T.C. DOĞUŞ ÜNİVERSİTESİ

INSTITUTE OF SOCIAL SCIENCES
DEPARTMENT OF FINANCIAL ECONOMICS

FOREIGN EXCHANGE RISK AND FINANCIAL PERFORMANCE: THE CASE OF TURKEY

Graduation Thesis

Hüseyin İLHAN
200986003

Advisor
Assoc. Prof. Deniz Parlak

İstanbul, June 2016

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ABSTRACT

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. 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 position were able to increase their overall profitability to the same level as companies with long foreign exchange position in periods when local currency was overvalued, but exposed to serious losses in periods of local currency devaluation. Applied regression analysis revealed that companies carried 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

ÖZET

Bu çalışmanın amacı, sanayi ve hizmet sektöründe faaliyet gösteren firmaların döviz açık pozisyon miktarlarını, bu açık pozisyonların şirketlerin finansal performansına etkisini ve şirketleri pozisyon açmaya iten etmenlerin incelenmesidir. 30 firmanın 2012 yılının üçüncü çeyreği ile 2015 yılının 2 çeyreği arasındaki 12 çeyrek dönemlik finansal raporları analiz edilmiş, açık pozisyonu olan şirketlerin faaliyet karlılığının olmayanlara göre düşük olduğu bulunmuştur. Pozisyon açan şirketler aktif karlılıklarını TL'nin değer kazandığı dönemlerde diğerleri ile aynı seviyeye getirebilmekte, değer kaybettiği dönemlerde ise ciddi kar kayıplarına maruz kalmaktadır. Uygulanan regresyon testi firmaların pozisyon açma kararlarını bir önceki dönem finansal performansını inceleyerek verdiklerini ve önceki dönemde likiditesi ve varlık verimliliği iyi ancak aktif karlılığı düşük olan firmaların pozisyon açma eğiliminde olduğunu göstermiştir.

Anahtar Kelimeler: Döviz Açık Pozisyon, Hedge, Finansal Performans, Göreli Satın Alma Gücü Paritesi

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ABBREVIATIONS

PPI   : Producer Price Index

PPP   : Purchasing Power Parity,

BIST   : Borsa Istanbul A. S,

TUIK   : Turkish Statistical Institute

KAP   : Turkish Public Information Service

BOP   : Balance of Payments

1 INTRODUCTION

Many studies have documented that macroeconomic factors do not always conform to fundamental values. These imbalances have important strategy implications for companies that are 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. Academicians and governmental authorities both contend that in order to exploit present and expected local currency overvaluations, companies tend to keep open positions.

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.

The remainder of the study is as follows. Section 2, literature review, delineates the general theoretical background of the study. Hypotheses are explained in Section 3. Section 4 denotes the data and variables used in this study. The analysis and related results are debated in Section 5. Section 6, the final section, summarizes the results of the study.

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2   LITERATURE REVIEW

2.1   Exchange Rates

The exchange rate links the domestic economy to other economies. Therefore, it is very important. The exchange rate presents a general summary about prices in the home country relative to other countries. In open economies, as a macroeconomic parameter, the real exchange rate is very important for this study.

As stated above, the exchange rate is a very important factor for economies, and this is especially true for open economies. There are many definitions of the real exchange rate. For years, the following issues have been debated: how to define the real exchange rate, how to control and understand the changes in attitudes over time, and what specifies the real exchange rate in a complicated environment. These public debates have recently gained increased meaning and importance (Obstfeld, 1995).

The nominal exchange rate is as shown below:

$$q_t = s_t - p_t + p_t^* \qquad (1)$$

where

s: the log exchange rate defined in units of home currency per unit of foreign

p and p*: log price levels

q: q is a constant that is related to price indices

Appealing to a decomposition is one way of thinking of real exchange rate movements. Suppose the price index is a geometric average of traded and non-traded goods prices.

$$P_t = \alpha p_t^N + (1 - \alpha) P_t^T \qquad (2)$$

where the lowercase letters denote logged values. Then, substituting ((2) into ((1) yields:

$$q_t = (s_t - p_t^T + p_t^{T*}) + [- \alpha (p_t^N - P_t^T) + \alpha^*(p_t^N - P_t^T)] \qquad (3)$$

$$q_t = q_t^T + [\omega_t] \qquad (3')$$

The third equation shows that the real exchange rate describes the components listed below:

The relative price for foreign trade (qT); and

The international relative price of non-tradables that remain tradables in the home country (ω) (Chinn, 2006).

2.2   The Determinants of the Real Exchange Rate

Equation (3) can be zero if the purchasing power parity (PPP) is considered only for tradable goods. Additionally, the determining factor in the real exchange rate value is the relative tradables or nontradables price. There are many variables that influence each relative price in any one of these cases. All of the three real exchange rate definitions are used, which sometimes causes considerable complexity in popular discussion (Salter, 1959, and Swan, 1960).

Purchasing power influences the value of money. Money demands also affect economic activity, because money demands influence its value. As a result, the exchange rate affects productivity in economies. In foreign trade for services and goods, relative price is a very important key for external balance. In addition, this variable is referred to as price competitiveness. In this context, something affects the price to increase it above cost, including demand level, costs of inputs, and market structure, which may define the real exchange rate (Feenstra, 2008).

2.3   Exchange Rate Changes

Marketing and production strategies determine exchange rates. If it is not possible to predict the price of currency changes, then likelihood plans can be generated. This planning includes improving a few reasonable currency scenarios, discussing the effects of each scenario on the company's competitive position, and defining strategies to address these possibilities.

Companies must be ready at all times for every possibility when it comes to currency changes. If a company is ready, then it can successfully manage to arrange its revised marketing and production strategies quickly. Companies should constantly review information on the market and be ready to convert their scenarios on the high probability of an occurrence and to establish appropriate plans and strategies that will have a strong impact on the company.

2.4   Exchange Rate Systems

In order to determine the exchange rate, certain exchange rate systems are used to determine currency prices. What about the determination of the functioning of the foreign exchange market and the extent to which exchange rates have a say (the official authority or market mechanisms)? Exchange rate systems are separated by their main features. Various exchange rate systems have

been applied in the past and are still applied today. These are the "Fixed Exchange Rate System" and the "Free or Flexible Exchange Rate System," the two titles around which the systems can be grouped. In addition, there are mixed exchange rate systems, which consist of a mixture of a fixed and a flexible exchange rate system (Krugman and Obstfeld. 2003).

2.4.1 Fixed Exchange Rate System

For a home currency exchange rate in a fixed exchange rate system, the prices in other currencies are determined by public authorities, and these prices are set in international payments that are taken into account. Foreign exchange supply or demand in the absence of any changes does not affect the exchange rate. Free foreign exchange rates are promoted or reduced by government only as deemed necessary.

In a fixed exchange rate regime, the central bank, in the absence of exchange rate specified limits or the selected rate balance rate (free market), intervenes in the currency market if it demonstrates deviations. The fixed exchange rate, to maintain the declared official rate, should cover any deficit of supply and demand that may occur. To achieve this goal, the central bank, which works much like default swap transactions in international reserves (which are foreign exchange reserves), must be kept at adequate levels. The classical gold standard, a monetary system in existence throughout the world, served this purposed from 1880 to 1914. The first gold standard in the world was launched in England in 1821 (Frankel, 2002; Calvo and Miskin, 2003).

Another period of enforcement of the fixed exchange rate system occurred with the implementation of the Bretton Woods system. During this period, an adjustable fixed exchange rate system was implemented. For all countries except the U.S. which is included in the system, the value of money was determined not by the money of another country, but was dictated primarily by gold (\$ 1 = 35 ounces of gold). Thus, the money of other countries is indirectly linked, as explained below. In terms of the value of the national currency against the dollar, this system could experience ± 1% fluctuation in rates. (Frankel, 1999)

The Bretton Woods system defines that the value of the national currency is denominated in U.S. dollars. The pair were called to the currency (dollar parity). Currency markets were allowed the permissible value of the parity of the national currency to fluctuate in both directions around 1 percent or less (Yin-Wong, 2009).

Advantages:

Currency risk reduction, Providing information concerning the expected future reduces the risk of foreign exchange. Therefore, this causes increases in foreign investment and international transactions.

Introduction to international market, This reduces uncertainty that is not due exclusively to the entrance of foreign investment. It also facilitates entrance into the international markets of local economic units.

Reduction in interest rates, This reduces uncertainty regarding internal interest rates and reduces the risk premium on foreign borrowing.

Resistance to monetary shock, This neutralizes the effects of unexpected changes in the exchange rate of the money supply.

Disadvantages:

Reliability, It is important that people can trust that the fixed rate regime will be carried out continuously. If the government loses this confidence, it can result in a very costly economic crisis.

Dependent monetary policy, Fluctuations in foreign currency affect the entire local economy. In addition, it will become more difficult to manage targeted exchange rate stability in order to implement an independent monetary policy.

Shocks, A fixed exchange rate regime is extremely fragile against external shocks and internal shocks caused by the real sector.

Current account deficit, Exports will decrease and imports will increase under a local currency decline. This will cause a current account deficit.

2.4.2 Flexible Exchange Rate Systems

Demand and supply of currency and money value defines exchange rates. However, market conditions determine the prices of foreign exchange, which can quickly change due to supply and demand. In flexible exchange rate systems, central banks do not control and intervene in rates. The opposite scenario, when central banks intervene in the market and define the limits and bands of exchange rates, it is called a fixed exchange rate system (http://www.policonomics.com/).

In addition, with this explanation of flexible exchange rate, different types of flexible exchange rates exist. The first are called pure floating regimes and the second are referred to as managed floating regimes. Official purchases and sales of currency are not allowed in pure floating regimes. However, there are some official purchases and sales of currency in managed floating regimes, so some interventions are allowed in this type of exchange rate regime (Jeanne,2000).

Flexible exchange rate regimes were rare before the late twentieth century. Before World War II, to ensure an appropriate exchange rate, governments purchased and sold foreign and domestic currency to arrange their trading policies. But after much testing with flexible exchange rates during the 1920s, many countries returned to the gold standard. In 1930, flexible rate regimes started to be employed again. Before the war, more than 50 countries were on the gold standard. However, many countries would abandon it just before World War II began (Frenkel,1978).

In 1944, near the end of the war, international policy coordination became more important. Following this, the Bretton Woods agreement was signed, and currencies were pegged to the dollar, which in turn was pegged to gold. The Bretton Woods system completely collapsed in 1973, which was followed by the move to a flexible exchange rate system.

Advantages:

Resistance to external shocks; The most important benefits of a floating exchange rate regime is resistance to external shocks, because such a regime is completely free to new conditions and exchange rates in the foreign exchange market functioning effectively, especially as they provide rapid and full compliance shocks.

Competition on foreign trade; Another advantage of the floating exchange rate regime is that the home country does not have a loss of competitiveness in foreign trade depending on the appreciation of the exchange. Balance of payments is not typically a problem.

Independent monetary policy, Currency stability is not a target in this system, so the central bank has the opportunity to carry out more effective monetary policy.

Disadvantages:

Imported inflation, A foreign country's inflation is imported with the floating exchange rate system.

Potential reduction in business and financial transactions, Depending on the structure of a free floating exchange regime, the risk perception of economic agents can increase. Therefore, risk premiums will increase and cause decreases in financial transactions.

Destruction due to currency risk, those firms or banks that have open positions may lose financially when the exchange rate increases.

2.5 Determinants of Currency

Exchange rates determine the relationships between two countries. As it's known, exchange rates are relative and are stated as a comparison of the currencies between countries.

Differentials in Inflation: For instance, the procurement of dollars rises relative to demand. Procuring large amounts of the money will of course create inflation. U.S. prices will then begin to increase relative to prices of goods and services in countries except the U.S. A higher rate of inflation in the U.S. compared to other countries at the same time will cause increases in exports from other countries to the U.S. and will also cause decreases in U.S. exports to other countries. Those countries that have higher inflation will face depreciation in their own currency in relation to the currencies of their trading partners. This is also generally causes higher interest rates.

Differentials in Interest Rates: As is widely known, interest rates, inflation and exchange rates are related to one another. If any changes in interest rates occur, this influences inflation and exchange rates. In this way, changes in interest rates affect inflation and the value of currency. Lenders prefer a high level of interest rates in an economy to secure sufficient earnings with higher returns relative to other economies. In other words, a high level of interest rates influences capital flows between countries. This in turn causes increases in exchange rate levels. Similarly, low interest rate levels leads to decreases in exchange rates.

Current -Account Deficits: A current account deficit occurs if the earnings from the export of goods produced by a country is less than the imported goods and services. On the other hand, a country which has a deficit pays more for foreign trade than what it earns, and this means that the country must borrow more capital from foreign sources to close the gap.

Public Debt: This is defined as the difference between all the income and expenses of the country. The only way to cover the gap is by borrowing or printing money. A large public debt cause inflation to rise, and if inflation increases, the public debt will increase. Under such a scenario, the government will need to supply money to pay its debt, but increasing the money

supply will cause higher inflation. Higher inflation will then lead to rises in interest rates, and, as expected, this will cause increases in public debt. The vicious circle has been realized.

Terms of Trade: This is a tool that measures changes in a country's imported and exported product according to the price of goods due to gains from foreign trade. Rising terms of trade allow a country to realize gains from trade, while decreasing terms of trade cause damage to a country. Simply, a definition for the terms of trade is the ratio of export prices to import prices. The terms of trade of a country can increase when export prices rise or import prices fall. Otherwise, there is a deterioration when the terms of trade decrease.

Political Stability and Economic Performance: Foreign investors search for especially strong economies and a great performance, investing their capital to achieve a higher return. If a country is perceived as having positive attributes by investors, of course this country will attract more investment than other countries.

2.6   Models of Exchange Rate Determination

There many determinants in the market that affect exchange rates positively or negatively. It is not possible to foresee fluctuations in the market, so it is not possible to accurately judge the future level of exchange rates.

Despite this fact, there are some methods that demonstrate where exchange rates should be in the future under present conditions to help investors make decisions about the future.

2.6.1   Partial Equilibrium Models

2.6.1.1   Purchasing Power Parity

Purchasing power parity eliminates differences in price levels between countries. It describes the changing ratio which equates the purchasing power of different currencies. On the other hand, purchasing power parity allows for the determination of a comparison of the exchange costs of goods and services between countries. The theory that the determinant of price differences between countries assumes that the importing and exporting activities resulted in a change in the spot exchange rate.

Following are some assumptions (Aslan and Kanbur, 2007);

- There are no transportation costs.

- There are no insurance expenses.

- There are no other transaction costs other than those above or other negligible costs.

- There are no barriers to trade between countries as to how goods can be traded freely between two cities, and the same rules apply.

- The nature of the goods in both countries is the same.

  There are some elements of the PPP theory that make it very important today. These can be listed as below (Kasman and Ayhan, 2008):

- Nominal and real shocks occurring together with deviations from PPP are used to explain movements in the real exchange rate.

- PPP determines the degree of exchange rate mismatch.

- Ensuring PPP is one of the assumptions in open economy macroeconomics.

- PPP aims to eliminate the inflation differential in the comparison of income between countries.

- PPP is used for the generation of parity.

The PPP theory assumes that in the exchange ratio between one currency and another, there is a balance between the currencies as domestic purchasing power. G. Cassell is shown as the modern architect of this theoretical approach. We see that the theory was clarified with Cassell's studies in 1916. In his analysis, Cassell argues that consideration of the absolute level of foreign exchange is not enough. Changes in this level ought to be considered.

2.6.1.2 Interest Rate Parity

Monetary policy makers agree that monetary policy changes affect exchange rates. The local currency usually appreciates when local interest rates increase and depreciates the local currency when the local currency decreases. This shows that the price of assets plays a key role in exchange rate fluctuations. Exchange rates are influenced by interest rates and inflation. This theory was developed by Keynes.

2.6.1.2.1 Covered Interest Rate Parity

Let's compare China and the U.S. for this model. The nominal interest rate at time t in the PRC is i_t, and at time t in the .U.S. is i_t^*, the spot exchange rate is S_t, and the forward exchange rate at time t+1 is S_{t+1}. If an investor in the PRC deposits one yuan in Chinese currency, he will get a return of i_t at time t+1, and the sum of his principal and interest rate at time t+1 is $i_t + 1$. If

this investor exchanges his one yuan domestic currency into USD at time t and then deposits it in a U.S. bank with an interest rate of i_t^*, the sum of his principal and interest in dollar terms is $(1+i_t^*)/S_t$. However, since the forward exchange rate is S_{t+1}, the sum of the principal and interest in yuan terms is $(1+i_t^*)S_{t+1}/S_t$. In a perfectly competitive market, it is generally known that it is less likely for the gap between the domestic currency's yield and that of the USD to persist for any length of time. In other words, the return from depositing yuan in the PRC must be the same as the return from depositing USD in the U.S. Covered interest rate parity can explain the relationship under the following conditions:

$$1+i_t = (1+i_t^*)S_{t+1}/S_t \qquad (4)$$

or

$$1+i_t/1+i_t^* = S_{t+1}/S_t \qquad (5)$$

The above equation is the definite covered interest rate parity (CIRP) condition. Covered interest rate parity may also be generated directly from the PPP and the Fisher condition. Based on the Fisher condition, real interest rates can be shown as below, both at home and abroad:

$$\left(1+i_t\right)P_{t+1}/P_t = (1+r_t)$$
$$\left(1+i_t^*\right)P_t^*/P_{t+1}^* = (1+r_t^*)$$

As is well known, real interest rates are shown using the following formula:

$$\left(1+i_t\right)P_{t+1}/P_t = \left(1+i_t^*\right)P_t^*/P_{t+1}^*$$

Assuming

$$P_t = S_t P_t^*$$

or PPP holds, then we reach the Covered interest rate parity condition.

$$\left(1+i_t\right) = \left(1+i_t^*\right)S_{t+1}/S_t$$

Rendering the model even more clear, we present the following formula:

$$1 + f_{t+1} = S_{t+1} / S_t \, ,$$

(6) where f_{t+1} is defined as the forward premium (discount), the proportion by which the forward exchange rate exceeds (falls below) its spot rate.

Using (6), (5) can be rewritten as

$$1 + i_t = (1 + i_t^*)(1 + f_{t+1}) = 1 + f_{t+1} + i_t^* + i_t^* f_{t+1}$$

(7) Since $i_t^* f_{t+1}$ is such a small number that it can be omitted, (7) can be written

approximately as $\quad i_t = f_{t+1} + i_t^* \quad$ (8)

If the home interest rate is higher than the foreign interest rate by an amount equal to the forward premium or discount on home currency, then it is called the normal form of the CIRP. According to CIRP, if the exchange rate of, say, the yuan against the USD is fixed, the interest rates of the two countries should be equal, so that a small country in a pegged exchange rate regime cannot manage monetary policy independently.

Levi (1990) demonstrated that deviations from the CIRP might occur due to major reasons listed below;

- Transaction costs,
- Political risk,
- Potential tax advantages, and
- Liquidity preference (Levi, 1990).

2.6.1.2.2 Uncovered Interest Rate Parity

Nevertheless, investors may encounter ambiguity over future events. As is generally known, market expectations can strongly define and influence future exchange rates. If there is uncertainty in the market, uncovered interest rate parity (UIP) may take hold.

Given that all other variables' symbols do not change but that the forward exchange rate $1 + t$ S is substituted by the expected exchange rate $)$ ($1 + t$ S E, the UIP condition can be formulated as follows;

$$1 + i_t \big/ 1 + i_t^* = E(S_{t+1} / S_t) \tag{9}$$

The above equation is the definite form of UIP. As it is known, much like PPP, UIP does not empower investor's choices. On the other hand, (9) is originated when investors are risk neutral. This means that agents are indifferent between an investment yielding a completely secure return, on the one hand, and one offering the prospect of an identical return on average, but with the possibility of a much higher or lower return. On the other hand, they are related only with average returns.

At the same time, the below equation can be used:

$$ES_{t+1} / S_t = 1 + \Delta s_t^e \tag{10}$$

where, Δs_t^e is the expected rate of appreciation of foreign currency, and then substituting (3.11) into (3.10) and ignoring the smaller number as we did previously, we get the formal uncovered interest rate parity condition:

$$i_t = i_t^* + \Delta s_t^e, \tag{11}$$

Formula (11) demonstrates that the local interest rate must be higher than the foreign interest rate by an amount equal to the appreciation rate of the foreign currency in question. As with PPP, uncovered and covered interest rate parity conditions are ensured under the assumption of no transaction barriers, a perfectly competitive capital market and no arbitrage opportunities at equilibrium. Simply put, this kind of equilibrium remains partial because only the assets market is considered (Hooper; Kohlhagen,1978).

2.6.2   The Mundell-Fleming Model

The provision of internal and external balance demonstrates macroeconomic stability in the IS-LM model. Adding to free capital movements to this model with studies of different exchange rates allowed for significant improvements in the economic literature (Uğur and Karatay, 2009).

The IS curve in the model shows the property market and also demonstrates the relationship between interest rates and national income. The IS curve is downward sloping Because the central bank determines the money supply while interest rates and the demand for money are

determined by national income, national income tends to increase when money demand decreases.

The LM curve in the model demonstrates the relationship between interest rates in the money market and GDP. The LM curve is positively sloped. Because the money supply is determined by the central bank, money demand and interest rates are determined by national income. National income increases when the demand for money increases. There is a positive relationship between the demand for money and national income. However, the interest rate increases when the demand for money decreases.

If the BP curve in the model represents the balance of payments, the slope of the curve BP is zero. The BP curve demonstrates the sum of the current account balance and the capital balance sheet. A full capital mobility BP curve assumes world interest rate (i *) and is a true parallel to the horizontal axis. In this case, this causes capital inflows to the country if the remaining part of the curve is toward domestic interest rates (i). Otherwise, outflows from the country will occur (Gok, 2006).

$$Y = C + I + G + (X - M)$$

and definitions;

Y   domestic national income;

C = C(Y)   consumption which is a function of income;

I = I(i)   investment, which is a decreasing function of nominal interest rate i;

G   government spending;

X = X(Y*,q)   exports, which is an increasing function of foreign national income and real exchange rate.

M = M(Y,q)   imports, an increasing function of domestic income and decreasing

function of the real exchange rate. The real exchange rate is defined by $q = \dfrac{SP^*}{P}$, where *S* is the nominal exchange rate;

P,P*   : domestic and foreign prices.

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Second, money market equilibrium is directly defined by the LM curve. Let Md/P = L(Y,i) represent money demand, which is an increasing function of domestic income and a decreasing function of the interest rate, and Ms represent money supply. The money market equilibrium condition can be written as follows:

$M^s/P = L(Y,i)$. (13)

As a result, the external equilibrium is defined by the BP equation:

$BP = CA + KA = 0$ (14)

where, current account $CA = PX - SP*M$ and capital account. $$KA = K(i - i^* - \Delta s^e)$$

2.6.3   The Balassa-Samuelson Model

Consequently, in this model the relationship between consumer and producer behavior is not completely considered. We observed that PPP and CIRP demonstrate different aspects of partial equilibriums. Nevertheless, the effect of supply and demand on each other describes price levels. The first step in identifying the effects of the real exchange rate is to associate producer and consumer behavior, which are related to the fundamentals of the micro economy of exchange rate theory.

This model demonstrates the role of creative games on the real exchange rate. (Macdonald, Ricci, Engel, Isard, Melitz, Ouliaris, Prasad, 2005)

Obstfeld and Rogoff(1996) introduced the primary version of the Balassa-Samuelson model using a single-factor aggregate production function. The formulas below show that the easiest model is the production functions of tradables and nontradables:

$$Y_T = A_T L_T$$
$$Y_N = A_N L_N$$
$$Y_T^* = A_T^* L_T^*$$
$$Y_N^* = A_N^* L_N^*$$

where Y is production, A is a constant describing technology, and L is the labor force. For technological parameters value A, there are differences between foreign and domestic

economies. The sub-index T symbolizes the tradable sector, and the sub-index N the nontradable sector.

At the same time, this model for tradable goods is supposed to be applicable to the world price of tradable goods and is equal to a model without a loss of generality. For all that, in each of the economies among the sectors, we accept that there is perfect labor mobility, and there is zero mobility of labor. The mobility of labor ensures that the wage rates w are equal in other sectors of the same economy. The price index is described as follows, which is the weighted geometric average of prices of tradable and nontradable goods (Burstein, Eichenbaum, Rebelo; 2005).

$$P = (p_T)^{\gamma}(p_T)^{1-\gamma} = (p_T)^{1-\gamma} = \left(\frac{A_T}{A_N}\right)^{1-\gamma}$$

Where γ is the share of tradable goods in total outputs. If this share is the same at home as abroad, the relative price vis-a-vis the outside world is

$$\frac{P}{P^*} = \left(\frac{A_T/A_N}{A_T^*/A_N^*}\right)^{1-\gamma}$$

the nominal GDP per employee can be expressed as $GDP_{nom} = A_T$. So the relative price can be turned to;

$$\frac{P}{P^*} = \left(\frac{GDP_{nom}}{GDP_{nom}^*}\right)^{1-\gamma}\left(\frac{A_N^*}{A_N}\right)^{1-\gamma} \qquad (15)$$

There are two production factors, which are labor and capital inclusion, that are part of the general model. If we assume a small economy which makes hybrid goods, this economy is manufacturing tradables and nontradables. Now, if we consider the production function as a function of capital and labor, and with that, non-varying return to scale:

$$Y_T = A_T F(K_T, L_T),$$
$$Y_N = A_N F(K_N, L_N),$$

where *K* denotes capital. Taking the log-differentiation of the relative price of tradable goods and nontradable goods;

$$\hat{P} - \hat{P}^* = (1-\gamma)\left(\frac{\mu_{LN}}{\mu_{LT}}(\hat{A}_T - \hat{A}_T^*) - (\hat{A}_N - \hat{A}_N^*) \right)$$

(16)

where $\mu_{LT} = wL_T / Y_T$ and $\mu_{LN} = wL_N / pY_N$ are one by one the labor share of the income created in the tradable and nontradable goods sectors. If nontradables are relatively

intensive in terms of labor which means $\frac{\mu_{LN}}{\mu_{LT}} \geq 1$,

model estimates of the domestic economy will be more helpful in predicting a real rise in value provided that the economy's rise in efficiency results in an advantage in tradables that extends beyond its rise in efficiency advantage in nontradables (Obstfeld and Rogoff, 1996).

We know the theory of the Balassa-Samuelson model, which is important for the real equilibrium exchange rate. The theory of the Balassa-Samuelson model argues that while performance is increasing in the tradable sector, it leads to a proportional increase in wages. These wages relate the tradable to the nontradable sector, and this also causes an increase in the nontradable sector in terms of wages and prices. This causes an increase in the mean price level, which also leads to an increase in the real exchange rate (Akila, 2004).

If we consider PRC, relative to developed countries, efficiency is very low, both in tradable and nontradable goods. With developments and economic reforms, China was among the last of developed countries in terms of its economic and technological level of development. This caused cheap labor, a rise in efficiency, and foreign direct investment. Balassa-Samuelson

predicts that China should be faced with real depreciation. In the long term, this causes nominal appreciation pressure.

2.6.4   Simple Monetary Exchange Rate Model with Price Flexibility

The Mundell-Fleming model contains the balance of international payment. However, contrary to the Mundell-Fleming model, in an ordinary situation, to reach money market equilibrium PPP and UIP, a situation with just an item and a warrant must be intentionally created. Three blocks are contained in this model (Sercu, 2009).

The first money market equilibrium equation is shown below:

$$m_t - p_t = -\eta i_t + \phi y_t \qquad (17)$$

In this equation;

P   log price level,

İ nominal interest rate,

y   log of real output

m   log of money supply.

If we describe;

e   the log of the nominal exchange rate which is described as the price of foreign currency in terms of domestic currency;

p*,p the log of the world foreign currency price of the goods basket and the log of the domestic currency price level. The PPP in log terms is; (Taylor, Taylor; 2004)

$$e_t = p_t - p_t^* \qquad (18)$$

The third one is uncovered interest parity. It is almost expressed in the forms of logs:

$$i_t = i_t^* + E_t e_{t+1} - e_t \qquad (19)$$

With some manipulation, using (18) and the UIP approximation equation with money market equilibrium equation (17), we arrive at:

$$e_t = \frac{1}{1+\eta} \sum_{s=t}^{\infty} \left(\frac{\eta}{1+\eta} \right)^{s-t} E_t \{ m_s - \phi y_s + \eta i_t^* - p_s^* \}$$

(20)

Considering the money provider, the foreign interest rate and price, this simple monetary model indicates that the exchange rate relies on recent values and estimated future values of relevant variables. The local price level and nominal exchange rate level rises with an increase in the local money provider and foreign interest rates. The domestic level and nominal interest rate is negatively affected by changes in the real domestic level and nominal interest rate (Krugman and Obstfeld, 2003).

The local interest rate and price level are similar to the fixed exchange rate regime at the most difficult times.

The money provider is internally defined by local output, the foreign interest rate, and the foreign price level:

$$m_s = \phi y_s - \eta i_t^* + p_s^* .$$

2.6.5   Price to Market and the Exchange Rate Regime

The currency models of Dornbusch and Obstfeld and Rogoff are dependent upon simple PPP.

However, some empirical studies and experiences in Japan demonstrate that over the short term, nominal exchange rate changes only partially pierce consumer prices. To demonstrate this fact, Devereux and Engle (2003) suggested some other kind of price stickiness: prices are pre-arranged in the consumer's currency (Devereux and Engle, 2003).

In the short run, the effects of increasing consumer prices can be negligible to exchange rates in terms of local currency pricing. Policy makers are not able to adjust to real shocks if prices do not directly affect exchange rates. (Edwards and Savastano, 1999).

Otstfeld (2004) goes further in developing the model of Devereux and Engle in two modalities. First, he designed monetary policy as a choice of the nominal interest rate instead of the monetary aggregate. Second, he demonstrated nontraded goods in the LCP system. However, his

result is at odds with that of Devereux and Engle. He contends that countries can be free not to intervene in interest rates when they choose a floating exchange rate regime.

2.6.6 Currency Interventions

Nowadays, central banks of developing countries primarily use foreign market intervention. However, developed countries use this less so. Some reasons for most developed countries to not effectively interfere include the following:

- As is commonly known, if interest rates or other policy arrangements are explained earlier, then this parameter may become effective.
- Significant intervention can devastate the viewpoint of monetary policy.
- Financial markets have sufficient funds to compensate for shocks

There are different types of intervention (Sarno and Taylor, 2001). These are described below.

Direct intervention: Central banks, may be involved in trading in order to achieve the short- and long-term monetary policy objectives of the market. When subjected to intervention, central banks strive to reduce/increase currency using tools such as interest rate variables to reach policy predictions in the market. The interventions may vary depending on the circumstances. Situations that require intervention take shape within the framework of monetary policy targets that are being implemented.

Sterilized intervention: Central banks want to obtain foreign capital from the market. Central banks will offer domestic currency instead of foreign currency, thus expanding the money supply. When the money supply expands, the value of domestic currency falls, and this raises the value of foreign currency. Such intervention is called sterilized intervention.

Non-sterilized intervention: Nonsterilized intervention changes the monetary base. Particularly, authorities affect the exchange rate by buying or selling foreign currency or bonds with domestic currency. For instance, by aiming to decrease the exchange rate/price of domestic currency, authorities might be able to purchase foreign currency bonds. During this process, an extra supply of domestic currency will decrease the domestic currency price, and an extra demand for foreign currency will increase the foreign currency price.

The conclusion is that the exchange rate will go down. In addition to this, the influence of sterilized interference is more contradictory and uncertain. The definition of sterilized

intervention indicates that it has a very weak or no effect on local interest rates because the degree of money providers has remained unchanged.

The signaling channel theory says that agents sometimes recognize exchange rate intervention as an indicator of the future view of policy. Following this, the possibility of hope will influence the current level of the exchange rate (Obstfeld, 1996).

Indirect intervention: Indirect currency intervention is a procedure that implicitly affects the exchange rate. Capital management (taxes or limitations on transnational processes in wealth) and exchange controls (the limitation of trade in currencies) are a few of these examples. These tactics may cause ineffectiveness or decrease market trust, however, which could be seen as a crisis of lost control (Obstfeld, 1996).

The thought of the signaling channel proposal is that by dealing with intervention, the central bank briefs the market, or dispatches a signal, about its impending monetary policy plans. Accepting that financial markets are farsighted and monetary policy is a foreign exchange rate consideration, knowledge about impending monetary policy can in turn affect current exchange rates (Mussa, 1981).

2.7   International Capital Movements

2.7.1   International Capital Flows

International capital movements is transferring funds from one country to another country from a person or institution to another person or institution to buy activities. International capital movements are classified as short-term and long-term capital flows according to the balance of payments. Capital tends to increase in developed countries according to developmental progress. An increased amount of capital causes a decrease in the return of capital from interest.

Therefore, profit from capital, according to the amount of capital, tends to decrease, so that capital generally flows from developed countries to developing countries. These days, foreign capital is mobilized in large part by multinational companies.

2.7.2   Classification of International Capital Movements

2.7.2.1   International Private Capital Flows

Portfolio investment, foreign direct investment and private capital flows might be seen as additional private capital flows.

Foreign Direct Investment**:** This refers to the orientation to invest in the production of goods and services with intangible rights, buying factories in the country, building, leasing physical assets such as land, opening branches, along with acquisitions in the form of investments and lending. Reinvesting the profits earned from investments of foreign capital with the use of this capital is also considered within the scope of foreign investment.

Portfolio Investment: Saving owners are investing in capital market instruments, despite political risk, country risk, foreign exchange and currency risk, and economic risk, by undertaking additional risks in order to obtain benefits, such as interest and dividend income, stocks, and bonds. The goal of investors is to achieve the highest return. However, the fund will distribute what is on hand to ensure the highest return among the various levels of risk in certain securities. At the same time, it is very important to keep the capital secure.

Other Investments: Other capital movements can be divided into long-term and short-term capital movements. Long-term capital movements of the banks, the public sector, private companies, and international financial institutions, which they receive from foreign governments, are referred to as loans. Investment banks, the IMF and the World Bank, the banks' consortiums and other organizations are a source of such funds (Snow and Kelly, 2002: 9).

2.7.2.2   Official Capital Flows

Official loans, because they are usually associated with the development of the country, are also called development loans or foreign aid. Such capital movements are guided by official institutions. These include official capital movements, including economic, political, military, cultural, historical, humanitarian, and moral reasons from which they arise.

Official loans, separate from market conditions, have low interest rates and are typically long-term loans (Pazardzhik et al., 1989: 16). As an official aid agency, the Organisation for Economic Co-operation and Development (OECD) was established within the "Assistance for Development Committee (DAC)" to secure public aid for development or official aid "within the meaning of uses" (OECD, 2014).

Public bilateral aid (includes aid from the government, while multilateral (aid comes from the government of international organization sand is divided into two groups. Bilateral aid includes financial transfers (project loans), while food assistance (and technical assistance are divided into

three groups. Multilateral benefits are provided by international organizations or aid organizations (Sönmez, 1998: 115).

2.7.3   Foreign Exchange Risk

The definition of exchange rate risk can be understood differently by various financial managers of business. The reason for this is confusion between the concepts of "foreign exchange exposure" and "foreign exchange risk" (Habibnia, 2013).

Foreign exchange risk represents the changes that are caused by an unexpected change in exchange rates because of a company's income and expenses or in general cash flow. 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 (Habibnia, 2013).

The reasons for exchange rate risk are as follows:

- 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.

When foreign exchange rate risk is investigated, it appears that it has different effects on financial tables and cash flows in the future. For this reason, there are three types of foreign exchange risk for businesses operating on an international scope (Dufey and Srinivasulu, 1983).

These risks are as follows:

- Transformational risk;
- Transactional risk; and
- Economic risk.

Transformational Risk: Transformational risk is defined as "The risk that is caused by obligation of saving assets and liabilities with different currencies, in other words foreign currencies and conversion of foreign currencies to each other." It also identified as an accounting risk. More

specifically, this type of risk is faced by multinational companies frequently, and it is important to manage (Christoffersen, 2011).

Transactional Risk: Transactional risk 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. As a result, if businesses export continuously, they will be more commonly exposed to transactional risk. Uncertainty regarding exchange rates over the long term causes cash flows to face different risks, and costs increase with the increase in exchange rate pressure (Guay and Kothari, 2003).

Economic Risk: Economic risk includes the long-term effects of the foreign exchange rate. The effect of changes in foreign exchange rates on the economic value of business is expressed in economic risk. In other words, it is the effect of the differences between liabilities of business and assets of business with the change in exchange rate to today's value. This is the change of today's net value of expected cash flows in the future (Guay and Kothari, 2003).

2.7.4   Effects of Foreign Exchange Rate Risk on Commercial Transactions

In determining the effect of foreign exchange risk to companies, strategy development and an increase in the methods of managing foreign exchange risk will be increased. Business is affected multidirectionally from exchange rate movements in the determination of company value, marketing management, international transactions, financial statements and strategic management decisions.

Exchange Rate Effects on Company Value: Developing economies that experience intense financial crises and sudden changes in exchange rates face challenges in the continuous protection of company value. Especially in instances of volatility in the price of goods, volatility in exchange rates, volatility in interest rates, and the effect of competitors, possible market shrinkage will decrease company value (Guay and Kothari, 2003).

Exchange Rate Effects on Pricing: Currency unit differences between countries create an important complication from the viewpoint of the exporter. First, it looks for answers to "which exchange rate will be used for determining issue price" question. While the exporter's currency is generally accepted, developed country exporters often prefer to use their own currency. Exchange rates significantly affect both exporters and importers (Guay and Kothari, 2003).

Exchange Rate Effects on Company Competetive Power: Internal and external boundaries of a company influence competitive power. Long-term returns depend upon competitive power. If a company estimates the risks that are caused by variations in the exchange rate and doesn't use protection through risk strategies, it will lose its competitive power by giving its advantages to companies that have a financial advantage. Again, in situations where importers engage in transactions with different currencies, it causes decreases in purchasing power and a loss of competitive power (Guay and Kothari, 2003).

Exchange Rate Effects on Financial Statements: Financial statements are the most obvious factors that are affected by exchange rate movements. How to expresses the currency of company assets, resources, income and expenses is an important problem. Which currency transactions on financial statements will be expressed is also important.

2.7.5 Hedging

A multinational company with transactions in foreign currencies is exposed to foreign exchange rate risk because currency fluctuations can have a negative impact on financial performance.

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. Moreover, hedging is a price method designed to reduce the risk of price fluctuations. The same or very similar goods in a selling or buying process are separated into two different markets simultaneously with an equal amount.

As mentioned above, hedging of foreign exchange rate risk is used to decrease the effects of currency fluctuations. It reduces the risk of unfavorable exchange rate movements by taking an offsetting position (Bereke and Hodrick, 2007).

A company's hedging strategy and policy are determined in relation to internal and external determinants. Some of the internal factors are capital structure, managers, shareholders, businesses, company structure, financial performance and forecast reliability. External factors are accounting standards, market volatility in relation to the financial crisis, and technological development.

2.8 Foreign Exchange Regime and Risk in Turkey

2.8.1 Exchange Rate Policies in Turkey

The exchange rate regime applied in Turkey for a considerable period is the fixed exchange rate. Founded in 1950, it was based on the true British pound, Then, after 1950, USD based rates were used. One of the milestones relating to the regime of the foreign exchange market when direct controls were put into place in 1930 was law number 1567 regarding the value of money protection. Applications under this law calling for monetary policy to carry out the duties of the "Central Bank" failed due to the absence of countries.

In past years, including 1947, and when the first devaluation was examined in 1946, World Bank and IMF members began to observe a fixed exchange rate and adjustable applications. On May 1, 1980, it also switched to a single exchange rate system, and the exchange rates began to be announced by the Central Bank on a daily basis. Grand National Assembly of Turkey (TBMM) decision on the degree came into force in 1983, and in 1984, came into force to ensure freedom of foreign exchange regime practices (Ward, 2013).

Liberalization of foreign trade and the financial sector during the post-1980 period is the basis for the selection policy. The implementation of the most important steps toward this selection, one occurring in 1989, was the full liberalization of capital movements and the rendering of the Turkish Lira (TL) as convertible instruments. From 1980-1982, the main concern was the liberalization of the banking sector. As a first step, deposit limits on interest rates were abolished in 1981. By 1984, currency had been liberalized.

In 1986, the Central Bank developed a marketing arrangement with Interbank that began its open market operations. (On May 1, 1981, with the adoption of daily exchange rate practices, such practices began to set daily exchange rates of the banks, the main objective of which was the prevention of a foreign exchange black market, which lasted until 1983.

There was a second period of the liberalization program (1983- 1987), and the basic emphasis during this period was based on the creation of financial institutions. In this context, the law of the Capital Markets Board was established in 1983 by decree. Secondary arrangements were made for market operations and securities in Istanbul in 1986, the year that exchange was founded.

In 1985, structural weaknesses in the banking system was accepted by a new banking sector that aimed to correct operations. Later, in 1986, the Interbank money market and the Central Bank were created, and in 1987, open market operations had begun. In 1989, foreign exchange market operations and international capital movements had been completely liberated, and the TL was convertible. The next year, banks were completely free to determine interest rates that could be applied. They were free to make this determination completely in 1989.

At the end of 1993, a stabilization program was introduced. This program was applied to the nominal exchange rate as an anchor in order to reduce inflation. In 1995, a stand-by agreement was signed with the IMF, and the agreement extended to the foreign exchange rate.

In 1996, while implementing monetary policy, the Central Bank exchange rate policy within the framework was minimizing fluctuations in the real exchange rate, but could not prevent the real exchange rate. The Central Bank continued monthly nominal devaluation in 1997 and 1998 to achieve the projected inflation rate.

As 1999 approached, the "Exchange Rate Reduction Program Based on Inflation" had been implemented. The stand-by agreement with the IMF was signed in 2000, covering a three-year program. The three main elements of the program¬ – a tight fiscal policy, an income policy with a monetary inflation target, and an exchange rate policy – were determined. The target inflation rate for 2000 was 20 percent, and the currency basket provided an increase of 18 percent. Negative developments caused a crisis to occur November (Gazioglu, 2001).

In February 2001, a second crisis occurred in mid-April. A "Transition to a Strong Economy Program," with measures and regulations explained to the public, was accepted. The floating exchange rate system was adopted (Arata, 2003: 24).

The Central Bank announced in a statement that the annual policy would continue in the floating regime, which was introduced in 2004.

Between 2003 and 2007, a high continuous growth policy, with corresponding tight monetary and fiscal policies, was implemented (Özatay, 2005).

2.8.2   International Capital Flow Policies of Turkey

In 1986, 1992 and 1995, the framework of foreign capital legislation took shape in various decisions made, and by 1996, Turkey had become more liberal with EU customs, and an agreement to join the EU was signed in 1999 and eventually made effective in international

arbitration (Central Bank, 2000: 52). In the period after 1980, in the context of these developments, foreign direct investments have increased, although these increases remained limited. In particular, these investments increased until the beginning of the second half of the 1980s and 1990s.

2.8.3 The Effects on Capital Movements and Exchange Rate Volatility in Turkey

Today, with the acceleration of the process of financial globalization, securities and external factors such as stock exchange indices and domestic financial market price variables have an effect on foreign capital.

The increase in domestic exchange rate volatility negatively affects a company's exports and its profitability. The increase in the rate of volatility of foreign exchange will reduce the number of foreign companies. Between 1999 and 2006, Turkey provided investments in equities and foreign capital inflow that have reached $1 billion.

2.9 Field Studies on Foreign Exchange Risk

RUNO (2009) investigated the relationship between foreign exchange risk and performance of oil companies in Kenya. It 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), who managed a similar study focused on the Kenyan airline industry, also found that foreign exchange risk is a major determinant of a company's profitability.

Hallgren (2006) investigated how foreign exchange risk is managed in Swedish mid-level corporations. The study found that mid-sized companies perceive exchange risk as the most critical risk to consider in international trade. The findings of this study indicate that managing the exchange risk of companies can be eased with access to the right indicators.

Batten (1993) investigated the issue using a cross-sectional study of foreign exchange risk management practices and product usage of large Australian-based companies. This study provides useful information on how to identify foreign exchange positions that support this thesis.

3   HYPOTHESES

As explained in the literature review section, real sector companies tend to keep open foreign exchange positions to exploit 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 premise emerges the second and third hypotheses.

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 in previous studies that companies very carefully follow their financial performance indicators and design their strategies accordingly. Risk-taking in the foreign exchange market is an important corporate policy.

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

4 VARIABLES, DATA AND METHODOLOGY

4.1 Variables

The aim of this study was to analyze the causes and consequences of high foreign currency exposure among Turkish real sector companies. The analysis was conducted at three stages.

The aim of the first stage was to determine the periods of currency overvaluation and undervaluation, which are measured as deviations from relative purchasing power parity.

Deviations were calculated with the following formula for each subperiod:

Real Return of Local Currency = (equilibrium rate − actual rate) / equilibrium rate

where the equilibrium rate is the fair value of local currency (TL) with respect to hard currency (USD) and is calculated with the relative purchasing power parity formula presented in the literature review section.

The aim of the second stage was to determine the financial performance differences between companies taking an open foreign exchange position and those that do not take an open position. The open currency position is the difference between entitled assets and liabilities net of hedged positions. The open currency position is the measure of the foreign exchange risk. The difference between the open position and the hedged position, is the measure of the foreign exchange risk.

There are different financial indicators that allow us to measure business performance. The key indicators used to assess the performance of a company are as follows: liquidity, profitability, leverage and efficiency.

Liquidity: Simply, conversion ability with low cost for an entity to quickly convert into cash. Liquidity ratios indicate the power to pay short-term debts of the company on time. The main liquidity measure is the current ratio, which is calculated by dividing current assets, or assets that can be converted into cash in the current year, by current liabilities. If the current ratio is greater than or equal to 1.5, the company is considered to be liquid.

Current Ratio (CR) = Current Assets/Short-term Liabilities

Profitability: The profitability of a company influences its value and the amount of income it generates for its owners. Two financial indicators that measure the profitability of a company are net profit margin and return on assets. Return on assets can be measured in two different ways. The profitability measures used in this study are return on assets measured with net income,

return on assets measured with net income, return on equity and net profit margin, which are defined as follows:

Return On Assets 1(ROA1) = Net Profit / Total Assets

Return On Equity (ROE) = Net Profit / Total Equity

Return On Assets 2 (ROA2) = Operating Profit -Tax / Total Assets

Leverage: Companies can have high debt but still perform well if they have used their debt to purchase assets, such as equipment or other companies. To determine the debt ratio, simply divide the firm's total liabilities by its total assets:

Debt Ratio = Total Liabilities / Total Assets

This financial indicator reveals how much of the debt the company used for assets that retained their value. A ratio below one means the company has the long-term ability to pay all of its obligations and survive challenges.

Efficiency: Efficiency ratios evaluate how efficiently the company manages its business. The asset turnover is net sales divided by assets, which measures how effectively the company puts its assets to work.

 Asset Efficiency (AE) = Revenues / Total Assets

Inventory turnover evaluates how efficiently the company manages its inventory and is the cost of sales divided by average inventory. A higher turnover means better performance for both ratios. The operating expense ratio is operating expenses divided by total revenue, which measures how much is spent to generate revenue. A lower ratio means a company is using its money efficiently.

Many studies have documented that firms' financial performance varies according to firm size. In this study, size – which is defined as the natural logarithm of sales – is added as a control variable. The variables are summarized at Table 1.

Table 1: Independent Variables

MEASURE	VARIABLE	ABBREVIATION	DEFINITION
Debt Ratio	Capital Structure	DR	Total Liabilities / Total Assets
Current Ratio	Liquidity	CR	Current Assets/Short-term Liabilities
Return On Assets 1	Profitability	ROA1	Net Income / Total Assets
Asset Efficiency	Efficiency Ratio	AE	Net Sales / Total Assets
Return On Equity	Profitability	ROE	Net Income / Total Equitiy
Return On Assets 2	Profitability	ROA2	EBIT -Tax / Total Assets
Size	Sales	LNS	Ln Sales (Net Sales)

4.2 Data and Sampling

To test the hypotheses of this study, manufacturing and service companies that are listed on the BIST 100 were selected. The final sample consisted of 30 firms, as shown at Table 2.

Table 2. Sectoral-based Company Summary Table

Automotive	Chemical	Food	Home Appliance	Retail	Total
10	6	4	3	7	30

The analysis period is 12 quarters, beginning with the third quarter of 2012 and ending with the second quarter of 2015. Data for financial position indicators is calculated from quarterly financial tables, and data for open positions is obtained from financial statement footnotes provided through the Public Information Platform (KAP) website.

Turkish Producer Price Index data were obtained from TUIK (http://www.tuik.gov.tr/). U.S. Producer Price Index data were obtained from the Producer Price Index (http://www.bls.gov/ppi/). Exchange rate values were obtained from the Turkish Central Bank web site (http://www.tcmb.gov.tr/).

4.3 Methodology

To test the hypotheses, one way analysis of variance (ANOVA) and ordinary least squares regression (OLS) methods were used. One way ANOVA aims to compare the mean of more than two groups is based on one factor (independent variable). The null hypothesis is the equality of

means (2008, Prentice-Hall, Inc.), The first three hypotheses of the study are tested with ANOVA.

Regression analysis is a statistical process for estimating the relationships among variables. To determine the relationship between causality, data obtained from study regression analysis is used to predict the dependent variable values depending on the independent variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables (or 'predictors').

Specifically, regression analysis helps to clarify how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables remain fixed. Additionally, the last hypothesis is tested with ANOVA.

5 ANALYSIS AND RESULTS

The final sample of the study consisted of 30 companies. The sample was divided into three groups with regard to sales. The size distribution of the sample is presented at Table 3.

Table 3. Size-based Company Summary Table

SIZE	LN SALES	NO OF COMPANIES
BIG	20 - 21	14
MEDIUM	18 - 19	11
SMALL	16 - 17	5

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 4.

Table 4. 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 there were no statistically significant differences between financial performance indicators and open position ratios across subperiods. The results are presented at Table 5.

Table 5. Subperiod 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	1,005
OPR	-0,0809	0,1583
* significant at 95% confidence level		
** significant at 90% confidence level		

The ANOVA test also revealed that mean financial indicators and open position ratios did not differ across the three size groups.

					Mean			
ANOVA TABLE								
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
1,00	60	-,0787	,21125	,02727	-,1332	-,0241	-,51	,40
2,00	132	-,0714	,14252	,01240	-,0959	-,0468	-,46	,21
3,00	168	-,0893	,10191	,00786	-,1048	-,0737	-,33	,05
Total	360	-,0809	,14016	,00739	-,0955	-,0664	-,51	,40
	Sum of Squares	df	Mean Square	F	Sig.			
Between Groups	,024	2	,012	,609	,544			
Within Groups	7,028	357	,020					
Total	7,052	359						

Among the 30 companies in the sample, 26 carried open positions, while the remaining 4 did not take any foreign exchange risk for all subperiods in the analysis. In addition, only 12 of the 26 did assume foreign exchange risk for all subperiods.

The first hypothesis, which states that the financial performance of companies assuming 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 Table6.

Table 6. 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 debt ratio of companies with a short foreign exchange position is higher than those with a long foreign exchange position, but the difference is not statistically significant. The current ratio of groups does not vary according to company size. Liquidity levels are the same for all groups. Asset efficiency is higher for those companies that do not assume exchange rate risk. This means that asset efficiency is much better for those companies that do not assume an open position. ROA1 is also higher for those companies that do not assume exchange rate risk. This means that profitability is higher in those companies that do not assume an open position.

In summary, if ROA is higher, asset efficiency is higher as well. For ROA2 levels, those companies that do not assume exchange rate risk are more profitable. This means profitability before interest is higher which does not have open position. As a result, for all subperiods, that profitability, as measured by ROA2, and profitability and asset efficiency, as measured by ROA1, are lower for companies that assume open positions than for those that do not assume open positions. The findings lend partial support to 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 7.

Table 7. 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 TL was overvalued for the terms of 2012/09, 2012/12, 2014/03, 2014/06, 2014/12 and was undervalued for the terms of 2013/03, 2013/06, 2013/09, 2013/12, 2014/09, 2015/03, 2015/06.

The gain and loss from the short position is defined as the product of the short position figure and ex-post real TL return. The results are shown at Table 8.

Table 8. Short Position Gains and Losses

Subperiod	Short position (mln TL)	Real Return of TL	Short Position Gain and Losses	Gain and Losses/ EBIT
2012/09	-5.874.353.079	0,50%	-29.640.850	-3%
2012/12	-5.248.989.967	2,55%	-133.851.591	-16%
2013/03	-6.183.486.373	-1,75%	107.992.115	10%
2013/06	-7.185.456.934	-4,84%	348.109.610	26%
2013/09	-7.405.767.690	-2,85%	211.307.288	23%
2013/12	-7.728.057.046	-2,80%	216.358.414	40%
2014/03	-6.870.341.895	1,93%	-132.539.499	-14%
2014/06	-7.064.220.844	1,31%	-92.677.302	-8%
2014/09	-8.737.628.899	-25,42%	2.221.201.012	224%
2014/12	-7.762.709.313	20,35%	-1.579.857.829	-233%
2015/03	-9.225.087.204	-8,86%	817.402.012	96%
2015/06	-6.324.022.969	-1,52%	96.237.981	5%

The companies in the sample lost TL1.968.567.071 in periods in which domestic currency was overvalued (terms 2012/09, 2012/12, 2014/03, 2014/06, 2014/12), and won TL4.018.608.432 in periods in which domestic currency was undervalued (terms 2013/03, 2013/06, 2013/09, 2013/12, 2014/09, 2015/03, 2015/06).

The second hypothesis posited that companies that assume 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 subperiods in which TL is appreciated against USD. The results are presented at Table 9.

Table 9. ANOVA 1

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 when compared to companies with a long position. The results are statistically significant at a 90 percent confidence level.

These findings demonstrate that companies with low operating profitability tend to assume foreign exchange risk. ROE (Net Profit / Equity) and ROA2 (Operating Profit-Tax / Current Assets), which show profitability, are lower for the group that does not have an open position when compared with the group that has an open position. No difference was found between the groups for ROA1 (Net Profit / Total Assets). The findings lend support to Hypothesis 2.

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 subperiods in which TL is depreciated against USD. The results are presented at Table 10.

Table 10. ANOVA 2

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		0,034	
* significant at 90% confidence level						

ROA1 (Net Profit / Total Assets) and ROA2 (Operating Profit-Tax / Current Assets), which demonstrate profitability, are higher for the group that does not have an open position than for

the group that has an open position. No difference between the groups was found for ROE (Net Profit / Equity). The findings lend support to Hypothesis 3.

The fourth hypothesis posited 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 was formulated:

Oprt =a+ aDRt-1+bCR t-1+cAE t-1+dROA1 t-1+eROA2 t-1+fROE t-1+e

Table 11. Correlation Table

Correlations						
	DR	CR	RE	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
RE	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	

As Table 10 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:
Oprt =a+ aDRt-1+bCR t-1+cAE t-1+dROA1 t-1+fROE t-1+e

OLS regression analysis is applied to test the model. Multicollinearity is checked with tolerance and VIF statistics. The results are presented at Table 12.

Table 12. Regression Analysis

Model Summary

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

For all three, current ratio (CR), asset efficiency (AE) and profitability (ROA1) were significant, which means that companies with higher liquidity and asset efficiency and lower profitability have a greater tendency to assume an open position.

Companies decide to take a foreign currency position by considering previous financial results, including profitability, efficiency and liquidity position. Companies with higher liquidity and asset efficiency and lower profitability tend to assume an open position. Companies that assume an open position have lower operational profits. They are willing to increase their profitability by taking an open position. This strategy works for the local currency overvaluation term, and companies are able to increase their profitability level during this period. However, they encounter serious loss of profit during periods of local currency depreciation.

Overall, when compared with similar previous studies, the major findings of this study are as follows: foreign exchange risk is the risk of a change (gain or loss) in a company's future economic value resulting from a change in foreign exchange rates (Oxelheim, 1984). This phenomenon was observed despite currency fluctuations affecting all companies, which indicates that managing foreign exchange risk is critically important. This study differs from previous

studies in terms of the number of companies studied, as well as the country in which the study was conducted (Turkey study).

Selected variables that characterize the tendency of companies to assume an exchange rate risk were studied. It was found that companies consider previous financial performance results when contemplating an open position.

6 CONCLUSION

In countries with special institutional features and characteristics, decisions relating to capital structure may not follow the same trend. Turkey, because it is much different from developed countries but quite similar to other emerging economies, represents an excellent case study to examine the relevant issues.

The purpose of this study was to identify those institutional factors that affect the foreign exchange risk policies of Turkish manufacturing companies. For this purpose, current ratios, debt ratios, asset efficiency and net income-based return on assets, operating income-based return on assets, and return on equity were calculated for 30 sample firms for 12 subperiods spanning from the third quarter of 2012 to the second quarter of 2015. An open position is defined as the difference between foreign currency denominated assets and liabilities net of hedged positions.

The preliminary findings revealed that there were no financial performance and open position differences between subperiods and between size groups. The applied relative purchasing power parity formula demonstrated that the local currency was undervalued in 7 out of 12 subperiods and was overvalued in 5 out of 12 subperiods.

For both periods of undervaluation and overvaluation, return on assets, which measured according to operating profitability, was lower among firms with a short foreign exchange position than it was among firms with a long position. Return on assets, which was measured using net income, was not different for both groups in the subperiods of undervaluation, whereas it was lower for firms with an open position in subperiods of overvaluation.

The results demonstrated that firms with lower operating profitability tend to assume an open position and are able to recover their low profitability in times of currency undervaluation. However, profitability for such firms remains low in times of overvaluation when compared with firms that assume a long position.

At the second stage of the study, regression analysis was conducted to determine those factors that lead companies to assume an open position. The results demonstrated that previous periods' current ratios, asset efficiency and return on assets, which were measured according to net

income, were significant determinants of a current period open position. Companies with high liquidity, high asset efficiency and low returns tend to take an open position.

The results of this study are consistent with the results of the studies of Runo (2009) and Diffu (2011), which found that managing exchange rate risk and taking an open position directly define aa company's performance, as well as its profitability.

Due to financial data constraints, the sample was selected from the Public Information Service (KAP) list. As a result, small companies were not included in the analysis. Small, family-owned companies' foreign exchange risk and financial performance behavior remain open questions to be answered in future studies.

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