

CHAPTER 2

LITERATURE REVIEW

This chapter reviews previous literature and articles that motivated and supported this investigation into foreign exchange risk exposure. The chapter begins with the foreign exchange rate volatility, and is followed by the definition and type of exposure. After that, an overview of the relationship between firm value and foreign exchange rate is given. Then, the attributes and determinants related to the exposure and the types of methodology – including the economic model applied by previous researchers – are presented. Finally, the valuable literature review is summarized.

2.1 Foreign Exchange Rate Volatility

International and domestic economic changes, interest rate and purchasing power parity influence foreign exchange rate volatility. The high volatility or fluctuation of the exchange rate is affected by the sudden change in the economy, interest rate adjustment and the demand and supply of the currency. According to Ooi, Wafa, Lajuni, and Ghazali (2009) the major factors that influence current exchange rates may not be the same for future exchange rate movements. For example, the current exchange rate might be affected by the export performance of a country. However in the future, the exchange rate might instead be affected by a sudden supply shock, political events, productivity loss, war, stock market crash, hyperinflation or by other policy variables.

The foreign exchange movement tends to be unstable during the economic crisis. The decision made by the authority for interest rate changes will either increase or decrease the exchange rate especially when the investor transfers the deposits from a foreign currency with low interest to another currency with a higher interest. Besides that, supply and demand of money will cause changes to the foreign exchange rate in the short and long run. There are empirical studies that investigate the causal relationship between foreign exchange rate movement and the underlying factors such as interest rate and GDP growth.

2.2 Concept, Definition and Type of Foreign Exchange Risk Exposure

The general concept of exposure refers to the degree of change in the firm or industry's value due to the changes in exchange rates (El-Masry, 2006). Foreign exchange exposure is commonly defined as the sensitivity of firm value or stock returns to the exchange rate movement (Verschoor and Muller, 2007; Jorion, 1990). The foreign exchange risk is also represented by the possibility of losses as a result of the adverse evolution of the foreign exchange rate (Florentina and Daniel, 2005). In conclusion, the foreign exchange risk exposure is basically the level of risk or uncertainty driven by changes in foreign exchange rates. These changes affect a firm's stock returns, profitability and cash flow.

Three types of foreign exchange exposure are transaction, translation and economic exposure. Transaction exposure arises from transactions that

involve future cash flows in foreign currencies or occurs when a firm trades, borrows or lends in a foreign currency. Martin and Mauer (2003) mentioned that the effects of exchange rate risk on specific identifiable foreign currency transactions have a short-term time dimension. Such exposure happens when the relevant exchange rate changes between the date a transaction agreement is entered into and the date of receipt and delivery of payment. For example, an importer that has purchase commitments with the United States, is now carrying the foreign exchange risk because if the U.S. dollar appreciates at the time of payment, the importer has to pay more of its home currency to buy the U.S. dollar. This results in an increase in purchase price and operating cost and at the same time, decreases the firm's cash flow.

Translation exposure is basically an accounting-based exposure where a firm has to convert asset and liability items – including the revenues and costs of its subsidiary – from the currency used by its subsidiary to its home currency for financial statement purposes. The degree of risk depends on specific accounting rules or methods, such as monetary or non-monetary and the current or non-current method that pertains to the exchange movements and financial items involved. The gains or losses from the exposure do not affect short term cash flow until they are realized. Therefore, firms give less consideration to this exposure because it is not very significant.

Recently, operating exposure has become an economic concern and an important area for researchers. Operating exposure, which is known as economic exposure, is defined as the potential impact of foreign exchange on

future cash flow, liquidity, financial structure and profit. This exposure is usually uncertain and difficult to identify or quantify and can only be estimated. Economic exposure may arise from the change in sales price and volume based on the elasticity and change in the firm's cost of input as a result of foreign exchange rate volatility (Martin and Mauer, 2003). The adjustment of selling prices or costs due to exchange rate fluctuations will affect the competitive position of the firm and subsequently decrease the firm's cash flow and value. This risk is difficult to identify and quantify as it involves currency movements and there is no physical dealings involved. A pure domestic firm is expected to be exposed to this risk because when foreign currency depreciates, the customer tends to support imported goods that are relatively cheaper than local products. As a result, domestic sale decreases and reduces the firm's profitability.

Martin and Mauer (2003) conducted a study that assessed the differences between the transaction and economic exposure represented by short and long-term lags respectively. Their findings showed that cash flow effects were greater for long term lags than short term lags in the exchange rate movement. This is because transaction exposure is easier to hedge compared to economic exposure, which is more difficult to assess and hedge using financial instruments. They recommended firms to focus on strategies that are able to mitigate economic exposure, for example, geographical positioning of production and sales. Griffin, Doidge and Williamson (2006) focused on economic importance and also found significant economic exposure on a firm's exchange rate in over eighteen countries.

The following is a literature review that demonstrates a relationship between foreign exchange and firm value in terms of magnitude and significance.

2.3 Relationship between Firm Value and Foreign Exchange Rate

Foreign exchange rate fluctuations appear to be affecting the performance of firms and industries with an increase in competitiveness through structural changes in the economic and business environment. The flexibility of the exchange rate has also increased the financial instability and insolvency of the firm (Besancenot and Vranceanu, 2007). The unpredictable movement of the foreign exchange rate is expected to affect export and import activities where the firm is required to closely monitor exchange rates or hedge to minimize the exchange loss from dealings. As time evolves, firms that are domestically or internationally oriented discover that their firm value becomes more sensitive to exchange rate movements, and that is a challenging issue. Besides that, the volatility that influences trade flows between countries increases the risk exposure in international trade and financial transactions, which subsequently raises business expenses.

Over the past decades, there were many empirical studies investigating foreign exchange risk exposure, particularly on the sensitivity of stock returns against exchange rate changes including the correlation between volatilities of stock returns and exchange rate movement (e.g. Martin and Koutmos, 2003; Fraser and Pantzalis, 2003; Parsley and Popper, 2003; Schena, 2005; Chue and Cook, 2007; among others). These papers focused on the foundations of

currency risk exposure and also highlighted the important parameters including the cost and revenue structure in relation to the elasticity of the input and output market, competitive position and pricing strategies. Their findings summarized that there were cross sectional (Kolari, Moorman and Sorescu, 2008) and time-series exposure differences across firms, industries and countries, which produced mixed results, findings and implications.

Foreign exchange exposure varied between countries, which could probably be due to the economic situation and structure, changes in the economic policy and the foreign exchange regime adopted. For example, Turkish firms were found to be highly exposed to foreign exchange risks and their values were significantly influenced by exchange rate fluctuations due to a high inflationary environment and a rapid depreciation of its currency for the last few decades (Kiymaz, 2003). Chinese-listed firms, despite the currency peg, experienced significant foreign exchange exposure particularly against the Japanese Yen (Schena, 2005).

Furthermore, Brahmairene (2002) discovered that Thailand's real exchange rate significantly affected the bilateral trade balance between Thailand and its major trading partners such as Japan, resulting in Thailand's trade deficits. Japanese firms were found to have an adverse impact on the depreciation of Yen, but they have actually been able to respond to the unavoidable appreciation of the Yen that was anticipated (Jayasinghe and Tsui, 2008).

Fraser and Pantzalis (2004) used the firm-specific foreign exchange indices (instead of the common foreign exchange rate index) and found a higher number of firms with significant exposure. They also commented that firms operating in Central America had more exposure than firms in the Asian crises region. This evidence supports the idea that firms with subsidiaries or affiliates in foreign countries or abroad will be affected by the currency fluctuations of both countries. Bartram (2007) also documented that non-financial firms were significantly exposed to (at least) one of its major trading partners' currency, such as the United States.

Dominguez and Tesar (2006) focused on non-U.S. firms, examining the relationship among firms in eight industrialized and developing countries such as Germany, Japan and the Netherlands. They found that five of the eight countries, with over 20% of firms and 40% of industries, were exposed to weekly exchange rate movements. They concluded that there is a statistically significant relationship between profitability as measured by stock returns and exchange rates. The exposure beta magnitude towards the U.S. dollar ranged from 0.2 to 0.7.

Furthermore, the research conducted by Mun (2007), which tested the cross-market correlation between the international stock market of mature markets in relation to the U.S. market, discovered that higher exchange rate variability increased local equity market volatility. However, it decreased the U.S. stock market volatility. The exchange rate exposure was strongly correlated to local equity market returns instead of the U.S. market returns. When the local stock

market was down, international investors seeking better returns in the U.S. stock markets would transfer funds out of local markets, causing the local currency to depreciate.

Although, previous literature reviews showed that the foreign exchange exposure is significant to exchange rate shocks, there are still many empirical studies that found no strong evidence to support the significance of exposure (Senteney, Bazaz and Peyvandi, 2003; Guo, Neely and Higbee, 2007). To improve research findings, Bodnar and Marston (2000) developed a model of foreign exposure using three variables such as percentage of firms' revenues, expenses denominated in foreign currency and profit rate. However, the results still showed low exposure among the sample firms because these firms were presumed to have the ability to match their foreign currency revenues and costs, leaving them with little net exposure. Besides that, multinational firms also shielded themselves from foreign exchange exposure by creating offsetting foreign currency costs such as locating plants abroad.

Tulay (2003), in his research that measured economic exposure of individual Turkish companies using the market return approach, found that only 12% of sample firms had a positive and significant economic exposure. This concludes that there is no difference in significant exposure between economic and transaction exposures. However, the study denoted that the proportion and mean exposure coefficient were high for exporter firms compared to non-exporter. In addition, Muller and Verschoor (2007) discovered that only a small percentage of firms had significant exchange rate

sensitivity and the significant level of currency risk exposure decreased when the measurement was calculated on a portfolio level instead of firm level.

2.3.1 Size and Direction of the Exposure

Previous studies had proven that the size and direction of exposure were not consistent across countries, firms and time. The exposure might be negative or positive depending on the business nature of the firms and industries, or nature of its foreign activities. Exposure could vary from the large positive net exposure of exporting firms to the large negative net exposure of importing firms (Mckenzie, 1998; Bodnar and Marston, 2000). The large positive exposure elasticity showed that foreign currency revenues exceeded foreign currency costs where the export-oriented firms experienced a large increase in profits when the dollar depreciated.

The size of exposure due to depreciation or appreciation varies and changes across stocks and industries as time evolves. The beta coefficient used in the Aquino (2005) research represented the exposure of sixteen industry portfolios towards the exchange rate fluctuations. The results showed that all portfolios denoted negative betas and indicated that a positive change in the exchange rate that represented currency depreciation decreased the returns of the portfolio, subsequently increasing the risk premiums. The average beta of -0.0189 implied an average 1.46% monthly risk premium for the average portfolio. Apart from that, in the El-Masry (2006) study, the result also denoted a positive foreign exposure coefficient that indicated that lower (higher)

returns were associated with depreciation (appreciation) of the currency. A negative exposure indicates the contrast effect.

There are studies that argue that the level of significance and sign of exposure estimates depend on the elasticity of demand and competitiveness. For the purposes of examining the exposure elasticity of competing and colluding exporters, Dekle (2005) selected Japanese firms as the sample for his research. The competitors' structure of foreign markets and firm level characteristics – as well as substitutability between foreign and export products and type of competition among exporters – were used to determine whether a firm was competing or colluding. His findings concluded that exporters that collude in the foreign market were more exposed than when they compete, especially when foreign and Japanese goods were highly substitutable. This resulted in a fall in the profit margin of Japanese firms when the Yen appreciated because foreign sales became smaller in Yen. Apart from that, New Hampshire exporters had a currency competitive advantage based on a purchasing power parity exchange rate with their major trading partners such as Canada and the United Kingdom, and continued to benefit from the weakening dollar (Becker-Blease and Kaen, 2005; Kaen, 2006).

In a recent study (Liu and Fung, 2009), currency depreciation actually increased export, domestic sales, total sales, value-added and productivity. Currency depreciation had a positive relationship with productivity, which showed that depreciation does improve the productivity of a firm. It concluded

that a firm was actually gaining or benefiting from the depreciation of a currency, but suffered when it appreciated.

Firms with stocks with an abnormally high positive or negative foreign exchange sensitivity tend to be in a financial distress and as a result, may face high volatility in cash flows, consequently lowering their expected return especially in the presence of high leverage (Kolari, Moorman and Sorescu, 2008). The relationship between expected returns and foreign exchange exposure appear to be an inverse U shape, which is illustrated in their study, and not linear as proven in past studies. The implication is that firms and investors are obviously concerned about the magnitude of foreign exchange risk exposure.

2.4 The Determinants of the Foreign Exchange Risk Exposure

The differences in exposure found in empirical studies are actually caused by many reasons. The determinants of exposure found in many studies are firm size, firms' assets, liquidity, leverage level, multinational status, the ratio of foreign sales and purchase considering the competitiveness, growth, hedging and time horizon (Chow and Chen, 1998; Williamson, 2001; Chan, 2002; Bartram, 2004; Chue and Cook, 2005; Dominguez and Tesar, 2006; Doidge et al., 2006; Muller and Verschoor, 2007). Presented below are literature reviews that discuss the applicable and relevant determinants for this study.

2.4.1 Firm Size

The size of the firm plays a role in determining the exposure (El-Masry, 2006). Using U.S. pharmaceutical firms as samples, Chan (2002) discovered that stock returns of generic makers do not appear to be correlated with changes in the exchange rate because these firms tend to be smaller firms when compared to proprietary producers, who have high market capitalization.

The evidence provided by Griffin et al. (2006) also supported the idea that there is less exposure in a small stock group because smaller firms in some countries have stable and growing international sales. These firms tend to outperform when the currency depreciates. Vygodina (2006) used the Granger causality test to explore the relationship and discovered that both large-cap and small-cap are co-integrated with the foreign exchange market but the uni-directional causality indicated that only large-cap stock prices were influenced by changes in the exchange rate from 1995 to 2003.

However, on the other hand, Dominguez and Tesar (2006) argued that small, rather large and medium-sized firms were more likely to be influenced. This is also supported by Hsin et al. (2007) who concluded that smaller firms have a more significant lag exposure than larger firms because large firms tend to react to information more efficiently. Large firms that have large scale international activities are usually involved in hedging activities that contribute to less exposure because hedging outweighs the adverse impact. Therefore,

firms with a small capital are expected to be highly exposed to the changes in the international trade environment (Verschoor and Muller, 2007).

2.4.2 Characteristics of the Firm

Export and import firms that deal in international trade goods and services are expected to have the most significant impact. The firm's sensitivity to exchange rate changes depend on the elasticity of demand for the product and the profit generated in the country. Besides that, the firm's nature of business, the competitive structure of the market where the firm sells its products and the export and import ratio determine the sensitivity of the exposure of a firm. Firms that operate in a global environment are subject to foreign exchange exposure regardless of the level of involvement in international trade. These firms also utilize hedging to protect the firm's assets. An increase in foreign sales is a major determinant of a firm's exchange rate exposure (Williamson, 2001; Doidge et al., 2006; Hsin et al. 2007; Faseruk and Mishra, 2008; Rahman and Serletis, 2009).

Pritamani et al. (2004) discovered that 68% to 71% importers had a positive exposure of 25% to 32% significance. Meanwhile 73% to 76% exporters had a negative exposure, and 21% of overall firms were significantly exposed. For exporting firms, the adverse effects and impact of a strengthening dollar in foreign markets were expected to be offset by gains in the stronger domestic economy. Importing firms will benefit from a strengthening dollar in both foreign and domestic markets. Similarly, the weakening dollar will have a

positive impact on exporting firms. The conclusion is that there is an insignificant exposure for exporters and a significantly positive exposure for importers.

Multinationals are expected to have higher exposure compared to domestic firms as they are exposed to international trade and hold more international assets. As explained in Fraser and Pantzalis (2004) the U.S. multinationals were significantly influenced by the changes in the foreign exchange rate, if measured using the firm-specific exchange rate. In addition, their subsidiaries – either in the home country or at another geographical area – were exposed to the currency changes too. Prior & Jane (2005) focused on multinational firms in their study and discovered that 17% of total firms and 15% of U.S. multinationals had significant exposure when they used an industry specific exchange rate, which was slightly higher compared to the common index.

On the other hand, Verschoor and Muller (2007) explored the exposure risk of U.S. multinationals with real operations in Asia and argued that their trading activities were directly influenced by the currency environment changes, especially during the period of increased exchange rate variability. However, U.S. multinationals that produced or consumed non-traded goods were less affected by the changes. It was similar for the U.S. industry that heavily relied on both the exporting and importing business. The reason was that the positive impact on importing activities due to the U.S. dollar appreciation had been offset by the adverse impact on exporting activities (El-Masry, 2006). Besides that, the U.S. multinationals with net exposed Asian-denominated

liabilities would gain when the U.S. dollar strengthens while firms with net exposed denominated assets would lose. Furthermore, multinational firms in or outside Europe had been proven to have a lower market risk exposure after the EURO dollar was introduced (Bartram and Karolyi, 2006).

Although international-oriented firms are most likely to have higher exposure, there are a few empirical studies that show that domestic firms also have significant exposure in the long term due to the economic exposure (Kiyamaz, 2003). These studies argue that domestically-oriented firms without any international business face significant impact from the exchange rate volatility. Domestic firms that are not involved in foreign trades are expected to have less or no direct foreign exchange risk exposure. But, they are also not significantly different from the exposures encountered by firms that are directly involved in international activities. For example, the appreciation of the domestic currency tends to make foreign goods cheaper than local goods, thus encouraging firms to purchase from a foreign supplier instead of domestic firms. This results in sales and profit uncertainties. Besides that, domestic firms with a high market to book ratio, debt ratio and low asset turnover will likely face high exposure too.

According to Dekle and Ryoo (2007), when the domestic currency depreciated, the relative production costs of domestic exporting firms in Japan fell encouraging the firms to increase their exports and grab more market share from foreign firms. The export volumes were significantly affected by the exchange rate fluctuations when the elasticity was higher. However, the

tightening or constraint of external financing eventually restricted their export expansion that led to a lower cash flow, which explained that depreciation in the exporter's currency was positively correlated with a relaxation of financing constraints. They concluded that the exchange rate shocks and cash flow were correlated but the correlation could be positive or negative with high elasticity of export based on their export model. The sensitivity of the exposure depended on the demand elasticity and substitutability, whether the competition was a monopolistic or monopoly competition (Dekle, 2005). If the elasticity is less, then the impact is insignificant.

Overall, the depreciation of the home currency gives domestic firms a cost advantage and causes them to sell more. However, the sensitivity to the foreign exchange changes still depends on the elasticity of demand for the firm's product, either for its own price elasticity or the cross elasticity of demand with competitors. Therefore, if the elasticity is low, the firm might have a relatively high exposure. As a result, firms may seek an opportunity to increase or decrease the price of product to lessen the impact of the depreciation or appreciation of the exchange rate.

2.4.3 Characteristics of the Industry

Currency exposure varies between industries. It depends on the characteristics and nature of the industry. Industries that have greater breadth in foreign activities and operations are exposed to currency risk to a certain degree. Previous studies report that industries that are actively involved in

global business have significant exposure. Besides that, the more complex the industry's competitive structure, the more exposure the industry faces particularly in the globalization environment.

Koutmos and Martin (2003) provided evidence that the financial sector was the sector with the highest degree and frequency of exposure, which is not surprising due to its nature. The value of the sector was not affected by the depreciation of the domestic currency, but it increased in response to the appreciation of the currency. In conclusion, the financial sector was actually benefiting from a strong home currency.

Industries such as oil and gas, mining, electronics, chemicals and commodities tend to have higher exposure than consumer, food or services industries. During the Asian economic crisis, sectors that are most sensitive to the exchange rate are trade, services, finance, insurance, real estate, agriculture, mining and construction. Furthermore, trade and service-oriented industries proved to be more sensitive than manufacturing companies. (El-Masry, 2006; Verschoor and Muller, 2007)

As mentioned previously, the size and direction of the exposure depend on the nature of the industries. Jayasinghe and Tsui (2008) found that oil and gas, construction and building material sectors were negatively exposed to the change in exchange rate denominated in Japanese Yen. Meanwhile, automobile and parts, electrical and electronic equipment and household goods and textiles showed a positive exposure. The negative relationship

between the oil and gas industry's return and exchange rate contributed to Japan's heavy imports, and implied that the depreciation of Yen decreased the profits, which were affected by an increase of cost.

The recent study by Liu and Fung (2009) investigated the impact of the real exchange rate movement on Taiwanese manufacturing firms in different industries from 1992 to 2000. It found that these Taiwan firms experienced the largest depreciation of its currency during the Asian crisis. In addition, their findings reported that industries with the largest impact were electronics and machinery although they encountered the smallest real depreciation. Muller and Verschoor (2009) demonstrated that trade- and service-oriented industries were particularly sensitive to an exchange rate crisis. Based on the Cozzi and Toporowski (2006) study, they stated that tradable sectors were in a better position than non-tradable sectors during the economic crisis in Malaysia. It seemed that the foreign exchange risk exposure differed across the industry portfolio in terms of direction and level, which might have caused the firms belonging to the industry to show a similar behavior or exposure.

2.4.4 Time Variation

Exchange risk exposure is still evolving until today. For the past decades, the foreign exchange exposure has been very volatile, affecting many firms' financial performance from time to time regardless whether times are good or bad. The exposure tends to change as time evolves during the normal as well as critical periods. Firms are expected to be sensitive to the exchange rate

movement, particularly during the periods of financial turmoil or economic crisis. Evidence of time variation in exchange rate exposure is found to be consistent with the changes in the competitive environment within a country or an industry.

Early evidence found by Jorion (1996), who evaluated the impact of Japanese investments in the United States, showed that during the period from 1977 to 1993, the fluctuation in Japanese Yen had extensively affected the current account deficits and returns of the investment. This subsequently created a massive loss of US\$210 billion. This showed that the exposure differed from the normal and crises periods (Ihrig and Prior, 2005). During the crisis, firms tend to face higher exposure than during the normal period.

However, contradicting the above findings, Kiyamaz (2003) reported that the number of firms with a statistically-significant exposure coefficient declined from 43 to 15 firms in the post-crisis period, suggesting that firms paid more attention to their exchange rate exposures during the crisis. In order to evaluate the time variation impact, Prior & Jane (2005) modified Jorion's model by adding a crisis indicator as a dummy variable and found that exposure is significant in either crisis but not both (Prior & Jane, 2005). They mentioned that hedging may have played a role in the impact.

Aquino (2005) examined the sensitivity of the Philippines' stock market prices against the exchange rate movement before and after the Asian financial crisis (from 1992 to 2001). The paper reported that stock returns did not react

significantly to the foreign exchange before the crisis period but reacted after the crisis. During the post-crisis period, investors expected a higher risk premium on their investment due to an increase in the exchange rate risk.

Besides impacting Asian countries, the Asian crisis also affected countries outside Asia such as the United States and Japan through their firms operating in Asia. Verschoor and Muller (2007) found that the stock return variability of U.S. multinationals that were active in Asia increased significantly in the aftermath of the financial turmoil. The crisis also increased the market risk (beta), which eventually increased the firms' cost of equity. The volatility of stock returns of control firms was higher in the post-crisis sub-period than in the pre-crisis sub-period, which means that those firms were more sensitive and vulnerable to the exchange rate risk in the aftermath of a crisis. The exchange rate swung in the Asian currency crisis and eventually altered the business trade between Asia and the United States, contributing to an uncertainty in the economic and financial environment.

Additional evidence contributed by Jayasinghe and Tsui (2008) showed that between August 1992 and April 1995 the Japanese Yen appreciated 38%, it depreciated 65% between April 1995 and August 1998 and again appreciated 34% between August 1998 and September 2000. Furthermore, Williamson (2001) also found evidence to support the existence of time varying exposure in an automotive sample where the exposure changed as the industry's structure and competitiveness changed over time. The result showed that Japanese firms did not pose a large threat to US firms from 1973 to 1980, but

began to become a threat in 1980. The reason was because an automotive competitive landscape changed to a more international one and the competition in the North American Market grew.

The non-contemporaneous exchange rate effect found in previous studies has motivated subsequent researchers to consider the lag effect in their estimates as an explanatory variable (Chan, 2002; El-Masry, 2007). It is said that the market will take time to incorporate the implication of the exchange rate changes, which will likely affect future expected cash flow and return. The lagged effect results seem to be more reliable and meaningful, and show strong evidence of the changes between the exchange rate and firm value. Therefore, the lagged changes in exchange rate variables are important and should be included in this study.

2.5 Measurement Model

Stock return is initially regressed against foreign exchange rate changes based on a single factor model called the Capital Asset Pricing Model (CAPM), which was introduced by Harvey (1991) and was subsequently used by many researchers. For instance, De Santis and Gerard (1998), both of whom found strong support for the inclusion of foreign exchange rate risk, used this model. Later, CAPM was modified into the Arbitrage Pricing Theory (“APT”) model by adding market index as a variable to obtain better results and findings, and for relevancy and feasibility purposes. The augmented two factor model developed by Jorion (1990, 1991) was commonly used in many studies

including these studies: Chan, 2002; Fraser and Pantzalis, 2004; Ihrig and Prior, 2005; Dominguez and Tesar, 2006.

According to Martin and Mauer (2003), the market-based model that focuses on sensitivity of stock returns to exchange rate changes has two distinct benefits. The overall impact of exchange rate risk on the firm's value can be assessed and is more flexible, as well as form forward-looking expectations. However, there are limitations as the exposure heavily relies on the accuracy of information available in the market and does not provide a sense of the time profile of the exchange effects, whether it is a short or long term impact. Consequently, the cash flow-based approach was developed and initiated as an alternative to the traditional approach of estimating the exposures (Bartram, 2008).

Martin and Mauer (2003) explained that the cash flow-based approach has three benefits. First, the cash flow approach does not require the assumption that the market accurately assesses the impact of exchange rate changes on cash flows, but focuses on identifying the patterns of cash flow in response to the changes of exchange rates. Secondly, the method is able to identify the short-term and long-term effects of the exchange rate risk, which is useful to corporate financial managers, investors and analysts and to those interested in the time profile of exposures. The third benefit is that it provides the implications of the firm's cash flow stability due to exchange rate changes, to show whether the actions to protect cash flow as well as minimizing fluctuations for value-enhancing investments are necessary.

Nevertheless, findings from both models appear to be inconclusive due to weak evidence or other factors that contribute to such results. As there are no contemporaneous effect in the exposure in the past few studies, researchers such as Chan (2002) and Bartov and Bodnar (2004) have begun to include the lagged exchange rate variable in the regression. To strengthen the evidence, researchers continuously improved the methodology by including factors or variables with different dimensions such as incorporating firm-specific or trade weight index instead of the common index (Fraser and Pantzalis, 2004; Dominguez and Tesar, 2006).

Recently, Jayasinghe and Tsui (2008) employed a bivariate GJR-GARCH model to examine the exchange rate exposure of sectoral indexes for Japanese industries. Subsequently, the model was modified to multivariate GARCH-In-Mean VAR by Rahman and Serletis (2009). Choosing and adopting a regression model is important for a study to produce better quality findings and implications.

2.6 Conclusion

Based on the above literature review, it seems that the evidence from past empirical studies is inconclusive. There are studies that concluded that stock returns and exchange rate changes have a strong relationship, but there are a few arguing that there is no significant relationship. Furthermore, the size and direction of exposure are inconsistent and varies depending on the business activities, currencies used and how the firms adjust their behavior to respond

to risks in terms of hedging. Exchange rate exposure changes over time and is based on to the economic environment and growth. There are many factors determining the exposure, and they are found in past studies such as firm size, firm characteristics (whether domestic or multinational), foreign sales ratio, international assets and competitiveness, industry characteristics, firm liquidity and financial risk (Chow and Chen, 1998; Bartram, 2004; Chue and Cook, 2005; Hou, Karolyi and Kho, 2006; Dominguez and Tesar, 2006).

Failure in identifying the strong connection between the changes in foreign exchange rates, stock returns and firm value has motivated researchers to continue to investigate the relationship by using different approaches and methodologies that will eventually contribute to a conclusive finding.