

Chapter 2: Literature Review

2.1 Concept of exchange rate exposure

Notwithstanding the fact that the conversion rates of different currencies to one another usually change over time, it can provide the condition of risk for different parties from the countries that interact with each other through multinational activities. The risk or exposures in this situation “*represent the sensitivity of the value of the firm to exchange rate randomness* (Jorion, 1990, p. 331).” In simple words, the amount of any assets, liabilities or cash flows that are subject to exchange rate fluctuations, nominated as the exposure and in turn the possibility of losing that may reached to the company because of these fluctuations, are noted as the risk of the exposure (Bridges, 1988). Mathematically and statistically this concept can be expressed as the slope of the coefficient of firm’s value (based on domestic currency) on an exchange rate through a linear regression. Since determining the value of a firm (common stock price) and exchange rate changes are being considered jointly, the concept of this exposure is an arbitrary bespoke (Adler & Dumas, 1984).

Mentioning the value of a firm, there are two main components that can be influenced by exchange rate fluctuations; one is the value of all real assets held by the company, and the other is the value of net monetary assets with fixed nominal payoffs that also contain cashflows in the foreign currency clarified by contractual affairs. Regardless of the uncertainty of inflation rate, monetary assets in foreign currencies (especially short-term) are encountered to the risk of exchange rate completely, while there has not been this kind of

risk for local monetary assets. Nonetheless, the effect of this risk has realized and has shown by many theoretical analyses like the one done by Choi and Prasad in 2005. This concept is known as “Translation Exposure”. This exposure has some effects on the value of real assets too, since the costs of importing needed substances and goods or even aggregate demand may be changed and influenced by the fluctuation of the foreign currency exchange rates. Hence, the value of local corporations can be influenced by the risk of the exchange rate exposure too. The other category of exposure that is more relevant in this research is “Transaction Exposure” that usually takes place for the corporations that involve in foreign interactions via trading or operating abroad. Like in translation exposure, the volatilities of exchange rate will change the value of financial obligations of the firm that already entered into a foreign transaction and then can lead to gain or loss for the firm. So, the risk of the recent exposure is focused in this study.

2.2 Internal and External Hedging Definitions

Hedging strategies and techniques are segregated into two main categories in many previous scholar studies; internal and external. Most of the time in internal ways the corporations use the techniques related to the company itself like setting the rules and instructions via their financial instruments while in external methods the firms use the instruments that can engage the other parties for decreasing their risks.

Although the internal strategies are not the subject of this study, since some previous mentioned investigations discussed the internal methods, the two of the most relevant techniques are just explained briefly.

2.2.1 Matching and Netting (Internal Hedging Strategies)

Matching strategy provides a condition of interest or dividend payment to investors at the interval times regularly and the payment's amounts are usually fixed in this situation. As a case in point the strategies for payments to retirement workers that must be stable and continuous could be notified as matching. So, a company can acquire a portfolio including the securities catering for stable payouts altogether.

Netting technique encompasses two different concepts; one is the condition for settling the mutual obligations between two or more parties based on the net value of their contract that can lead two win-win interactions for the parties coincidentally. The other meaning is setting the limitation net amount for funds transformation between foreign subsidiaries.

2.2.2 FCD and FDD (External Hedging Strategies)

FCD is the abbreviation for the three words of Foreign Currency Derivatives. In fact, derivatives used as an overall label for financial instruments that their values related to the other variables. These variables usually are the assets which are underlying them, so FCD is a kind of contract which value depends on the value of its underlying assets. Four main categories of contracts can be mentioned under the label of FCD; Options, Futures, Forwards, and Swaps that each of them has its own terms and conditions. Some of these contracts can be traded within the exchange market while others could be traded via OTC (Over the Counter) market that is much bigger than exchange. The trade is usually bilateral in OTC and in turn has two alternatives; one trade takes

place between two financial institutions and the other contains one financial institution and its client.

Options: this contract can be traded through both OTC and exchange market and includes two types; Call Option is a kind of contract whereby its holder has the permission for buying the underlying asset with a certain price at a specific time and Put Option that provides the right for its holder to sell the underlying asset with specified time and price.

Futures: provide an agreement for both sides (buyer and seller) to trade specific asset with a distinctive price and time. Only some of these contracts may request for physical delivery of their assets while others are settled in cash and they normally trade within the exchange market.

Forward: it has the same contract as Futures, but delivery of their underlying assets (commodity) is deferred until after the contract has been made. These contracts usually are traded within OTC.

Swap: a kind of contract that provides the condition for both parties to exchange two different securities, interest rates, or even currencies for mutual benefits. In fact, in this situation two parties enter in the contract that can lead to win-win for both of them. For instance, in the condition that one can take a loan at a lower rate than the other party and then allocate a part of the loan to the other party at a higher rate. Since the recent party could not take the loan in the rate that the first one has taken, it would be profitable for him. From the other view, the one that has already taken the loan based on the specified interest rate, can make a profit by allocating some parts of the loan to the other party with the higher rate.

FDD refers to Foreign Denominated Debts and encompasses any debts that a corporation takes based on foreign currency like issuing the bond (in foreign currency) or taking the loans from outsiders that often is used for raising funds or other financial purposes as well as hedging against the risk of foreign exchange rate instability. There are some important factors for choosing the right currency to issue the debt indisputably. First and foremost, the currency of the countries that a firm interacts with through operations or exports is in the focal point of notification and is known as exposure. Some previous researchers noted that the issuance of foreign debt could be effective on hedging against the exposure that arises from revenue side while for cost side this strategy can lead to increasing the exposure. Moreover, the hindrances that are in front of international investment on the one hand and capital market segmentation on the other hand provide opportunities for selecting the suitable foreign currency to issue debt. Legal barriers like tax differentiation and higher costs for gathering information for foreign decision makers (about investment) are the most two noticeable sources of segmentation (Hietala, 1989). Furthermore, tax regulation is a remarkable factor for deciding about debt currency. In fact, tax can influence debt sourcing for multinational corporations. Tax treatment differences in interest and exchange rate for gaining and losing must be considered at the first, and the second is due to differences in judgment of firms in corporate tax rates for different countries (Kedia & Mozumdar, 1998).

Besides the previous factors, liquidity and legal regimes are the other important factors that a company must consider in times of debt issuance. Firms are eager to issue the securities in the debt markets with higher

liquidity, as the transaction costs can be reduced by the liquidity that is underlying this market and finally they can issue the bonds with lower yields.

Last but not least, legal regime must be notified in this situation, as the countries that have constraint rights for creditors cause the costs of borrowing to be increased. Hence, when corporations can find the other alternatives with less restrictions, they apply for them as soon as possible and ignore the previous one.

2.3 Hedging and Firms Value Relationship

Like the other subjects, many studies have found the strong and positive linkage between these two items. By presenting a theoretical model, a group of three scholars; Nieh, Lin and Wang (2008) continued their empirical studies for testing the relationship of exchange rate uncertainty with firm's value for ten different industries in Taiwan. By employing the GARCH model for measuring the exchange rate volatilities, and then from the cointegration test and the VECM (Vector Error Correction Model), the researchers clarified that the volatility of exchange rate could affect firm's value significantly, if there would be a huge discount rate. The result confirmed that there had been long-run equilibrium linkage between corporate values and the uncertainty of exchange rate for at least 6 industries in Taiwan. Moreover, the study displayed that the estimated value for the companies much influenced by their previous values.

The other investigation that has been implemented by a group of researchers; Carter, Rogers, and Simkins (2006), was on the behavior of hedging activities of the firms in the US airline industry towards jet fuel for the period of 1992 to

2003. According to this pre-assumption that hedging techniques would be usable for jet fuel, they could find a positive relationship between hedging and firms' value. Tufano (1996) found the positive relationship too. He declared that the companies that had used hedging during their risk management activities, not only increased value, but also provided the condition for their managers to be more utilitarian. Through the study of American non-financial firms during the period of 1990 to 1995, Allayannis, Ihrig, and Weston (2001) realized the significant positive linkage between the two above issues. The study implemented by Guay and Kothari (2003) clarified the effectiveness of hedging for protecting the value of corporations, given the fact that the exposure's risk that had been hedged forms the small part of an overall risk mentioned by the selected sample of non-financial firms. On the other hand, Graham and Rogers (2002) by exploiting the multivariate regressions for testing corporate debt and hedging policies indicated that by the use of hedging, the companies can increase their debt capacities that in turn can influence their tax shield. In fact, by decreasing the fluctuations of income and reducing the probability of financial distress, hedging could increase the debt capacity, and in this situation if the corporations add to their leverages in response to the greater capacity of debt, the associated increase in interest deductions reduces tax liabilities that in turn can lead to increasing the value of the corporations. Furthermore, hedging can make conditions safer for the companies, and the underinvestment problems can be reduced at the end of the day (Nance, Smith, & Smithson, 1993), so the suitable potential for increasing the value of the company is being provided.

2.4 Early Researches

Although the needed information and data had been accessible from many years ago, there have been only some theoretical researches about the sources and factors that had created the exposure of exchange rates, especially before the decade of the 1990s, and there have not been any studies for measuring the determinants of foreign currency exposure empirically. So in this study, the investigations that had been done for illustrating the influences of exchange rate risk on corporations theoretically, were considered as earlier studies. As a case in point, Heckerman (1972) had done one of the earliest of these theoretical investigations. He emphasized the changes of the firm's value through foreign operations had not been notified by traditional accounting methods while by means of PDV (Present Discount Value), the effects of changes in capital value (because of foreign activities) could be specified clearly. These changes could lead to gains and losses for the companies as well.

Logue and Oldfield (1977) were concerned that many financial officers believe that "wherever a currency of account has fluctuations relative to the local currency, the market value of the firm will change" and this opinion must be considered under some specific assumptions necessarily that had never been elaborated clearly until that time. Nevertheless, many companies have spent a lot of resources for eliminating the effect of the exchange rate changes. The research started with a discussion about efficiency of foreign market and then the amount and sources of gains and losses for the company illustrated through the context of market efficiency. By using an example of financial statements related to a foreign subsidiary of a company, the mechanism of

generating gains and losses within exchange rate changes has been explained, and a hedging model tested for specifying its efficiency. Finally they advocated that under the condition of efficient exchange market that the currency value could reflect all relevant economic information, the exchange rate floatations do not make a sense of rationality for hedging.

One of the earlier researches that can be mentioned as a foundation for the issue of the exposure from the view point of shareholders and other investors, is Adler and Dumas (1984). Moreover, the importance of this study was clarified when most of the later researches have referred to it as a prominent memorable research through their literature reviews. The aim of the mentioned study was providing the comprehensive definition and showing the measurement of the exposure thereto, nevertheless they hinted to some hedging instruments during their studies. They declared that the concept of exchange rate exposure is not separate from the market risk exposure and these two items can be measured in the same way, and the average exposure of a portfolio to volatility of exchange rates can be measured through *“regressing its total dollar value on a vector of exchange rates”*. Besides, the study verified that the concept of the exposure is based on statistical quantity instead of accounting number merely. Hence, the comprehensive concept of the exposure that is defined as a coefficient via a regression model could show the firm’s whole sensitivity to exposure thereto, and that view would be more attractive to managerial controls; since by decomposing the exposure into its components, the impact of each component could be evaluated separately.

2.5 Studies on Foreign Exchange Rate Exposure and External Hedging

To date, many investigations and studies have been done on the exposure of exchange rate and its influences on the value of corporations by many scholars and the other researchers through the entire the world. Some of these researches have focused only on the foreign exchange rate fluctuations and their exposure, and the others were on the ways that a firm can come up with the risks underlying foreign exchange rate changes in addition to the exposure to exchange rate changes. Two major categories of hedging have been considered by scholars yet; internal and external techniques. The one that occur without cooperation and support of third party (direct or indirect) is known as the internal way that two prominent of them has been considered previously. As explained about the different derivatives instruments before, it is natural that the alternatives under external techniques would be the main subject of this study, so the meaning of hedging in this situation refers to external hedging strategies.

2.5.1 Reasons for Failures

Like the other subjects, not all the previous researches could be successful in the case of clarifying the exposure of exchange rate fluctuations. As a matter of fact, the condition and situation had been different from one study to another, and each research has its own conditions that is not the same as the others necessarily; hence, many reasons can be enumerated for some dominant potential causes of failures in this situation. Even during some researches like the one that studied by Jong, Ligterink, and Macrae (2006) for a sample of Dutch firms, the point illustrated why some other previous

researches could not find and show the importance of the exchange rate exposure significantly. Indeed, one reason is about the inefficiency of the previous samples; as the most selected firms among the samples had not been exposed to the risk clearly. In addition, most of the related investigations have been done in the United States where the economy is open while some other countries lack this condition. So, because of recent aspect, the descriptive exposure may be more efficient in other parts of the world. Secondly, because of the fact that some methodologies used during the researches, have had some deficiencies, the sensitivity of the exposure that were discussed before, have not been considered for the corporations effectively. Lastly, the expressed techniques that companies have used as hedging against the risk of the exchange rate changes, might not decrease the aforementioned exposure considerably.

2.5.2 Exchange Rate Exposure of Stock Return

Up to now, many scholars in their researches have focused on the influences of exchange rate exposures on the return of the stock. One of the most recent studies in this area has been done in Mexico that already encompasses an emerging open economy. Based on a dissertation by Flota (2009), the impact of exchange rate volatility on the firm's value has been tested empirically. Both international and local firms had been included in the sample of 71 non-financial listed companies. In fact, by applying a two-stage model, the relationship between exchange rate exposure and the value of the firm examined so that the model has measured the return on common stock for determining whether or not there would have been a linkage between two

aforementioned items and then the estimation of the exposure analyzed. At the end of the day, a considerable significant exposure for exchange rate changes among the selected firms and industrial levels has been realized. The outcome showed a significant negative linkage between the exposure of the currency and the level of foreign sales as well.

The other new empirical study is the one by Ibrahim (2008). Within the research, the exchange rate exposure of stock return has been analyzed for the case of Malaysia. The foundation of analysis in this study is based on using a standard market model that the exchange rate changes, depreciation and appreciation as well as large changes in price increased its wealth dramatically. In fact, by gathering and analyzing monthly data belonging to the period 1994 to 2004 that includes the time for Asian crisis too, Ibrahim measured the related exposure in eight different sectors of industries and services in Malaysia. The significant exposure for majority of eight different sectors has been supported at the end of the day. Moreover, the vulnerability of some sectors like finance, properties and construction was clarified empirically. Furthermore, the robust exchange rate system provided by Malaysia and following beliefs of its stability creates a positive vision for many companies to ignore hedging against the risk of currency fluctuations especially before the time of crisis.

The other noticeable research is the one by Jong, Ligterink, and Macrae (2006) for a sample of Dutch firms. By having the vision that the exchange rate changes could be mentioned as a prominent source for firm's uncertainty, the relationship between exchange rate fluctuations and stock returns had been examined over the period of 1994 to 1998. The study presented that

more than half of the corporations (50%) had encountered significant risk of the exchange rate fluctuations. Moreover, all corporations that have had significant exchange-rate exposure benefited from a depreciation of the Dutch guilder relative to the index of the trade-weighted currency. The determination of the exposure was measured via this study too, and the size of firms and the magnitude of their foreign operations through foreign sales have been realized as two main effective factors providing the exposure. Besides, by gathering particular information about the individual currencies that would be most relevant for each firm (because of interaction with outsiders) and considering their following influences on the firm value, the study clarified that the usages of the trade-weighted currency index and the individual exchange rates could be considered as complementary instruments to each other.

The structure and the length of time have been focused in the research that has been done by Bondar and Wong (2003) in exposure exchange rate estimation for finding a more effective model and instruction to measure exposure in firm-level compared with other existing models. By reviewing previous researches characteristics especially researching about the importance of different features among the scholar models, they selected a relatively huge sample of American companies for the period of time that encompasses the years 1977 to 1996 to estimate the exposure and its appraisal. Including the return on market portfolio in the models that had been used by many scholars until that time, had been realized as an effective and significant factor in exposure estimation. Even though it caused some difficulties in evaluation, it could increase the accuracy of this estimation; since market portfolio includes both aspects of the influence of macroeconomic

factors and weighted average impression from the exchange rate volatility to the cash flows for corporations. Finally, as the different portfolios can vary the exposure in each time significantly, they present a new model that replaced this variable (market return portfolio) with the return to the CRSP(Center for Research in Security Prices) cap-based portfolio that is an index based on monthly data, and seems could decrease the influence of firm size to estimate the exposure more efficiently. Besides, the investigation showed that the longer time horizon creates the condition for increasing the exposure, and it concludes the consideration of one month as a best fixed standard in this situation cannot be as an effective time length necessarily, so the magnitude of this factor must be notified with sample size coincidentally.

With this approach that the importance of exchange rate volatility could be more obvious under the condition of high inflation, Kiymaz (2003) researched the fluctuation of foreign exchange rate and the firm's exposure to its following risk through an emerging market in Turkey. By providing a sample of 109 companies registered on the Istanbul stock exchange, the investigation commenced for a period of time from 1991 to 1998; the time that Turkey had experienced many crises especially the one that the value of Turkish lira to USD declined by more than 120%. The research advocated that the impact of the mentioned volatility of exchange rate could be specified through the atmosphere of high inflation clearly. Since under the condition of chronic high inflation, usually the rapid depreciation of local currency has taken place, and the riskiness of the exchange rate changes for Turkish corporations were supported through this research. Furthermore, depending on the kind of industry and the degree of foreign involvement via operation or trading

activities, the degree of risk could be different. Last but not the least, it showed that there has been more attention to this exposure and its risk after monetary crisis indeed.

The other valuable investigation was done by Chen and Raymond (2002) for American multinational corporations active in the Asia Pacific area during the time of the financial crisis in the region. While the intention of the study was to focus on the exchange rate variabilities, selection of this period was interesting chiefly owing to the fact that it would show how the hedging that had been done by some companies against exchange rate fluctuation could be effective or even palliated by the crisis. So, the needed data of 129 companies from the beginning of 1996 to the end of 1998 were gathered, and divided into two main sub periods (before and after crisis) for better analysis. Empirical findings elaborated that exchange rate volatility could influence return on the stock sufficiently. In addition, it shows the corporations that had activities in the region via foreign sales encountered significant market risk of the area while others have not. Besides, the outcome provides rational support for considering the opportunity cost by investors, since the rate of return is a remarkable issue that is usually assessed by them for choosing the best alternative. So the return on common stock and its variability could be so helpful in investor's evaluations.

He and Lilian (1998) investigated the exposure of foreign exchange rate changes for Japanese corporations. The influential possibility of exposure studied over 171 Japanese firms which were active in foreign markets and one fourth (25%) of the companies have had significant positive exposure with their stock returns during the period of 15 years from the beginning of 1979

until the end of 1993. The outcome approved the amount of at least 10% for foreign sales could be mentioned as an acceptable significant border for positive effect of foreign exchange varieties in this situation. So, the level of foreign activities and the hedging policy of the companies have been introduced as suitable indices for assessing the exposure. The magnitude of leverage is known as an effective factor for arousing companies to use hedging policies as well. Therefore, the firms with high leverage could be more eager to hedge and in turn would be more stable against exchange rate volatility. Furthermore, tighter and more restricted financial regulations and procedures can act as a trigger for tending to hedge more.

2.5.3 Hedging by External Strategies (FDD and FCD)

By developing the importance of foreign exchange rate exposure, and its underlying risk during the time, the necessity of investigations and studies to discover the effective methods for assuaging or even removing the influences of the risk have been realized. For this reason, many researches especially in two recent decades have focused on the strategies and techniques to put hindrance against the risk of the exposure in addition to the exposure itself.

Flota (2009) provided supportive evidence in Mexico that multinational firms with debt in foreign currency (FDD) have less sensitivity to exchange rate fluctuations compared with firms that just operate through sales domestically. By using a two-stage model, the research showed the negative relation between value of corporation and the exposure of exchange rate at first, and then the positive linkage between foreign sales and the exposure significantly.

In the research done among Australian non-financial firms, Nguyen and Faff (2003) selected the sample of 144 firms across the years 1997 to 1999. Their objective was to clarify the influences of foreign exchange changes via testing both short-term and long-term exposures, and then finding about how the use of FCD techniques could reduce this exposure through a cross-sectional regression model. Although short-term exposure was showed as having minimum effect of exposure for Australian firms, the FCD instruments could reduced this exposure efficiently. Furthermore, by stretching the time horizon (For instance 1 to 2 years: long-term instead of just 1 to 3 months: short-term), the effectiveness of hedging purposes of FCDs would be decreased. However, from the other view the exposure of exchange rate varieties for most

of the Australian companies under long-term horizon has realized. The study concluded that a negative relation between shorter horizon exposure and price earnings ratio had existed, and finally long-term exposure and liquidity positively correlated to each other.

Through the studies done by Marshal (2000), the approach of three different parts of the world to exposure and its management were investigated. The study clarified the variety of how different areas viewed the exposure and its following risk as well as the methods for managing related risk internally and externally. The UK, US, and some developed countries from the Asia pacific region (Australia, Hong Kong, Japan, Singapore, and South Korea) were selected as three different scopes to survey, and the result finally cleared the noticeable differences within these areas. Translation exposure, economic risk and managerial techniques have been focused in this study too. The opinion that management of exchange rate risk has exactly the same importance as business risk management, approved by most of the firms in Asia pacific while two thirds of the firms in UK and US believed and the rest considered the marginal importance for this issue. Moreover, the research shows that the issue was not so important for the service sector while for the other sectors the issue existed. In addition, transaction risk has had more importance compared to translation risk. Finally, the research specified that the size and the industry sector are two significant factors that should be considered for managing the exposure effectively.

A group of scholars including Elliott, Huffman, and Makar (2003) tested the linkage of exchange rate exposure and the application of FDD and FCD coincidentally through a special sample of American non-financial companies

(excluding the oil and gas industry) over the period from 1994 to 1997. The results revealed that both the usages of FDD and FCD could reduce the risk of the exposure considerably. But the FDD and FCD usages at the same time was negatively correlated. In other words, these two instruments could be considered as substitutes to each other. The effect of some factors such as firm size, type of industry, amount of total debt, and diversification in foreign market has been supported too.

Given that many previous researchers advocated that most of US multinational companies were not affected by exchange rate exposures like Jorion (1990), the objective of using FCD in US companies examined by Allayannis and Ofek (2001), so the influence of using FCD on firm's value sensitivity (considered as exposure) related to foreign exchange rate fluctuations were simultaneously tested in their research. In fact, the recent concept was drafted and supported as the proxy of return to common stock by earlier researchers too; Adler and Dumas (1984) by estimating the exchange rate exposure using monthly data for a period of three years (1992-1994) at first and then expanding that to 5 years period (1991-1995), the potential influence of FCD and FDD usages for reducing the exposure was analyzed and confirmed the protection of the firm's value from the risk of the exposure. Besides, it supports the positive relation between exchange rate exposure and the proportion of foreign sales.

Through the other research in 2001, Allayannis with other two scholars, Ihrig and Weston, studied financial and operational hedging methods. They found geographical dispersion of firms through foreign subsidiaries (for operational hedging) could not be effective for reducing the exposure of exchange rate

while FCD could be valid for the action especially for the companies that were more dispersed. Moreover, they illustrated that the use of operational methods can improve the influence of FCD to protect firms from exposure.

Based on investigation done by Fok, Carolyn, and Ming (1997), through the comparison of corporations that had used hedging strategies with the others that never used them, the result specified that although the previous opinion of increasing firm's value because of lowering the expected tax liability was rejected, hedging activities could increase the value of the firm via decreasing the financial distress that supposed to be more probable. Furthermore, they could cause to push the value of the company upward "*by reducing the agency cost of debt and some agency cost of equity*". Besides, by testing the ownership influential of tendency to use hedging activities, the outcome showed higher proportion of ownership for managers could lead to refuse from exploitation of hedging. In addition, it supported that large corporations and the companies that have had a larger percentage of value earned from growth opportunities are more eager to use hedging techniques, and operational activities can be mentioned as complementary for financial instruments (FCD).

2.6 Summary of Chapter

At the beginning of this chapter, some important related concepts and definitions like exposure of exchange rate fluctuations and the risk of the exposure, external and internal hedging instruments and techniques and following the most usable external hedging strategies (FDD and FCD) that implemented by many multinational companies have been explained. Afterwards, the linkage between the value of firm and the exchange rate

exposure was explained and the early researches and investigations that mainly discussed the subject theoretically, have been reviewed. The other considerable researches that were done for different areas and different periods of time have been discussed under three separate headings in the rest of this chapter. Since, some of the studies only focused on the subject of the exposure and its related risk, while the others have probed for the way of hedging against them coincidentally, and the third one discussed governmental intervention for stabilizing the foreign exchange rate especially within the emerging markets.