



Currency Exposure and The Determinants of Corporate Hedging Practice Among Malaysian Non-Financial Firms

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ABSTRACT

This study involves a two-stage analysis. Firstly, the study examines currency exposure and corporate hedging practice (proxied by foreign currency derivative (FCD)) among Malaysian non-financial firms from 1995-2016. It is found that 35.75% of the sample firms are significantly affected by the exposure. The use of FCD is also found to be significantly effective in managing the level of currency exposure. Secondly, the study further investigates the determinants of the use of FCD by incorporating both firm-specific and macroeconomic factors. The study finds almost all the firm-specific factors (liquidity, price-earning ratio, asset growth, and foreign sales) and macroeconomic factors (current account, trade, and inflation) as significant determinants behind the firms' decision to use FCD. Interestingly, the use of FCD is also driven by specific financial events. Due to the nature of the crisis period, the effect of FCD use is only significant during the Asian financial crisis rather than the peg period and global financial crisis. The novelty of this study lies in the inclusion of the macroeconomic determinants of the FCD use. Hence, the detailed analyses may guide the decision-making process of FCD use as the analysis tackles the exposure and FCD use issues in several aspects with the inclusion of the economic information content.

JEL Classification: G13, G14

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INTRODUCTION

Companies are concerned with currency exposure as it may affect the firm values, stock price and income. Accessibility to global networking extends the effect of currency exposure to firms that are not directly involved in international trade. The importance of the exchange rate was strengthened after the collapse of the Bretton Woods system in 1973 (Ameer, 2010; Ritschl, 2008). Currency exposure arising from the exchange rate movements could simultaneously affect numerous key indicators such as international trade volume (Chaudhry et al., 1993), firm value and stock return. Currency exposure is defined as the changes arising from movements in the foreign exchange market comprising operational, translation and economic exposure. Transaction exposure is the most common form of exposure, in which the firm's transaction is affected by currency movement. Translation exposure indicates the potential effects of exchange rate fluctuations towards the consolidated financial statement. Economic exposure showcases the effect of unexpected exchange rate movement towards a firm's stock return. The exchange rate exposure is related to firm value and overseas assets values through the import of future cash flows and alteration of trade payments and receivables, respectively (Nguyen et al., 2007). In this sense, exchange rate fluctuation is an important macroeconomic variable that significantly affects firm value (Clark and Mefteh, 2011).

Comparatively lower currency exposure is observed in advanced markets due to the existence of numerous strategies and tools to alleviate the impact of exposure. Derivative is a good investment tool to hedge and mitigate currency exposure as it protects any transaction from unexpected currency movement. A derivative that is properly used will protect the firm's value and risk because the gains and losses from the derivative are offset by the gains and losses from the underlying asset (Seok et al., 2020). It becomes critically crucial to coordinate the investment and financial decisions when similar risk exposure simultaneously affects the investment opportunity and risk of default (Spano, 2004). Cash flow smoothening in the presence of hedging derivatives also improves the probability of internal funding for future investment projects, especially when access to external financing becomes costly. In addition to the exposure mitigating benefit, hedging derivative also holds the potential to enhance the firm value by reducing the expected tax liabilities (Smith and Stulz, 1985). As long as the cost of hedging is not too large, the expected post-tax firm value will increase in response to the lower variability of pre-tax firm value due to the hedging (Sprcic and Sevic, 2012). Furthermore, together with a lower expected default rate, these positive effects of hedging activity contest the theory by Modigliani and Miller (1958).

However, the developing market does not fully utilise the derivatives and their benefits (Biplob et al., 2022). In fact, derivative practice in developing markets is low despite the comparatively higher exposure level in the market. This is illustrated by the low turnover level of over-the-counter (OTC) foreign exchange instruments in Malaysia by the Triennial Survey in 2016. Malaysia only accounts for USD 8 billion turnover, in comparison to USD 1,272 billion in the US and USD 2,406 billion in the UK. The neighbouring Singapore records USD 517 billion of turnover which is expectable considering the country's position as a developed country. Another closer example is the composition of unhedged and hedged firms in Malaysia as shown in Figure 1. The percentage of hedged firms increases from 5.314% in 1995 to 33.816% in 2016 while the composition of unhedged firms decreases from 94.686% in 1995 to 66.184% in 2016. Despite the theoretical higher currency exposure in developing market, majority of the sample firms in Figure 1 are not hedged by financial derivative. In fact, most of the firms resort to natural hedging rather than employing the derivative for hedging purpose. The study is aware of the absence of currencies futures and options contracts in the country and Malaysian firms solely depend on the over-the-counter forwards and options (Chong et al., 2013). Still, the low level of hedging activity in the country raises the question on the exact potential of foreign currency derivative (FCD) in alleviating the exposure effect towards the Malaysian firms. Hence, this study is motivated to investigate whether FCD use provides significant effect towards the currency exposure in the country. Findings on the significance effect of FCD can be utilised to motivate more Malaysian firms to engage FCD in their operation for better exposure hedging. Meanwhile, any trend or behaviour are believed to influence the overall tendency of these firms to employ FCD. Hence, identifying the factors that drive the decision to use FCD is also of crucial importance. However, previous studies tend to only include firm-specific factors as the potential determinants while the real macroeconomic indicators are scarcely analysed. This study argues that analysis of the determinants needs to include both firm-specific as well as the real macroeconomic factors in order to gain robust findings on the factors underlying firms' hedging strategy.

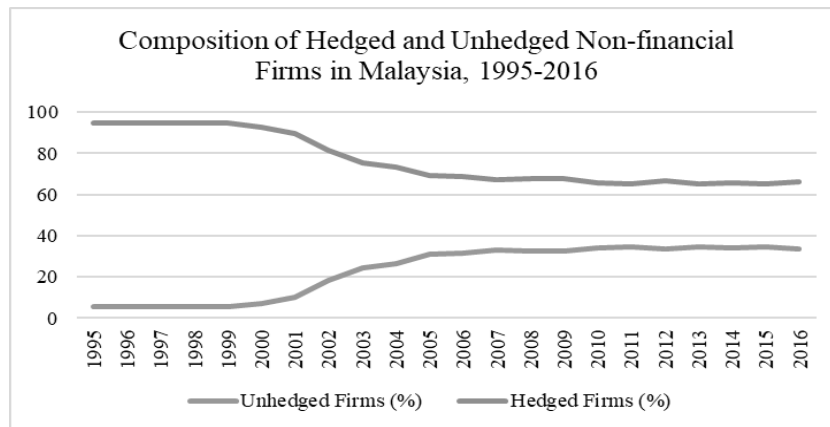


Figure 1 Composition of Hedged and Unhedged Non-financial Firms in Malaysia, 1995-2016

With this, this study sets a 2-stage analysis concerning the currency exposure and corporate hedging practice in Malaysia. The corporate hedging practice is proxied by the use of (FCD). In the first stage of the analysis, the study aims to measure the level of currency exposure in Malaysian non-financial firms and the corresponding effects of FCD use to alleviate the exposure level. This study analyses the exchange rate exposure of 207 non-financial firms using both market and firm-level approaches by extending the model developed by Yip and Nguyen (2012). The study further investigates the effect of FCD use among the non-financial firms in Malaysia. The study relies solely on the information disclosed in the financial reports of the selected firms to assess the impact of the FCD towards the currency exposure. The Malaysian Accounting Standard Boards has regulated the disclosure of hedging information in its Malaysian Financial Reporting Standards 9 (MFRS 9). Revolving from the previous IAS 39, MFRS 9 includes additional chapter on hedging accounting. Enforcement of the financial disclosure facilitates the study to observe the hedging activities among the selected firms. As the study focuses on a developing country, the exposure level is hypothesised to be higher than those reported in other studies on developed countries. We shall take the 5% findings by Jorion (1990) on the US market as the comparison. The FCD use is also hypothesised to exert significant effect to alleviate the currency exposure due to the latter's significance effects towards the sample firms.

Later, the second stage of the analysis further entails the assessment on the hedging practice involving the determinants influencing the hedging activities among the sample firms in Malaysia. The factors are tested under two models. The first model comprises the firm-specific determinants namely the liquidity, PE ratio, asset growth, debt-equity, and foreign sales. On the other hand, the second model tests against a few macroeconomic variables including the current account, total trade, inflation, Asian financial crisis, peg period, and global financial crisis. The inclusion of the macroeconomic factors in addition to the firm-specific determinants is relevant considering the expansion in the Malaysian foreign exchange market particularly due to the liberalisation of the administration rules involving the foreign exchange market (Chong et al., 2013). Significant fluctuation is also observed as the average turnover in the foreign exchange instruments dropped from USD11 billion in 2013 to USD 8 billion in 2016, despite the jump high increase from the previous USD7 billion in 2010. The significant development and fluctuation in the Malaysian foreign exchange market support the relevancy of the macroeconomic factors in the study of FCD use.

The study contributes to the development of detailed investigation on the effect of currency exposure, FCD use and factors of FCD practice. As time progresses, the cruciality of currency exposure has only been echoed. The borderless world nowadays has made virtually every transaction affected by the exposure. Hence, the first part of this study justifies the needs of the country (specifically developing markets) to use FCD as a form of risk protection. Secondly, investigating the determinants provides in-depth findings on the right button to push in order to accelerate the adoption of FCD in the market.

LITERATURE REVIEW

Foreign Currency Exposure

Numerous studies on currency exposure mainly focused on the developed markets such as the US and the UK (Allayannis and Ofek, 2001; Bartram et al., 2013; Bodnar and Wong, 2003; Parsley and Popper, 2006). Adler and Dumas (1984) pioneered the work by highlighting the effect of currency movement towards firm's profitability which was referred as currency exposure. Currency exposure in developed market was comparatively low due to the extensive hedging practice (Allayannis and Ofek, 2001). In contrast, developing markets often recorded high exposure level. Hence, assessing the currency exposure in developing markets was crucial considering the higher currency exposure level in the countries due to the markets' high degree of openness in capital and goods markets (Parsley and Popper, 2006). Simultaneously, developing markets were also characterised with high uncertainty, less aggressive hedging activities, and active involvement in foreign operation with high currency exposure (Clark and Mefteh, 2008). As measurement of currency exposure was based on the interaction of the firm's stock return and the currency movement, the measurement also signified the asset and liabilities positions within the firms.

Parsley and Popper (2006) showed that Asia Pacific countries (developing countries) were more exposed to widespread fluctuations of the USD and the exposure did not diminish under the exchange rate peg system. Bacha et al. (2013) found 71% of the listed Malaysian firms had significant currency exposure, indicating higher currency exposure compared to developed countries. The contradicting results between these two country groups justified Bartram and Bodnar's (2012) argument of economic content in currency exposure. The currency movement would not affect the stock return if it did not contain the economic information. In consideration of the currency shocks and negative impacts on Asian emerging economies and stock markets over the past few years, study on foreign exchange exposure on the region is of crucial importance.

Foreign Currency Derivative Hedging Practice

One of the strategies to minimise the currency exposure level is through the employment of FCD. Numerous literature dedicated to test the effect of FCD to manage currency exposure in consideration of the intensifying effect of currency exposure on firms' operation. However, past studies on the effect of FCD use towards the level of currency exposure produced mixed results (Allayannis and Ofek, 2001; Yip and Nguyen, 2012), with a few reasonings were provided on the relationship between FCD use and currency exposure (Yip and Nguyen, 2012). First, the existence of other risk management techniques such as operational hedging reduced the significant association between currency exposure and FCD use. Secondly, hedging was not fully implemented by the firms. Third is the insignificant relationship between the firms' returns and the macroeconomic factors such exchange rate, interest rate, and commodity risk. Lastly, the effect of FCD use may become less substantial if the firms were large, diversified and had good credit quality.

In this notion, the studies on FCD use attempted to incorporate a few approaches that were potentially consistent with the optimal hedging theory. Firms with derivative hedging usually took the position that could neutralise the exposure to prompt smoother future cash flows. Reducing the cash flow volatility would benefit the firm in a few theoretical aspects. The first theory postulated lower cost of financial distress (Smith and Stulz, 1985). The theory is applicable if financial distress would impose some cost on the firms. Secondly, hedging could also lower the agency cost by reducing the potential cost of debt and risk-shifting. Hedging could also increase the contractual relation between shareholders. This led to the third theory of shareholder value maximisation as hedging provided value-enhancing benefit through lower expected tax liabilities. Smooth cash flow also enabled maintenance of sufficient internal fund and hindered the firms from running into costly external financing in the market. In essence of managerial control, hedging was used to showcase the managers' strategies in maximising the firms' value as well as their own personal wealth position (Spric and Sevic, 2012). Such moves would communicate good managerial skills within the firms. Hence, hedging could also be assumed as prompting smoother and value-added cash flow for hedged firms. With this, analysing the effect of FCD use also weighs its cruciality towards the overall study of currency exposure.

Determinants of Foreign Currency Derivative Hedging Practice

Further analysis on the topic evaluated the potential factors that influenced firms' decision to employ FCD. Even though FCD use is commonly prompted by risk aversion and exposure minimisation (Atkin and Harris, 2023), several other factors are also responsible to drive the decision behind FCD use. As this study gears towards comprehensive analysis on the determinants of FCD use, Table 1 depicts both the firm-specific and macroeconomic factors included in the study. Firm specific factors were included in the studies to closely investigate the factors undertaken by the firms. Firstly, asset growth had been a classic determinant of hedging decision based on the investment and size effect theories. The investment theory supported lesser likeliness to hedge among smaller or growth firms (Hu and Wang, 2006). The lesser tendency to hedge was propelled by the huge cost incurred by FCD that could not be met by small firms. Otherwise, growth firms would need to use the budget allocation for growth purposes. Other firm-specific factors associated with high growth potential is research and development (R&D) expenditure (Allayannis and Ofek, 2001).

In line with firm size, price-earning ratio (Hu and Wang, 2006; Yip and Nguyen, 2012) and current ratio (Fok et al., 1997) were also used to proxy the firms' size and operation level. Firms with high PE and current ratio tended to showcase higher tendency of FCD use to protect their operations from unexpected currency movements. Similarly, firms with high gearing ratio also tended to use FCD. Clark and Judge (2008), Fok et al. (1997), and Yip and Nguyen (2012) included gearing ratio in their analysis as high gearing signalled the possibility of bankruptcy and financial distress. On the other hand, hedging may also become non-favourable in times of high liquidity as firms posse greater flexibility to meet their cash flows need (Marshall et al., 2012). The contrasting effect between liquidity and hedging use was recorded by Ameer (2010), Marshall et al. (2012), and Yip and Nguyen (2012).

Table 1 Expected Effects of the Corporate Hedging Practice

Determinant	Expected Sign	Hypothesis
Liquidity	-	There is a negative relationship between liquidity and derivative hedging.
PE Ratio	+	There is a positive relationship between PE-ratio and derivative hedging.
Asset Growth	-	There is a negative relationship between asset growth and derivative hedging.
Debt-equity Ratio	+	There is a positive relationship between debt-equity ratio and derivative hedging.
Foreign Sales	+	There is a positive relationship between foreign sales and derivative hedging.
Current Account	-	There is a negative relationship between current account and derivative hedging.
Trade	+	There is a positive relationship between trade and derivative hedging.
Inflation	+	There is a positive relationship between inflation and derivative hedging.
Asian financial crisis	+	There is a positive relationship between Asian financial crisis and derivative hedging.
Peg period	+	There is a positive relationship between peg period and derivative hedging.
Global financial crisis	+	There is a positive relationship between global financial crisis and derivative hedging.

Another point of consideration was the scarce past studies focusing on the macroeconomic effects towards the FCD use. A novel study by Hu and Wang (2006) utilised a dummy variable to denote for financial distress. They proposed the ability of hedging practice to reduce the effect of financial distress because hedged firms tended to borrow more. Still, other macroeconomic factors such as inflation rate, balance of payments, and tax rate were dependent on the economic condition and randomly influenced the currency exposure. As shown in Table 1, this study incorporates macroeconomic factors influencing the currency movements such as current account, trade, and inflation rate (Ravindran and Soroush, 2015) that were considered as influential towards the decision on FCD use. Current account is one of the components in balance of payment which represented the net flow of goods, services, income and unilateral transfer between a country and its trading partners (Shapiro, 2010). Varying amount of current account indicated different spending levels of the country compared to their earning and influenced the demand and supply of local currency.

As for trade factor, any incidence of lower trade volume would decrease the revenues from exports. Under such condition, firms needed to hedge their exposure from any unexpected future currency movement. On contrary, negative relationship was recorded for inflation. Ramasamy and Abar (2015) recorded more apparent evidence of inflation effect towards currency exposure in country with low inflation rate. High inflation caused lower purchasing power parity in the country, thus decreased the value of the currency compared to other country. Consequently, study on the macroeconomic factors showed significant effects of the factors towards the hedging practice in Hong Kong (Hu and Wang, 2006). Additionally, higher hedging practice was postulated during high trading activities and financial volatility in order to shield from unexpected price movements. In line with the significant effects of these macroeconomic determinants towards the currency movement, similar direction of causality was expected between these macroeconomic

determinants and the FCD use. Generally, the mixed hypothetical relationships between the FCD use and its determinants as recorded in past literature rings the relevancy of the current study. Ascertaining the factors specifically to the country could enable the involved parties make the necessary moves to gear up FCD use in the market.

The following Figure 2 illustrates the conceptual framework on the relationship between the FCD use as the dependent variable and the independent variables at both the firm and macroeconomic levels. The firm-specific determinants included the liquidity, PE ratio, asset growth, debt-equity ratio, and foreign sales. Meanwhile, the macroeconomic determinants included current account, trade, inflation, Asian financial crisis, peg period, and global financial crisis. The practice of FCD may be strongly influenced by the firm-specific determinants as these factors were crucial considerations when the firms decided on their hedging strategies. Consideration on the effect of economic conditions towards currency exposure was highlighted by Ozcelebi (2020) where developing economies could actually experience good capital inflows when these economies experienced low exchange market pressure. On the other hand, the macroeconomic factors mainly exerted indirect consideration towards the FCD use. Regardless of the strategy implemented at the firm level, the firms still needed to be watchful on the economic weather surrounding the market.

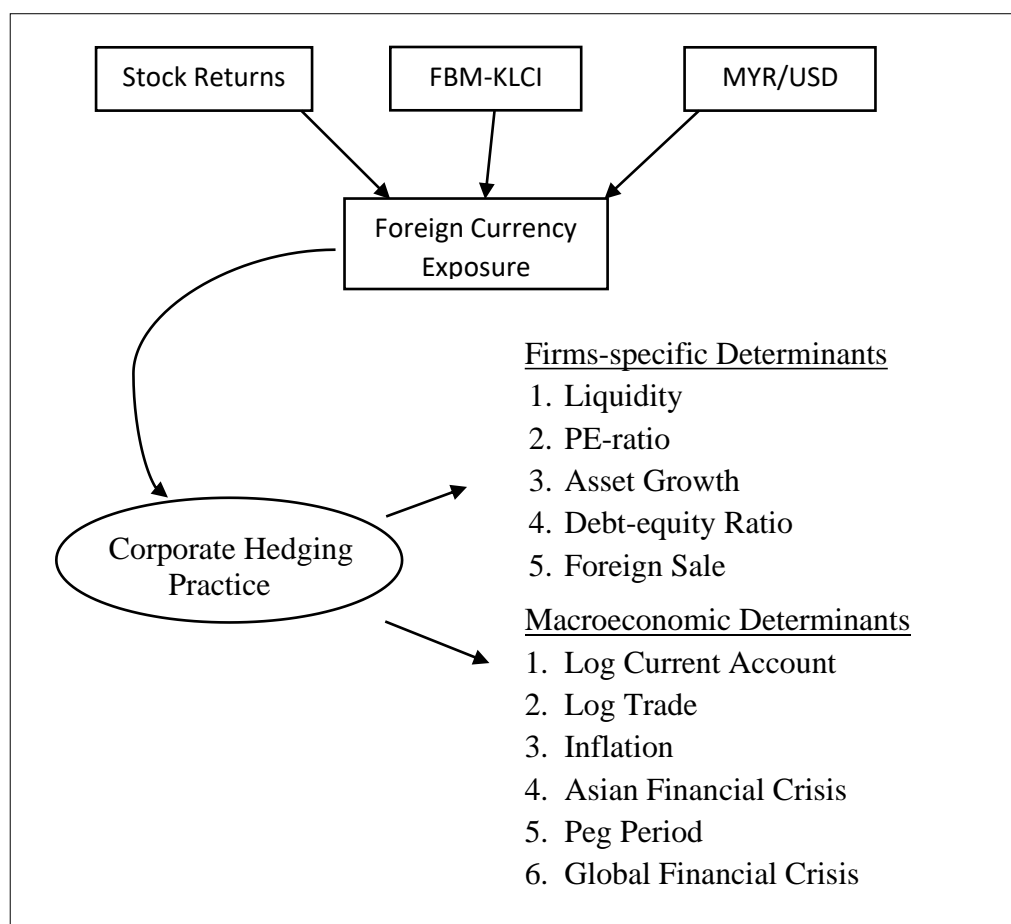


Figure 2 Conceptual Framework

METHODOLOGY

Data

Data on stock return, currency exchange (MYR/USD) and market index are collected from Bloomberg on a monthly basis for a sample of 207 Malaysian firms. In order to enable comprehensive data collection, the firms are required to be non-financial firms and have sufficient data from 1995 to 2016. This study referred to the study of Allayannis and Ofek (2001) to exclude financial firms, whereby most of the firms are also market makers in the foreign currency market. Hence, their exposure to currency fluctuations is different from those

of non-financial firms. In addition, non-financial firms are highly exposed to the effect of exchange rate fluctuations as they are significantly involved in export-import businesses. As the study concentrates on the Malaysian single market, the KLCI index is used to represent the market index.

This study chooses Malaysia as the sample study to investigate FCD use, considering the country's active involvement with international trade and ranked among the 20 top trading nations in the world (Bacha et al., 2013). The extensive trade activities in Malaysia are illustrated by the trade-to-GDP ratio (134%), which signifies a high degree of market openness compared to developed countries such as the United States (28%), the United Kingdom (56%), and Japan (36%). Despite the importance of determining currency exposure for the Malaysian market, and with the exception of the study by Bacha et al. (2013) that primarily focuses on Malaysian firms, the level of currency exposure in Malaysia is relatively unknown, and policymakers depend on findings from developed nations in constructing trading policies in Malaysia.

Methods

Measuring Exchange Rate Exposure

The currency exposure is measured at both firm-specific and panel levels. The measurement for the firm-level exposure follows the residual model by Jorion (1990), as illustrated in the following equation:

$$R_t = \gamma_{0i} + \gamma_1 R_{m,t} + \beta_{US\$,t} S_{US\$,t} + \mu_t \quad (1)$$

where R_t = monthly stock return of a firm, $R_{m,t}$ = monthly return on the index, $S_{US\$,t}$ = nominal monthly change in USD exchange rate, μ_{it} = regression residual, and firm is indexed by i , t represents time.

The Effect of Foreign Currency Derivative on the Level of Currency Exposure

This practice of FCD is examined using the cross-sectional regression as below:

$$EXP_i = \gamma_0 + \gamma_1 USE_i + \theta_i \quad (2)$$

where EXP_i = currency exposure for firm i , USE_i = average value of hedging practice, and θ_i = regression residual.

Determinants of Foreign Currency Derivative

For deeper comprehension of the FCD practice in the country, the study further examines the determinants that could influence the non-financial firms to employ FCD in their operations. The study segregates the analysis into two steps to account for different groups of determinants. The first group of FCD determinants comprises the firm-specific determinants, while the second group considers the macroeconomic factors.

Probit Model for Firm-specific Determinants of FCD Use

The study tests five firm-specific variables as the determinants of FCD use, namely the liquidity, PE ratio, assets growth, debt-equity ratio, and foreign sales. The model is illustrated by the following equation:

$$\Pr(USE_{it} = 1 | \tilde{x}, \delta_{0i}) = \vartheta(\delta_1 Liq_{it} + \delta_2 PE_{it} + \delta_3 Asset_{it} + \delta_4 Debt_{it} + \delta_5 FSale_{it}) \quad (3)$$

Otherwise

$$\Pr(USE_{it} = 0 | \tilde{x}, \delta_{0i}) = 1 - \vartheta(\delta_1 Liq_{it} + \delta_2 PE_{it} + \delta_3 Asset_{it} + \delta_4 Debt_{it} + \delta_5 FSale_{it}) \quad (4)$$

where USE_i = Dummy variable for hedging for each firm i at time t , $\vartheta(x_{it})$ = cumulative distribution function (CDF) of normal distribution, x_{it} = vector of regressors, Liq_{it} = Liquidity of firm i at time t measured as the ratio of cash to cash and short term investments, PE_{it} = price-earning ratio of the firm i at time t , $Asset_{it}$ = Asset growth of firm i at time t , $Debt_{it}$ = Level of leverage in firm i at time t measured as the ratio of total debt to common equity, $FSale_{it}$ = level of firms' foreign sales relative to its total sale at time t , ϵ_{it} = regression residual, and \tilde{x} and δ_{0i} are assumed to be independent.

Probit Model for Macroeconomic Determinants of FCD Use

Meanwhile, the study considers six macroeconomic variables as the determinants of FCD use. Three of the variables are dummy variables that are used to denote the specific financial events taken into consideration in the study. The variables are gross domestic product, total current account, total trade, inflation, Asian financial crisis, peg period, and global financial crisis. The model is illustrated by the following equation:

$$\Pr(USE_{it} = 1 | \tilde{x}, \delta_{0i}) = \theta(\alpha_0 + \alpha_1 GDP_t + \alpha_2 Current_t + \alpha_3 Trade_t + \alpha_4 Inf_t + \alpha_5 AFC_t + \alpha_6 Peg_t + \alpha_7 GFC_t + \epsilon_t) \quad (5)$$

Otherwise

$$\Pr(USE_{it} = 0 | \tilde{x}, \alpha_{0i}) = 1 - \theta(\alpha_0 + \alpha_1 Current_t + \alpha_2 Trade_t + \alpha_3 Inf_t + \alpha_4 AFC_t + \alpha_5 Peg_t + \alpha_6 GFC_t + \epsilon_t) \quad (6)$$

where $\theta(x_{it})$ = cumulative distribution function (CDF) of normal distribution, x_{it} = vector of regressors, USE_{it} = Dummy variable for hedging for each firm i at time t , $Current_t$ = Log of annual current account in Malaysia, $Trade_t$ = Log of annual merchandise trade in Malaysia, Inf_t = Annual inflation rate in Malaysia, AFC_t = Dummy for Asian financial crisis in Malaysia, Peg_t = Dummy for pegging of Malaysian Ringgit, GFC_t = Dummy for global financial crisis in Malaysia, ϵ_t = regression residual, and \tilde{x} and α_{0i} are assumed to be independent.

RESULTS**Descriptive Analysis****Financial Characteristics of Sample Firms**

Tables 2 and 3 present the descriptive statistics on the financial characteristics of the sample firms. As shown in Table 2, the growth of assets as the proxy for firms' size increased from 7.978 in 1995 to 8.735 in 2016. Similar consistency is observed for foreign sales whereby the value increased throughout the years. On the other hand, the leverage level is indicated by the debt-to-equity ratio. The ratio level was high in 1995, 2000 and 2005 and decreased in 2010 and 2016, respectively. The highest amount of debt relative to the equity in 1995 showed that the company needed to obtain external funding to support its operation. Such a need existed to buffer off the effect of fixed exchange rates towards local firms. Generally, the firms' liquidity improved from 1.3273 in 1995 to 1.4178 in 2016.

Meanwhile, firms' performance was based on the PE ratio. PE ratio decreased in 2000 until 2010, before increased in 2016. Higher levels of firm characteristics such as debt-to-equity ratio, PE ratio, and foreign sales show a higher tendency to practise hedging as a form to protect the firms' future cash flows.

Table 2 Mean of Financial Characteristics of FCD Users, 1995-2016

	Mean				
	1995	2000	2005	2010	2016
Total Asset	7.9780	8.2043	8.3875	8.5188	8.7341
Debt/Equity	3.4690	3.5357	3.5258	3.4474	3.4511
Liquidity	1.3273	1.3486	1.3383	1.3950	1.4178
PE Ratio	3.3301	3.0093	3.0918	2.9067	4.7603
Foreign Sales	2.3329	2.7877	3.0297	3.1406	3.2108

Macroeconomic Characteristics of Malaysia Market

In Table 3, the GDP and trade volume consistently increased from 1995 to 2016. However, the current account was positive from 2000 until 2010. The values decreased in 2016. In contrast, the inflation rate fluctuated throughout the study period. The highest rate was in 1995, and decreased in the subsequent years. Greater trade over the years is in line with the proposition of greater economic openness in Malaysia. This is accompanied by increasing GDP values and a stable positive current account. All these indicators simultaneously indicate higher trading and economic robustness in the country and potentially enquire higher hedging practices in the market.

Table 3 Macroeconomic Indicators in Malaysia, 1995-2016

	1995	2000	2005	2010	2016
GDP (RM 'billion)	414.28	523.50	626.48	821.43	1108.00
Trade (RM 'billion)	795.88	1153.84	1277.11	1297.41	1425.39
Current Account (RM 'billion)	-40.37	47.38	87.21	82.60	26.65
Inflation Rate (%)	3.45	1.45	2.96	1.71	2.09

Currency Exposure of Malaysian Non-financial Firms

This section discusses exchange rate exposure at the firm level analysis in comparison to the overall level analysis.

Table 4 Currency Exposure Level of Malaysian Non-financial Firms

Panel Analysis	
Constant	-0.0036 (0.0000)
Market Index	1.1314 (0.0000)
Currency Exchange	-0.0633 (0.0000)
Firm-level Analysis	
Mean of beta	-0.2942
Median of beta	-0.2758
SD of beta	0.4615
Maximum beta	1.1102
Minimum beta	-2.2429
No of Positive Cases (%)	59 (28.50%)
No of Negative Cases (%)	148 (71.49%)
Significant Positive Cases at 10% (%)	9 (4.35%)
Significant Negative Cases at 10% (%)	65 (31.40%)
Total \ of Significant Cases at 10% (%)	74 (35.75%)

The results of the regressions $R_{it} = \alpha_{0i} + \alpha_1 R_{mit} + \beta_{US\$} S_{US\$,it} + \mu_{it}$ for both panel and firm-level analyses.

In Table 4, 35.75% of all sample firms have statistically significant exchange rate exposure. First of all, the 35.75% finding is compared with those of Jorion (1990) as the basis of this study. The study by Jorion (1990) on a developed country showed that a mere 5% of the sample firms were affected by currency exposure. Secondly, the finding is of this study is parallel with the finding of Bacha et al. (2013), who found 71% of their Malaysian sample firms to be affected by currency movements. The parallel findings accentuate the study hypothesis of the significant effect of currency exposure towards firms' stock return in a developing country. In fact, the negative signage of the beta coefficient indicates lower stock return potential for higher exposure levels. This sits well with the theoretical assumption of value defeating the effect of currency exposure, as well as spurs higher urgency for any study on any potential solution to managing the effect of currency exposure. The next section of the study is on the significance of FCD use towards currency exposure.

The Use and Determinants of FCD

From the previous section, the study has shown the significant effect of currency exposure and also the need to manage such effects stemming from currency movements. For this purpose, the study continues with the analysis on the significance of FCD use to alleviate currency exposure, and ultimately determines the factors that influence these firms to engage with FCD.

For this purpose, the beta coefficient obtained from the eq. (1) is used as the dependent variable against the FCD use. The analysis aims to test the effect of FCD use towards symmetric exposure in Malaysia. In Table 5, the use of FCD is significantly associated with foreign exchange exposure. The negative beta signage translates to lower exposure with the use of FCD in the firms' operations. Hence, it is shown that FCD is effective in managing the currency exposure faced by the sample firms.

Almost all the variables included in the study are found to be significant determinants of FCD use at a 10% significance level. Results of the determinants are presented in Panel B of Table 5. Parallel with past findings, asset growth shows a significant effect towards FCD use. Asset growth is a classic determinant of FCD. The negative coefficient of asset growth signals the consideration of the firms to use their asset for growth purposes rather than employing the derivative to hedge their business. Higher liquidity, PE ratio and foreign sales are found to prompt a higher tendency to use FCD for these firms. Firms with high liquidity and

PE ratio must want to protect their stock value from any unforeseen currency movements, thus accentuating their preferences to employ the FCD. On the other hand, firms with high foreign sales are naturally exposed to greater currency exposure as their trading encompasses a larger proportion of cross-border transactions and foreign currency.

Meanwhile, debt to equity is found to insignificantly contribute to the FCD practice. With this, the firm's debt to equity level does not influence the firm's decision to employ FCD in its hedging strategy. The marginal effect of liquidity towards the FCD use is 0.3955 for a 1% increase in liquidity level, further stressing the significant impact of liquidity. The marginal effect is measured as $\frac{\delta E(y|x)}{\delta x} = \frac{1}{\sqrt{2\pi}} e^{(\beta_0 + \beta_i x)^2 / 2} \beta_i$ to illustrate the change in the dependent variable for any change in the specific independent variable. The marginal effect of PE ratio, asset growth, debt-to-equity, and foreign sales are 0.3541, 0.3891, and 0.3943, respectively, for any 1% change in these variables.

Table 5 The Use and Determinants of FCD

Panel A: Currency Exposure and FCD Use	
Constant	0.0011
FCD Use	-0.2875 (0.000) ^c
Panel B: Firm-level Determinants	
Liquidity	0.3801 (0.017) ^b
PE Ratio	0.0003 (0.041) ^b
Asset Growth	-1.2937 (0.012) ^b
Debt-equity	0.0657 (0.335)
Foreign Sales	0.0329 (0.000) ^c
Constant	-0.2687 (0.081) ^a
Panel C: Macroeconomic Determinants	
Log Current Account	3.5578 (0.000) ^c
Log Trade	1.0155 (0.000) ^c
Inflation	-0.3853 (0.000) ^c
Asian Financial Crisis	4.1741 (0.000) ^c
Peg	-2.6635 (0.000) ^c
Global Financial Crisis	-1.0879 (0.003) ^c
Constant	-4.1453 (0.000) ^c

Note: * the value in parenthesis indicates p-value. ^a Significant at 10% level. ^b Significant at 5% level. ^c Significant at 1% level.

In providing a detailed analysis, the study further investigates macroeconomic determinants of FCD use. Panel C in Table 5 presents the results of the macroeconomic determinants. The current account is a significant determinant of FCD use. Accordingly, firms have a greater tendency to use FCD when the country experiences higher current account. The finding is relevant, considering higher current account indicates greater trading activities. In other words, a good economy spurs the firms to use FCD. Inflation is also a significant determinant of FCD use. In line with theoretical prediction, higher inflation is more likely to hinder firms from using FCD. This is true as inflation induces higher costs and reduces the firm's profitability.

Meanwhile, the trade factor shows a significant causal relationship towards FCD as trade is the main business activity that is directly affected by currency movements. The decision to hedge is also influenced by specific financial events and government intervention. Accordingly, the Asian financial crisis in 1997, the peg period and the global financial crisis in 2008 show significant impact to the FCD use. Despite the significance of these determinants, the marginal effect inflicted by these variables is notably small. Any 1% change in the log of the current account will prompt a 0.001981% increase towards the initiative to use FCD. The marginal effects of trade and inflation are also small at 0.001774% and 0.001669%, respectively. An even smaller marginal effect is observed for the dummy factors of the peg period and GFC. The small effect of the GFC is

within expectation in consideration of the regional factor of the GFC. Naturally, the effect of AFC is 0.5115 in consideration of the direct effect of the crisis towards the Malaysian economy back then.

ROBUSTNESS TEST

A robustness test is performed to ensure the consistency of the results, which are presented in Table 6. Initially, the study tests the robustness of the exposure level by considering the potential effect of asymmetric exposure towards FCD use. This is to follow Clark and Mefteh (2011), who highlighted the possible asymmetric reactions of stock returns to currency fluctuations. In Table 5, the significant effect of FCD use during USD appreciation is similar to the base case result. However, the effect of FCD use is insignificant when the firms face USD depreciation.

Table 6 Robustness Test of the Use and Determinants of FCD

Panel A: Asymmetric Currency Exposure and FCD Use	
Constant	0.0052
FCD Use (USD Appreciation)	-0.4419 (0.000) ^c
FCD Use (USD Depreciation)	0.0215 (0.432)

Note: * the value in parenthesis indicates p-value. ^aSignificant at 10% level. ^bSignificant at 5% level. ^cSignificant at 1% level.

Even though the sample consists of hedged firms that have maintained continuous trade from 1995 to 2016, a wide gap exists in the firm size as the total asset of the biggest firm is RM132,871,000 while the smallest firm is worth RM432,928. As numerous literature has recorded firm size as a significant determinant of exposure level, a robustness test is necessary to further re-estimate the exposure. In accordance with Yip and Nguyen (2012), the sample was separated into two portfolios in terms of market capitalisation. The first group contains the largest 25 sample firms, while the remaining 24 sample firms are included in the second group. For further understanding of the two groups, descriptive statistics of the firm-specific determinants of the firm groups are presented in Table 7. Apart from asset growth, the second group showcases better performance for most of the firm characteristics, namely the liquidity, PE-ratio, debt-equity ratio, and foreign sales. While the difference is not substantial for foreign sales, the differences are prominent for liquidity, PE-ratio, and debt-equity ratio for both firm groups. Naturally, firms in the first group possess bigger asset growth compared to the second group.

Table 7 Descriptive Statistics of Sized-base Group

	1995	2000	2005	2010	2016
First group (Larger Market Capitalisation)					
Liquidity	0.2337	0.3002	0.3297	0.3941	0.4499
PE-ratio	23.527	19.757	18.853	14.886	812.23
Asset Growth	6.1184	6.3719	6.5055	6.6938	6.8587
Debt Ratio	0.2411	1.3114	1.2842	1.2158	1.4631
Foreign sales	4.1029	11.403	17.505	28.050	30.588
Second group (Larger Market Capitalisation)					
Liquidity	0.6561	0.5938	0.5819	0.6391	0.6368
PE-ratio	64.601	29.989	31.844	18.104	1380.7
Asset Growth	5.5294	5.5500	5.6388	5.7419	5.8424
Debt Ratio	1.4368	1.3119	1.5951	1.1921	1.2493
Foreign sales	4.6930	13.675	26.398	28.3714	35.838

The results of the robustness test for the determinants of FCD use are presented in Table 8. Panel A illustrates the results for firm-specific determinants, while Panel B indicates the macroeconomic factors. Consistent with the base case study, most of the firm-specific determinants remain significant for both groups in Panel A. However, a slight change is recorded for the first group. The PE ratio in the first group turns out to be a significant determinant of FCD use for the firms.

Table 8 Robustness Test of the Determinants of FCD

Panel A: Firm-level Determinants		
	First Group	Second Group
Liquidity	0.9370 (0.000) ^c	0.0318 (0.890)
PE Ratio	0.0005 (0.471)	0.0004 (0.048) ^c
Asset Growth	-2.0308 (0.020) ^c	-1.0505 (0.090) ^a
Debt-equity	0.2846 (0.003) ^c	-0.1368 (0.183)
Foreign Sales	0.0261 (0.000) ^c	0.0354 (0.000) ^c
Constant	-0.4508 (0.024) ^c	0.0240 (0.922)
Panel B: Macroeconomic Determinants		
	First Group	Second Group
Log Current Account	0.4262 (0.026) ^b	-0.5136 (0.249)
Log Trade	17.2109 (0.000) ^c	29.2706 (0.000) ^c
Inflation	0.0499 (0.501)	-0.3053 (0.023) ^a
AFC	3.5525 (0.338)	2.5680 (0.775)
Peg	430.446 (0.534)	-2586.792 (0.004) ^b
GFC	4.7413 (0.667)	-124.7714 (0.991)
Constant	-51.6181 (0.000) ^c	-87.6573 (0.000) ^c

Note: * the value in parenthesis indicates p-value. ^a Significant at 10% level. ^b Significant at 5% level. ^c Significant at 1% level.

While debt to equity ratio becomes a significant factor in using the derivative, results for the second group show a consistent insignificant effect of debt-equity. In addition, liquidity is found to be an insignificant point of consideration for the firms in the second group.

As for the macroeconomic determinants in Panel B, most of the determinants in the second group comply with the results in the base case study. There are four significant determinants in the second group, while two determinants in the first group maintain their significance. In terms of signage, the positive effect of trade and Asian financial crisis factors in the first group are consistent with the base case study. With the exception of the current account, signage for trade, inflation, the Asian financial crisis, the peg period, and the global financial crisis show a similar direction to the signage found in the previous base study.

CONCLUSION

This paper empirically examines the currency exposure of non-financial firms listed in Malaysia. The study further investigates the effect of FCD use on the level of currency exposure and the potential determinants of FCD use. Similar to past studies on currency exposure in developing countries, results from this study show high level of currency exposure among the sample firms in Malaysia. The results support the relevance of the two analyses on FCD use in Malaysia. Firstly, the study evaluates the effect of FCD use towards the currency exposure level where the effect of FCD is found to be significant towards the currency exposure level and stresses the importance of the financial tool in such market. Secondly, the study identifies the determinants behind the decision to hedge using FCD. All the firm-specific determinants are found to be significant factors in influencing the firms to hedge using FCD. As for macroeconomic factors, the study finds all the economic indicators to be significant for FCD employment. Meanwhile, only AFC proves as a significant event factor while GFC and pegged periods are insignificant factors of FCD use. The result is within expectation considering the relatively small effect of GFC on the developing market compared to the effect of the AFC.

Implications of the study lies on two findings. While the study manages to indicate the high currency exposure level in the market, proving the significant effect of the FCD use towards currency exposure level justifies the contribution of the findings to ring for more practice and use of FCD in a developing country specifically Malaysia. Non-financial firms in Malaysia need to be more adaptive towards FCD use because derivative holds significant effect in managing the exposure level. Second, identification of the significant

determinants behind the decision to use FCD provide in-depth insights on the underlying factors that are being considered by firms in their risk management framework. These findings may contribute to two fronts. Firstly, it serves as a knowledge base for firms' managers to intensify their hedging strategy. Secondly, availability of such information can pave ways for more functional financial market in Malaysia, establishment of more apt financial instruments and derivatives in foreseeable future. In order to improve the financial instrument, other further studies are also welcome to conclude more specific potential determinants to better apprehend the patterns and characteristics of the Malaysian firms. Further analyses can be conducted by looking into currency exposure topics from different aspect such the asymmetric nature of the exposure.

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