV. Foreign Exchange Risk

variable	0 long -1 short	N	Mean	F	Sig.
DR	,00	120	,5867	2,607	,107
	1,00	240	,6185		
	Total	360	,6079		
CR	,00	120	1,4578	,084	,772
	1,00	240	1,4375		
	Total	360	1,4443		
AE	,00	120	,4783	56,317	,000
	1,00	240	,2928		
	Total	360	,3547		
ROA1	,00	120	,0295	2,908	,089
	1,00	240	,0206		
	Total	360	,0236		
ROA2	,00	120	-,0085	6,557	,011
	1,00	240	-,0301		
	Total	360	-,0157		
ROE	,00	120	,0342	,467	,495
	1,00	240	-,0324		
	Total	360	-,0102		

The companies carrying short position had higher current ratio and debt ratio and lower asset efficiency and profitability than companies which did not take any foreign exchange risk. The difference was statistically significant only for asset efficiency, ROA1 and ROA2 at 90 percent confidence level. The findings gave partial support Hypothesis 1.

To test the second and third hypotheses of this study, real return of TL was calculated first. The results are presented at Table V.

Table V. Real Return of TL

Subperiod	Inflation Turkey (PPI)	Inflation USA (PPI)	Equilibrium FX Rate	Actual FX Rate	Real Return of TL	Result
2012/06			1,8065			
2012/09	0,98%	1,70%	1,7847	1,794	0,50%	overvalued
2012/12	1,71%	-0,49%	1,7776	1,824	2,55%	overvalued
2013/03	0,50%	0,50%	1,8087	1,778	-1,75%	undervalued
2013/06	1,95%	0,44%	1,9248	1,836	-4,84%	undervalued
2013/09	1,91%	-0,93%	2,0365	1,980	-2,85%	undervalued
2013/12	2,42%	0,65%	2,1304	2,072	-2,80%	undervalued
2014/03	5,44%	2,19%	2,1557	2,198	1,93%	overvalued
2014/06	-0,37%	-0,14%	2,1226	2,151	1,31%	overvalued
2014/09	2,00%	-2,22%	2,7772	2,214	-25,42%	undervalued
2014/12	-0,81%	-5,71%	2,3269	2,922	20,35%	overvalued
2015/03	2,58%	-0,57%	2,6134	2,401	-8,86%	undervalued
2015/06	2,79%	1,57%	2,6850	2,645	-1,52%	undervalued

Domestic currency was overvalued for five out of 12 sub-periods and was undervalued for seven out of 12 sub-periods. The second hypothesis claimed that companies that carry foreign

exchange risk incur lower operating profitability and higher after-tax returns than companies that are not subject to foreign exchange risk in periods of local currency overvaluation. To test the hypothesis, an ANOVA test was applied to the data for the five sub-periods in which TL is appreciated against USD. The results are presented at Table VI.

Table VI. Profitability Differences: Periods of Overvaluation

Groups	ROA1		ROA2		ROE	
	mean	f value	mean	f value	mean	f value
Between groups	0,0003	0,1405	0,0108	2,9569*	0,9094	0,5109
Within Groups	0,0018		0,0036		1,7801	
* significant at 90% confidence level						

Return on assets, which is measured as net income divided by EBIT after taxes (ROA2), is lower for companies with short positions compared to companies with a long position. The results are statistically significant at 90 percent confidence level. No difference was found between the groups for ROA1 and ROE.

The third hypothesis posited that companies which assume foreign exchange risk incur lower operating profitability and lower after-tax returns than companies that are not subject to foreign exchange risk in periods of local currency undervaluation. To test the hypothesis, an ANOVA test was applied to the data for the seven sub-periods in which TL is depreciated against USD. The results are presented at Table VII.

Table VII. Profitability Differences: Periods of Undervaluation

Groups	ROA1		ROA2		ROE	
	mean	f value	mean	f value	mean	f value
Between groups	0,0083	3,4109*	0,0318	4,3929*	0,0069	0,2021
Within Groups	0,0024		0,0072		0,0340	
* significant at 90% confidence level						

ROA1 and ROA2, which are proxies for profitability, are higher for the group that does not have an open position than for the group that has an open position. The results are statistically at 90 percent confidence level No difference between the groups was found for ROE.

The findings show that companies with short foreign exchange position had lower operating profitability than companies with long foreign exchange position for all periods in the analysis. In the sub-periods when local currency was appreciated against USD, companies with short positions were able to bring their total profitability to the same level with the companies with long positions. In sub-periods when TL is depreciated against USD, short position strategy resulted in serious after tax losses.

The fourth hypothesis argued that there is a negative association between an open position and a previous period's financial performance indicators. To test the fourth hypothesis, the following regression model is formulated:

$$Opr_t = a + b \times DR_{t-1} + c \times CR_{t-1} + d \times AE_{t-1} + e \times ROA1_{t-1} + f \times ROA2_{t-1} + g \times ROE_{t-1} + \epsilon_t$$

As Table VIII reveals, the correlation between ROA1 and ROA 2 was high. To avoid multicollinearity, ROA 2 was left out of the analysis. The final model is as follows:

$$Opr_t = a + b \times DR_{t-1} + c \times CR_{t-1} + d \times AE_{t-1} + e \times ROA1_{t-1} + f \times ROE_{t-1} + \epsilon_t$$

Table VIII. Correlation Table

Correlations						
	DR	CR	AE	ROA1	ROA2	ROE
DR		-0,53	0,20	-0,17	0,20	-0,05
CR	-0,53		-0,27	0,08	-0,13	0,05
AE	0,20	-0,27		-0,07	0,03	-0,04
ROA1	-0,17	0,08	-0,07		-0,87	0,11
ROA2	0,20	-0,13	0,03	-0,87		-0,09
ROE	-0,05	0,05	-0,04	0,11	-0,09	

OLS regression analysis was applied to test the model. Multicollinearity was checked with tolerance and VIF statistics. The results are presented at Table IX.

Table IX. Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error			
1	0,503	0,253	0,241	0,12382			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-0,245	0,044		-5,589	0,000		
DR	-0,073	0,047	-0,09	-1,554	0,121	0,690	1,448
CR	0,096	0,014	0,4	6,992	0,000	0,703	1,422
AE	0,223	0,031	0,374	7,194	0,000	0,854	1,171
ROA1	-0,292	0,154	-0,098	-1,899	0,058	0,865	1,156
ROE	0,002	0,008	0,016	0,331	0,741	0,987	1,014

Current ratio, asset efficiency and after tax profitability were found to be significant predictors of open position ratio. The coefficient of current ratio and asset efficiency were positive and the coefficient of return on asset 1 is negative. The regression results show that the magnitude of foreign exchange risk increases if previous period's liquidity and efficiency level increases and profitability level decreases.

The analysis showed that, firms with high liquidity and efficiency but low operating profitability relied on foreign exchange risk to increase their after tax return; the mentioned strategy however was found to be a very dangerous tool; it helped to increase after tax return considerably in times of TL appreciation but resulted in serious losses in times of TL depreciation.

VI.   CONCLUSION

The purpose of this study is to investigate the amount of foreign exchange open positions of manufacturing and service sector companies, to determine the effect of open positions on companies' financial performance and to find out the factors that contribute to the firms' tendency of keeping

short foreign exchange position. It is hypothesized that the financial performance of companies taking foreign exchange risk was different than the financial performance of the companies that are not subject to foreign exchange risk; companies taking short foreign exchange position incur lower operating profitability in all sub-periods but higher total profitability in sub-periods when local currency appreciates and lower total profitability in periods when local currency depreciates against USD than companies with long foreign exchange position. Local currency appreciation and depreciation were defined as positive and negative deviations from equilibrium level calculated with relative purchasing power parity formula. The last hypothesis stated a negative relationship between open positions and previous period's financial performance. To accomplish the purpose open positions were defined as the difference between foreign currency denominated assets and liabilities net of hedged positions and financial performance indicators were defined as current ratio, debt ratio, asset efficiency, net income-based return on assets, operating income-based return on assets, and return on equity were calculated for a sample of 30 manufacturing and service sector firms for 12 sub-periods spanning from the third quarter of 2012 to the second quarter of 2015.

The preliminary findings revealed that there are no financial performance and open position differences between sub-periods. ANOVA test showed that when all sub-periods are considered companies with short foreign exchange position had significantly lower asset efficiency, operating profitability and total profitability compared to firms with long position. The relative purchasing power parity formula demonstrated that the local currency was undervalued in seven out of 12 sub-periods and was overvalued in five out of 12 sub-periods. For sub-periods of undervaluation and overvaluation, operating profitability was lower among firms with a short foreign exchange position than it was among firms with a long position. Total profitability on the other hand, was not significantly different for both groups in the sub-periods of undervaluation, whereas it was significantly lower for firms with open position in sub-periods of overvaluation. The regression analysis revealed that previous period's current ratio and asset efficiency was a significant determinant of present period open position ratio with a positive sign whereas previous period's total profitability was a significant predictor of the present open position ratio with a negative sign.

The results demonstrated that the magnitude of foreign exchange risk was positively associated with liquidity, asset efficiency and negatively associated with total profitability. Firms with lower operating profitability relied on open positions and were able to recover their low profitability in times of currency undervaluation. However, profitability for such firms remained low in sub-periods of currency overvaluation compared to firms that carry long position.

The findings have important strategy implications for manufacturing sector firms: taking short positions to boost profitability is a very dangerous tool; although the strategy works well and results

in considerable gains in periods when local currency appreciates, causes serious losses in periods when local currency depreciates.

Due to time and data constraints, the study was conducted on a limited sample size consisting of medium and big size companies. Small and family-owned companies' foreign exchange exposures remain open to debate in future studies.

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