# The Effects of Financial and Operational Hedging on Company Value: The Case of Malaysian Multinationals

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# ABSTRACT

Fluctuations in foreign currency (FC) always have been a source of concern for multinational companies exoposed to higher FC risk compared to domestic companies. These companies employ different hedging strategies to reduce FC risk exposure. This study examines the value effects of financial hedging (i.e., derivatives and FC debt) and operational hedging in a managed floating exchange rate regime with strict limitations on the trading of Malaysian Ringgit and control for the value effects of non-operational income (loss) measured by foreign exchange profits (losses), and its two components: transaction and translation profits (losses). The results of two-step system generalized method of moments (GMM) estimation for a sample of 109 Malaysian multinationals over the 2004−2018 period show that, on average, derivatives hedging creates a value premium range of 7.88−8.21 % in the short-run, and 18.81−19.80 % in the long-run, with respect to company value approximated by Tobin's Q. In contrast, foreign debt hedging, on average, creates a value discount range of 8.19−8.54 % in the short-run and 12.70−13.12 % in the long-run. Operational hedging strategies do not affect company value, though different proxies represented operational hedging. Although all the Malaysian multinationals in this study face significant FC risk exposure, less than half of Malaysian companies do not use any financial hedging strategies whereby hedgers reduce their FC risk exposure through forward contracts in the over-the-counter market and employ FC swaps occasionally. The positive value effect of derivatives hedging should motivate managers of Malaysian multinationals to involve in hedging more actively and encourage policymakers to take steps in developing derivatives market and products. However, the negative effect of foreign debt hedging on company value may stem from two

potential causes; higher company risk due to FC borrowing, and improper hedging practices including high cost of hedging in the underdeveloped derivatives market. These potential causes need further empirical evaluations.

**Keywords:** Financial hedging; operational hedging; company value; foreign currency derivatives; foreign currency debt; Malaysia.

# ÖZ

Yabancı para (YP) birimindeki dalgalanmalar, yerli şirketlere kıyasla daha yüksek YP riskine maruz kalan çok uluslu şirketler için her zaman bir endişe kaynağı olmuştur. Bu şirketler, YP riskini azaltmak için farklı korunma stratejileri kullanır. Bu çalışma Malezya çok uluslu şirketleri için finansal (türevler ve yabancı para cinsinden borçlanma) ve operasyonel hedge metotlarının şirket değeri üzerindeki etkisini incelemektir. Ayrıca, çalışma operasyonel olmayan gelir/zarar (yabancı para kar/zarar) kontrol ederek etkiyi ölçmektedir. Çalışmada, yabancı para karları (zararları) iki bileşeni ile ölçülür; işlem ve çevrim karları (zararlar). 2004-2018 dönemini kapsayan ve 109 Malezyalı çok uluslu şirketten oluşan bir örneklem için iki aşamalı genelleştirilmiş moment yöntemi (GMM) ekonometri metodu kullanılmıştır. Sonuçlar, türev koruma metodunun kısa vadede 7.88−8.21% aralığında değer primi aralığı oluşturduğunu göstermektedir. Uzun vadede ise 18.81−19.80% aralığı tahmin edilmiştir. Buna karşılık, yabancı para borçlanma riskinden korunma ortalama olarak kısa vadede 8.19–8.54% değer indirimi aralığı yaratır. Uzun vadede ise 12.70−13.12% aralığı tahmin edilmiştir. Çalışma, operasyonel riskten korunma metotlarının şirket değerini etkilemediği bulunmuştur. Bu çalışmadaki tüm Malezyalı çokuluslu şirketler önemli ölçüde YP riskiyle karşı karşıya kalsa da, şirketlerinin yarısından azı herhangi bir finansal riskten korunma stratejisi kullanmamaktadır. Genelde, tezgah üstü piyasada vadeli sözleşmeler yoluyla YP risklerini hedge ederler ve az miktarda YP swapları kullanırlar. Türevleri kullanarak korunmanın pozitif değer etkisi, Malezyalı çok uluslu şirket yöneticilerini riskten korunmayı daha aktif bir şekilde dahil olmaya motive etmelidir. Ayrıca, politika yapıcıları türev piyasasını ve ürünlerini geliştirmede adımlaratmalıdırlar. Ancak, yabancı para borç riskinden korunmanın şirket değeri

üzerindeki olumsuz etkisi iki olası nedenden kaynaklanıyor alabilir. YP borçlanma nedeniyle daha yüksek şirket riski ve gelişmemiş türev piyasasında yüksek riskten korunma maliyetleri dahil olmak üzere uygunsuz riskten korunma uygulamaları bu nedenler arasında gösterilebilir. Bu nedenler daha fazla ampirik incelmeye tabii tutulmalıdır.

**Anahtar Kelimeler**: Finansal riskten korunma; operasyonel riskten korunma; şirket değeri; döviz türevleri; döviz borcu; Malezya.

# DEDICATION

*To my family*

*You are my rock as your support, guidance and*

*motivation help me grow each day.*

*Thank you*

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# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LISTS OF SYMBOLS AND ABBREVIATIONS

| | |
|---|---|
| & | and |
| # | number |
| % | percent |
| 1MDB | One Malaysia Development Berhad |
| AR | Autocorrelation |
| AR(1) | Autocorrelation first-order |
| AR(2) | Autocorrelation second-order |
| ASEAN | Association of East Asian nations |
| BNM | Bank Nigara Malaysia |
| BNM OPR | Bank Nigara Malaysia overnight policy rate |
| CEO | Chief executive officer |
| DISP_INDEX I | Dispersion index I |
| DISP_INDEX II | Dispersion index II |
| FASB | Financial accounting standard boards |
| FC | Foreign currency |
| FC_DERV | Foreign currency derivatives |
| FC_DEBT | Foreign currency debt |
| FC debt | Foreign currency debt |
| FDIs | Foreign direct investments |
| FSALES | Foreign sales |
| FTSE | Foreign trade securities exchange |
| FX | Foreign exchange |
| FXPROFIT | Foreign exchange profits (losses) |
| FXPROFIT_tsc | Foreign exchange transaction profits (losses) |
| FXPROFIT_tsl | Foreign exchange translation profits (losses) |
| GDP | Growth domestic product |
| GFC | Global financial crisis |
| GMM | Generalized method of moments |
| GROW_OPP | Growth opportunities |

| | |
|---|---|
| HK | Hong Kong |
| INDSDY | Industry dummy |
| LEVE | Leverage |
| LIQU | Liquidity |
| LNCOUNS | Logarithm of number of countries |
| Ln(Q) | Logarithm of Tobin's Q |
| LNREGNS | Logarithm of number of regions |
| M/B | Market to book ratio |
| MYR | Malaysian Ringgit |
| OLSs | Ordinary least squares |
| Para | Paragraph |
| PROF | Profitability |
| RM | Ringgit Malaysia |
| Q3 | Third quarter |
| SIC | Subject industry category |
| UK | United Kingdom |
| US | United States |
| USD | US Dollar |
| USD FED | US Dollar Federal Reserve |
| US Fed | US Federal |
| USD/MYR | US Dollar against Malaysian Ringgit currency pair |
| YEARDY | Year dummy |

# Chapter 1

# INTRODUCTION

## 1.1 Introduction

Fluctuations of foreign curency (FC) highly affect the values of exporting or multinational comapanies. The currency fluctuations affect the future cash flow streams and consequently the company value (Jorion, 1990). To reduce FC risk exposure, companies use derivatives contracts such as forwards, futures, options, and swaps and FC debt as financial hedging strategies. Multinational companies, on the other hand, also involve in operational hedging strategies including operational flexibility and geographical diversification of foreign subsidiaries in different countries.

The question is that whether hedging FC risk creates value. In the absence of market imperfections, hedging policies do not affect company value (Modigliani & Miller, 1958). However, market imperfection-based hedging theories including taxes, financial distress costs, underinvestment, and agency costs explain how hedging can increase value (Bessembinder, 1991; Froot, Scharfstein, & Stein, 1993; Géczy, Minton, & Schrand, 1997; Smith & Stulz, 1985). In particular, foreign currency (FC) volatility affects the values of companies with foreign sales or operations. To reduce FC risk exposure, such companies utilize financial hedging, operational hedging or both. However, the empirical evidence on the value effects of financial strategies, i.e.,

hedging through derivatives and FC debt (foreign currency debt) shows mixed results.[1] For instance, in the US market, Allayannis and Weston (2001) finds FC derivatives create a value premium of 4.87 %, on average, while Jin and Jorion (2006) finds hedging company's stock exposure to oil and gas prices does not create value especially for US oil and gas companies. In the Euro area markets, for instance, Clark and Judge (2009) find that if FC debt and derivatives are combined, short-term hedging creates on average a value premium of 14 % in the UK market. Vivel Búa et al. (2015) show that FC derivatives hedging creates a 1.53 % value premium in Spanish non-financial companies, while Belghitar, Clark, and Mefteh (2013) find FC derivatives generate no value premium for French non-financial companies.

There is not much attention in the literature given to the value effects of FC debt as another financial hedge strategy. The empirical evidence on the value effect of FC debt hedging is also inconclusive. Clark and Judge (2009), for instance, find no value premium for FC debt hedging unless it is combined with FC derivatives. In contrast, Bae, Kim, Kwon (2016) find a value discount for Korean non-financial companies. Some few studies find empirical evidence for the value effects of simultaneous use of FC derivatives and FC debt. For instance, according to Clark and Judge (2009) the combination of FC debt hedging and FC derivatives creates 13.3 % value premium, on average.

The empirical evidence on the value premium of operational hedging is inconclusive[2]. Allayannis et al. (2001), for example, show that for US non-financial

[1] For the US and Eurozone countries, the empirical evidence is abundant in the literature. For the US market, see Allayannis and Weston (2001); Allayannis, Ihrig, & Weston (2001); Gleason, Kim, & Mathur (2005); Kim, Mathur, & Nam (2006); Allayannis, Lel, and Miller (2012). For the European countries, see Keloharju and Niskanen (2001); Belghitar, Clark, and Judge (2008); Clark and Judge (2009); Belghitar et al. (2013); Vivel Búa et al. (2015), and Panaretou (2014).

[2] Allayannis et al. (2001) and Vivel Búa et al. (2015) show operational hedging solely does not create value. In contrast, Kim et al. (2006) find that operational hedging creates value.

multinational companies operational hedging strategies do not create value unless combine with financial hedging strategies (i.e., FC derivatives and FC debt hedging). In contrast, geographical diversification of US companies as operational hedging, according to Kim et al. (2006), generates value premium range of 4.8–17.9 %. Vivel Búa et al.'s (2015) findings show that operational hedging does not generate value in Spanish non-financial companies.

Susceptible to higher FC risks (Allayannis & Ofek, 2001; Bodnar & Wong, 2003; Faff & Marshall, 2005; Jorion, 1990), multinational companies directly experience both accounting exposure through foreign assets and liabilities, and economic exposure through operating cash flows (Choi & Jiang, 2009). To mitigate permanent or long-term risk exposure (economic exposure), multinationals employ operational hedging. Geographical diversification and operational flexibility through foreign subsidiaries constitute the multinationals' selection criteria in probing the value effects of operational hedging (Allayannis et al. 2001; Bodnar, Tang, & Weintrop, 1997; Carter, Pantzalis, & Simkins, 2003; Choi & Jiang, 2009; Denis, Denis, & Yost, 2002; Dunning, 1973; Gleason et al. 2005; Kim et al. 2006; Morck & Yeung, 1991; Vivel Búa et al., 2015).

## 1.2 Malaysia an Interesting Case for Evaluating the Value Effects of Currency Hedging

Several reasons account for why Malaysian companies represent an interesting case for evaluating the effects of hedging FC risk on company value. As an export-dependent Asia-Pacific country with strong manufacturing and service industries, an average trade to GDP ratio growth of over 130 percent since 2010 secures Malaysia's position as one of the most open global economies (World Bank, 2020). The open economic and investment environment has significantly contributed to wealth and

employment growth−especially, given that the export industry roughly occupies 40 % of the employment (World Bank, 2020). Multinationals have also boosted Malaysia's significant export-based economic growth. The 8th annual Invest Malaysia conference (IMKL 2012) highlighted the growth of Malaysian multinationals in ASEAN's "marketplace" ("IMKL: Malaysia as multinational marketplace", 2012, para. 2). Bursa Malaysia's CEO stated that

> our public listed companies have transformed from domestic players to regional and global multinationals. The top 30 per cent of FTSE Bursa Malaysia KLCI [Kuala Lumpur Composite Index] companies, for instance, are generating 40 per cent of their revenue from abroad ("IMKL: Malaysia as multinational marketplace", 2012, para. 6–7).

Aside from the multinationals' important role in exports, a number of policy settings also make Malaysia an interesting case. Following the Asian financial crisis in 1997, Malaysia has implemented prohibitions in trading its Ringgit to limit the capital outflows and speculative activities. Having pegged Malaysian Ringgit to US Dollar at 3.80 USD/MYR from 1998 to mid-2005, Malaysia subsequently changed its foreign exchange regime to a managed float exchange rate system. However, the Malaysian Ringgit trade prohibitions remain in effect. In response to a 2017 press release criticizing the introduction of Malaysian Ringgit futures in Singapore Exchange (SGX), and in the Intercontinental Exchange (ICE) Futures Singapore, the Central Bank of Malaysia, Bank Negara Malaysia (BNM), stated that

> the Malaysian Ringgit is a non-internationalized currency and thus, offshore trading of ringgit, in any form where as a non-deliverable forward traded out of offshore financial centers or as futures, options and other derivative contracts on exchanges outside of Malaysia, is against Malaysia's policy (Bank Negara Malaysia, 2017).

Consequently, with its unique financial market settings, Malaysian companies face severe limitations to access different financial hedging instruments including no standardized options and futures on Malaysian Ringgit trading in the official Bursa

Malaysia Derivatives Market. As such, onshore financial markets offer limited derivative financial instruments include forward contracts and some swap contracts to Malaysian companies (Ameer, 2010; Othman & Ameer, 2009). Thus, great economic openness coupled with an underdeveloped derivatives market creates a major hurdle for Malaysian companies.

## 1.3 Exchange Rate Policies and Foreign Currency Risk in Malaysia

This section discusses Malaysia's exchange rate policies and the value of US Dollar against Malaysian Ringgit (MYR) (USD/MYR currency pair) from 1995 to 2018 during which adopting different exchange rate regimes resulted in considerable fluctuations in the Ringgit value against USD. The discussion on USD/MYR currency pair reflects the USD debt dominating Malaysia's external debt. As of 2018 (Q3), 55.9 % Malaysia's external debt is in USD, followed by 30.6 % in MYR, 3.3 % in Chinese Renminbi (RMB), 2.0 % in Japanese Yen (JPY), 2.0 % in Singapore Dollar (SGD) and 6.2 % in other currencies. Moreover, corporations and banks carry the "bulk" of the external debt (Rozimi, 2018, p. 19). According to Rozimi, 43.3 % of foreign-currency denominated debt is in banks' hands, and 46.4 % (i.e., including intercompany loans) in Malaysian corporations (2018, p. 20). Malaysian corporations face credible foreign currency risk, and have the potential to create systemic economic problems in the country.

Covering the period right before and after the Asian financial crisis, Figure 1.1 shows fluctuations in USD/MYR currency pair from 1995 to 2018 and also depicts the major events affecting these fluctuations. Based on its significant trading partners' currencies, where MYR traded around 2.50 USD/MYR, Malaysia had a floating exchange rate regime between 1995 and 1997. However, when the Asian financial crisis hit Malaysia in July 1997, at the end of August 1998 MYR depreciated about 66

% against USD to a level of 4.16 USD/MYR due to major capital flights and speculative attacks. Making MYR non-convertible outside of Malaysia, and imposing capital controls, the Malaysian government changed its exchange rate regime in September 1998, and pegged MYR to USD at 3.80 USD/MYR. The pegged exchange rate system continued until July 2005.

To avoid trade distortions, following the exchange rate regime shift from pegged currency in China, the Malaysian government switched from pegged to a managed float exchange rate regime in July 2005 (Jayaraman & Mirtha, 2017, para. 7–8). The market's supply and demand forces allowed MYR to fluctuate while the Malaysian Central Bank had power to intervene in the FX market, albeit "…limited to maintaining orderly foreign exchange market conditions with a view to avoiding extreme movements in the ringgit exchange rate that could destabilize the real economy" (Aziz, 2013, p. 217).

As Figure 1.1 shows, after abandoning the pegged exchange rate regime, due to strong capital inflows, MYR appreciated against the USD till September 2008. However, Aziz (2013) stated that the "deleveraging activities by international investors", and the 2008 global financial crisis resulted in MYR's steady depreciation from September 2008 to April 2009 (pp. 217–218). Subsequently, MYR appreciated against USD and stayed around 3.15 USD/MYR until August 2011 after which 1Mayalsia Development Berhad (1MDB) scandal occurred in late 2014. Laundering millions of dollars from 1MDB, a government-run strategic development fund launched in 2008, for personal use by the politicians in power resulted in a huge political scandal and loss of investors' confidence. According to Ho (2015), the global attention over Malaysia's 1MDB scandal dealt a blow to Ringgit's confidence in late

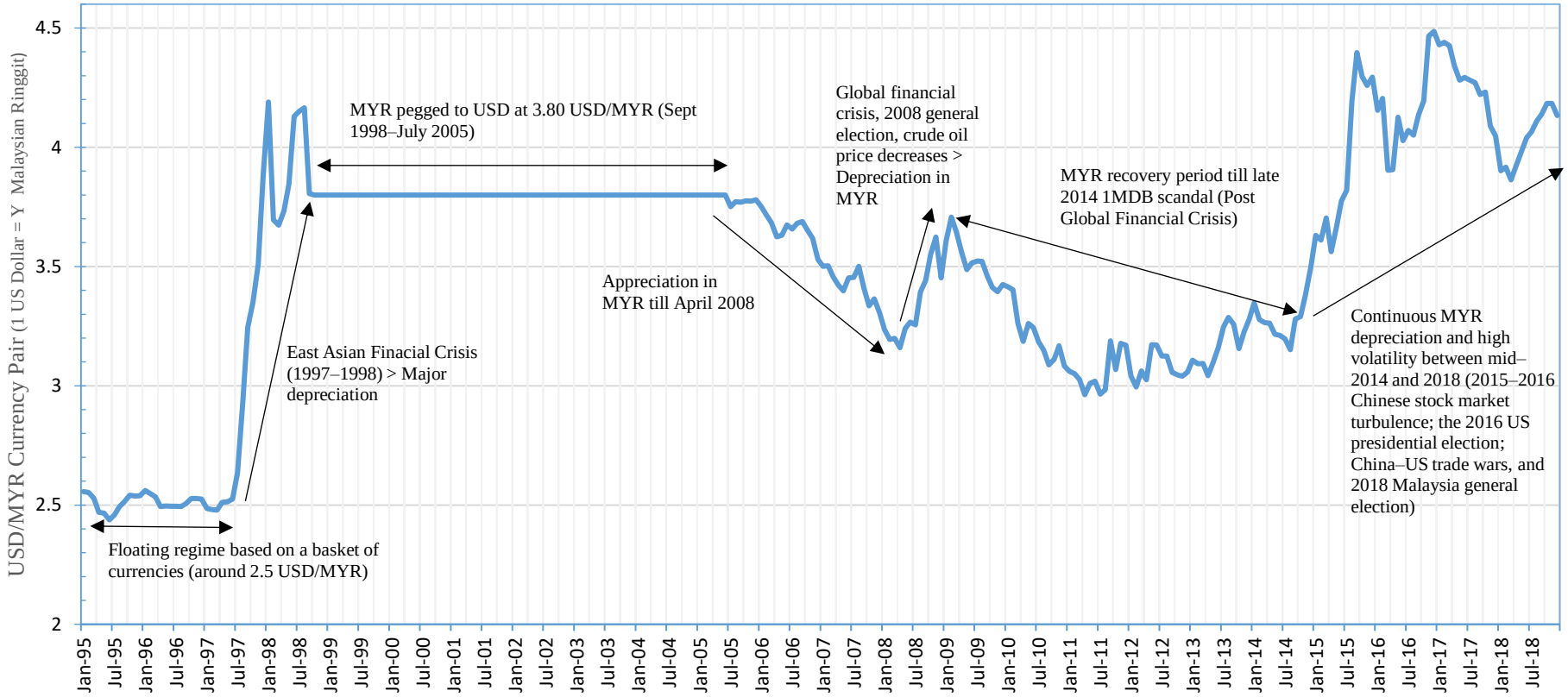


Figure 1.1: Monthly USD/MYR exchange rates (1995–2018)

2014 (“What caused the drop in the ringgit”). Its opponents viewed this scandal as one reason for Ringgit’s devaluation. Moreover, in July 2015, the transfer of USD700 Million from 1MDB money to Prime Minister Najib Razak’s personal accounts exacerbated the further low confidence in currency. Ever since, MYR steadily depreciated against USD and reached a peak of 4.48 USD/MYR in December 2016.

## 1.4 Problem Statement

Companies employ derivatives such as forwards, futures, options, and swaps to avoid or minimize FC risk exposure. Several Malaysian companies explicitly state in their annual reports that they do not apply any financial policy to reduce FC risk, keeping their FC risk at an acceptable level. Ameer (2009) points out that “a few Malaysian companies hedge market risks”, and notes that in their annual reports, most Malaysian companies do not hedge due to insignificant exposure to FC risk (pp. 78, 81). Similarly, Yazid et al. (2008) report that the majority of Malaysian non-financial companies (55%) characterize as FC non-hedgers due to their insignificant exposure. According to Yazid et al.’s (2008) findings, insignificant exposure to FC risk motivate Malaysian companies to employ natural hedge such as borrowing in foreign currency or match their revenues and expenses in the same currency. In fact, Yazid et al.’s (2008) and Ameer’s (2009) findings probe whether Malaysian companies exposed to significant FC risk use more FC derivatives. This study fills this gap by selecting a sample of Malaysian multinationals exposed to significant FC risk and examines whether they employ FC derivatives. If Malaysian multinationals employ financial hedging (i.e., FC derivatives and FC debts), currency hedging adds/destroys company value.

As commonly used in the empirical literature (e.g., Donnelly & Sheehy, 1996; Elliott, Huffman, & Makar, 2003), a minimum 20 % foreign sales to total sales ratio

exposes the sample multinationals to significant FC risk. This method captures the potential value effects of financial hedging in Malaysia compared to studies using sample companies with no foreign sales thresholds.

## 1.5 Research Questions

Multinationals are representatives of companies that face FC risk exposure more than domestic ones. The questions of this study are as follow:

$H_1$: After controlling for FX profits (losses) and FX profits (losses) of transaction and translation, financial hedging (i.e., FC derivatives and FC debt) expectedly generates a value premium for Malaysian multinational companies.

$H_2$: Operational hedging is expected to generate a value premium for Malaysian multinational companies.

## 1.6 Significant of Study

Previous studies on Asia-Pacific countries' hedging effects have ignored companies' and industries' foreign involvement levels, and have simply differentiated their FC exposure factors (i.e., foreign sales or operations).[3] Affecting companies' assets in the long-run (El-Masry, 2006), however, the FC exposure level serves as an important indicator in financial hedging (Allayannis & Ofek, 2001). This study captures the extent of FC exposure, and FC hedging— both in terms of derivatives and debt,[4] and operational hedging.

This study also contributes to the extant literature on the effects of foreign exchange profits (losses) on value. As the only study on this theme, Bae et al. (2016) controls

[3] See Nguyen and Faff (2007), Ameer (2009), Bae et al. (2016), Bae, Kim, Kwon (2018), Alam and Gupta (2018), Luo and Wang (2018).

[4] Previous empirical studies typically test for value effects of financial hedging by using a dummy variable which does not capture the hedging magnitude and can bias the results (e.g., Allayannis & Weston, 2001; Allayannis et al., 2001; Gleason et al., 2005; Allayannis et al., 2012; Belghitar et al., 2013; Luo & Wang, 2018).

the effect of foreign exchange profits (losses) on value to find the "true" FC debt financing value effect for Korean companies. This study also contributes to the literature by controlling for foreign exchange profits (losses) effect on company value and finds the "true" value effects of both FC derivatives and FC debt hedging for Malaysian multinationals.

A few previous studies focus on the extent of FC hedging use and the determinants of FC derivatives use, while some examine the relationship between hedging and capital structure and the cost of equity in Malaysia.[5] For example, Yazid, Hussin, and Razali (2008) examine the extent of FC risk management among manufacturers and find that 55 % of manufacturers are non-users of foreign exchange risk. Ameer (2010) examines some determinants of derivatives use and finds a strong relationship between derivatives use, foreign sales, liquidity, growth options, managerial ownership, and size. Ahmad and Harris (2012) find that current ratios and market-to-book value as the two main factors affecting Malaysian non-financial companies to use derivatives.

While few studies have discussed the value effect of hedging in the Asia-Pacific region, only one has discussed foreign exchange and interest rate derivatives in Malaysia (Ameer, 2009). Ameer (2009) finds a very small value premium relative to findings in the other countries. To the best of our knowledge, this is the first study that investigates the value effects of both financial hedging (i.e., FC derivatives and FC debt hedging) and operational hedging for Malaysian multinationals.

## 1.7 Different Types of Exposures

Derivatives are used to shield against changes in foreign exchange rates or foreign exchange risk exposure. The three main types of foreign exchange exposure under

[5] Studies on FC hedging (Yazid, Hussin, Razali, 2008; Wahab, 2017, Wahab et al., 2017); studies on hedging determinants and capital structure or cost of equity (Ameer, 2010; Ameer, Isa, Abdullah, 2011; Ahmad & Haris, 2012).

floating exchange regime are: transaction exposure, accounting exposure, and operating exposure.

Transaction exposure is the possibility of incurring gains or losses on transactions already entered into and denominated in a foreign currency. Since the transaction will result in a future cash inflow and outflow, any change in the exchange rate between the time the transaction is entered into and the time it is settled in cash will lead to change in the dollar amount of the cash inflow or outflow (Shapiro, 1991, p. 185). Eliminating transaction exposure, according to Shapiro (1991) doesn't eliminate all foreign exchange risk and long-term operating exposure still remains (p. 185)

Accounting exposure also called translation exposure arises as a result of translating the FC denominated financial statements of foreign subsidiaries or affiliates into the parent's reporting currency for the purpose of consolidating financial statements (Eiteman, Stonehill, & Moffett, 1992, p. 244). According to Eiteman et al. (1992) although it is nearly impossible to offset both transaction and translation exposure simultaneously, if managers forced to choose, most of them would protect against transaction losses because these are realized cash losses, rather than protect against accounting losses, which are only book losses (p. 265). "Realized" means that the loss or gain involves cash flows. *Realized* foreign exchange losses are deductible for purposes of calculating income taxes. Similarly, only *realized* gains create taxable income. Losses from transaction exposure usually reduce taxable income in the year in which they are realized. Nevertheless, companies don't concern about hedging translation exposure because it does not have cash flow effect, and thus accounting losses are not realized and so are not deductible (Eiteman et al., 1992, p. 186). However, the translation gains/losses may have psychological effects on investors.

Operating exposure also called economic exposure measures the change in company's future revenues and costs—its operating cash flows due to unexpected change in exchange rates. Losses from operating exposure reduce taxable income over a series of future years and thus it is a long-term exposure (Eiteman et al., 1992, p. 186). Thus, transaction and economic exposures are both cash-flow exposures (Shapiro, 1991, p. 185).

## 1.8 For which Type of Exposure do Companies Undertake Hedging Practice?

Hedging different types of foreign exchange exposure is likely to influence companies in different ways. Hedging transaction exposure can add value by reducing the cost of financial distress or underinvestment problem. The use of derivatives to reduce transaction exposure results in less effect of exchange rate risk on company's cash flows. In another word, hedging transaction risk reduces short-term effects of exchange risk (Clark & Judge, 2009). Similarly, according to Hagelin's (2003) findings companies hedge transaction exposure to reduce the expected costs related to financial distress, taxes, and the underinvestment problem and thus FC hedging increase their values.

According to Butler (1999) hedging accounting exposure is not a concern for companies. Similarly, Hagelin (2003) also notes that no evidence supports the idea that hedging translation exposure increases company value. The economic exposure, on the other hand, affects the long-term cash inflows and outflows of a company. According to Chow, Lee, and Solt (1997) hedging economic exposure requires matching FC cash inflows and outflows through operational hedges that are costly and exhibit significant economies of scale in terms of both capital and human resources.

Consequently, large companies have more economic incentives to hedge than smaller companies.

## 1.9 Hedging Mechanism: Types and Contracts

Undertaking financial derivatives can reduce the effect of change or variability in the value of underlying assets. Currency exchange rates, interest rates, commodity or equity prices are considered as underlying assets (Ameer, 2009).

Use of derivatives as one of the financial instruments to reduce market risk is called hedging through derivatives or derivatives hedging. In the financial markets the market risk or systematic risk is defined as the risk of loss due to the adverse change or variability in the value of underlying assets. For instance, in a sell transaction if the value of home currency depreciates relative to the value of currency that transaction is settled, change or variability in the exchange rate can affect the value of trade receivables. This variability is beneficial to buyer, but hedging can reduce the risk of loss for seller in this example.

There are four types of derivatives instruments: forwards, futures, options, and swaps. When two parties agree to transact at a future date with the price that is determined today the contract is forward. There are some problems to settle the forward contracts. The two parties come to an agreement in a forward contract would have to match with regards to quantity and time of transaction. It means that the counterparty must need the underlying asset of the party in the same quantity and time, indicating that finding a counterpart with opposite needs, but with the same time for undertaking transaction and also same quantity to deal. Moreover, both sides of forward contract usually arrive at the price of forward contract through negotiation. Last, the default risk of counterparty in forward contract is high and price movement

as an incentive increases this possibility that the counterpart is not being involved in the transaction due to price changes.

Futures are contracts to deal the underlying asset at a predetermined price in the future date. The future contracts can be written over the underlying assets e.g., foreign currency, interest rate, and commodities. A future contract is a standardized form of forward contract with this option that the two parties of transaction can choose the quantity of underlying asset, the date of maturity, the product quality and place of delivery on an exchange rate. This option increase liquidity of future contracts compared to forwards and reduces the cost of transaction. The problem of double coincidence timing and quantity in the forward contract is easily overcome in the future contract, because all buyers and sellers transact on an exchange. The problem of default risk in the future contract is removed in the way that each part of deal is a price taker and the price of future contract depends on the prevailing price of underlying asset in the market at the time of contract.

A swap is a contract in which both parties of contract settle to make payments to one another on scheduled dates in the future. The swaps contracts are mainly used by corporations to change foreign debt into domestic debt or domestic debt into foreign debt. Finally, options are contracts where two parties of the contract have the right to trade the certain quantity of underlying asset at the determined price within the specific time period by paying the premium, but they don’t have obligation to trade.

## 1.10 Organization of Study

The remainder of this study is organized as follows. Chapter 2 presents a review of the related literature on the theoretical background on financial and operational hedging and the empirical evidence on the value effects of financial and operational hedging. Chapter 3 explains data collection, regression models, introduction of

dependent and independent variables, control variables and their respective measurements and the research methodology. Chapter 4 presents the GMM estimation results on the value effects of hedging. Chapter 5 shows robustness results, and Chapter 6 presents concluding remarks and suggestions for further studies.

# Chapter 2

# LITERATURE REVIEW

## 2.1 Introduction

Modern finance theories provide little incentives for corporations to use derivatives. According to Modigliani and Miller (1958) in the efficient financial markets, hedging activities by the company do not add any value to shareholders. In the efficient market investors have the same access to market price and to information without any cost such as transaction costs, agency costs and taxes; and therefore the company's financial policy will be irrelevant. Investors can eliminate the unsystematic risk through diversified portfolio, and therefore in this way the risk management destroys shareholders value without any advantage.

In recent years with regards to market imperfections, incentive confilict, and information asymmetries managers are much more motivated for value-maximizing through changing the risk-return portfolio of company. Hedging or derivatives uses can add value due to market impefections. The reason for this value-increasing is that hedging reduces the variability of cash flow and reduces the cost of financial distress and underinvestment problem (Smith & Stulz, 1985; Bessembinder, 1991; Froot et al., 1993).

## 2.2 Financial Hedging Theories

Based on the managerial risk aversion theory, risk-averse managers have incentives to undertake hedging strategies because they invest their personal wealth in their companies (Stulz, 1984). In another words, mangers can use derivatives for reasons

other than benefits of shareholders, e.g., as a way to protect their positions or pursue their favorite projects. Ameer (2010) finds that a positive relationshiop between managerial ownership and derivatives use indicates that manegerial ownership might be an incentive for manegers to maximize personal wealth objectives and therefore they have incentive to be involved in hedging practice.

To deal with fluctuations in foreign exchange rates and to avoid their negative effects on company value and the resulting variability in their personal wealth, managers use derivatives as financial hedging instruments. Smith and Stulz (1985) state that a company's use of derivatives mitigates the volatility of its cash flows, and reduces the expected payment of taxes, financial distress, and agency costs. The convexity of the tax function for a company lowers the expected taxes by reducing the variability in taxable income. Furthermore, Leland (1998) finds that hedging results in greater tax reduction for companies by increasing their debt capacity. Similarly, Ameer et al. (2011) argue that tax motivation for Malaysian companies could carry forward their business losses and lower their effective tax rates.

According to Nance et al. (1993) hedging practice increases the value of company through reduction in taxes payment, cost of financial distress, and agency cost. Using a dummy variable as a proxy for derivatives use, Nance et al.'s (1993) findings show that hedgers facing more tax convexity have more growth opportunities and fewer substitutes for implementing the hedging practice.

Financial hedging reduces underinvestment costs by decreasing the probability of financial distress. Companies' cash flow fluctuations result in variability of internal financing, affecting either external financing or investment spending (Froot et al., 1993). If raising funds externally turns out to be costlier than raising them internally, hedging helps to supply sufficient internal funds for investing in attractive investment

projects, and avoids unnecessary external financing. Hagelin's (2003) findings show derivatives use reduces cost of financial distress and underinvestment problem.

Furthermore, according to Myers (1977) and Bessembinder (1991), hedging increases value by reducing agency and underinvestment costs, and protects companies' expected cash flows against market risks. Financial hedging also reduces cash flow uncertainties and information asymmetry between managers and shareholders. Ameer et al. (2011) note that much research has shown the information asymmetry problem in Malaysian companies increasing financing costs and cash flow volatility (p. 60). Thus, lowering information asymmetry would reduce underinvestment problem for Malaysian companies.

In practice, except for swaps, multinationals use financial derivatives to hedge transaction exposure. Clark and Judge (2008) and Aabo (2006) indicate that derivatives such as forwards, futures, and options have a finite time horizon appropriate for hedging short-term exposures. Compared to hedging closely matched with exposure, the mismatch in the hedge durations and the exposure, according to Clark and Judge (2009), causes higher basis risk. Thus, the use of long-term currency swap or long-term foreign debt seems more appropriate for hedging long-term exposures that reduces basis risk by decreasing the duration differential.

Although foreign debt serves as an alternative to derivatives, they still vary. For example, foreign debt increases a company's financial risks typically issued with long-term maturities. Therefore, companies choose hedging between derivatives and foreign debt considering its duration, the cost and the accessibility to foreign debt. Rather than using foreign debt, however, Judge (2003) finds highly geared companies use foreign currency swaps.

## 2.3 Empirical Evidence about the Value Creation through Financial Hedging Strategies

Most empirical studies have focused on derivatives use for financial hedging (e.g., Allayannis & Weston, 2001; Ayturk, Gurbuz, & Yanik, 2016; Bae et al., 2016; Clark & Judge, 2009; Danisman & Demirel, 2019; Giraldo-Prieto et al., 2017; Graham & Rogers, 2002; Hagelin, 2003; Kuzmina & Kuznetsova, 2018; Nguyen & Faff, 2007; Vivel Búa et al., 2015). Findings on the value effects of hedging, however, do not reach similar conclusions in the US, European, and Asian developed markets. In the US market, for instance, Allayannis and Weston (2001) examine the impact of FCDs on company's value for a sample of US non-financial multinationals over the 1990−1995 period. The results show that currency derivatives use is positively related with company value. Specially, on average hedgers have 4.87 % higher value compared to non-hedgers. Similarly, Kim et al. (2006) find a value premium range of 5.1–5.4 % for a sample of 424 US companies including 212 operationally hedged companies (have foreign operations) matched (i.e., size- and industry-matched) with 212 non-operationally hedged companies (have foreign sales) over the 1996–2000 period.

Carter, Rogers, Simkins (2006) examine the hedging behavior of jet fuel price in the US airline industry over the 1992–2003 period. According to Carter et al.'s (2006) findings the US airlines have incentives to hedge fuel price risk because a large percentage of airline operating costs relates with jet fuel prices and their high variability. Moreover, findings show that hedging jet fuel price adds value up to 14 % which is consistent with Allayannis and Weston's (2001) findings. Similarly, Duran and Gungor's (2017) findings show that a positive long-run relationship between aviation fuel hedging and companies' values in the US major passenger

airlines. Using dynamic panel methodology for nine US major airlines over the period of 2002−2011 the results show approximately 10–15 per cent value discount and 10 per cent value premium during the global financial crisis and following the merger agreements respectively.

According to Allayannis, Brown, and Klapper (2003) strong internal and external corporate governments associate derivatives use and company value. The study highlights the importance of external corporate government in relation between hedging practice and company's value. According to Allayannis et al.'s (2003) findings currency hedging adds 9–20 % value premium in companies holding strong internal and external corporate governance over the 1996−1998 period. Similarly, studying the relationship between corporate governance and FC derivatives for 1605 multinationals cross-listed in the US market, Allayannis et al. (2012) find that FC derivatives adds 8.9 % and 2.61 % value premiums in the strong and weak company-level governance sampled companies respectively. According to Allayannis et al.'s (2012) findings currency derivatives add 10.7 % value premium to hedgers compared to non-hedgers over the 1990−1999 period.

In the European context, Clark and Judge (2009) and Belghitar et al. (2008) find that currency derivatives hedging create value premiums ranging between 11–34 % and 8–15 % in a sample of 412 UK non-financial companies for the year ended to 1995. However, Clark and Jude (2009) show that FC debt solely does not generate value unless combined with FC derivatives. Panaretou (2014) also show that large UK non-financial companies have high incentives to hedge FC risk due to significant FC exposure and currency derivatives hedging generates 6 % value premium. Vivel Búa et al. (2015) find a 1.53 % value premium for FC derivatives hedging, using 100 Spanish non-financial companies over the 2004–2007 period. Hagelin (2003) also

shows that hedging transaction exposure through derivatives increases company value in Swedish companies and FC derivatives users have higher value premium compared to non-users. Nguyen and Faff (2007), on the other hand, find that hedging through FC derivatives generating a 39 % value discount in Australia, while Khediri (2010) reports no value effect in France. Ayturk et al. (2016) show that FC derivatives hedging in Turkey generates a 0.53 % value premium while Akpınar and Fettahoğlu (2016) find it ineffective for Turkish companies. In the Asian developed markets, Luo and Wang (2018) find a value premium of 31.4 % for Chinese companies. In Korea, Bae et al. (2018) find that risk reduction results from currency derivatives hedging in companies with high exposure does not generate higher values. Alam and Gupta's (2018) study in India reveals that FC derivatives reduce company value volatility for hedgers and increase value during the financial crises. Finally, Ameer (2009) finds the maximum value effect of the notional amount of derivatives to be around 0.004 % for non-financial Malaysian companies-a very small number compared to other countries. To sum up, the empirical evidence on the value effect of derivatives hedging seems quite mixed.

Furthermore, few studies have focused on FC debt as an alternative financial hedging instrument.[6] Allayannis and Ofek note that "…since foreign debt represents a cash outflow in a foreign currency, it can only be used as a hedge when a company has foreign revenues (cash inflows), either from operations abroad or from exports" (2001, p. 293). The value effect of FC debt shows mixed results and seems inconclusive. For example, Vivel Búa et al. (2015) associate a 7.52 % value premium with FC debt for Spanish companies whereas Bae et al. (2016) find foreign debt solely for hedging

[6] Allayannis and Ofek (2001), Keloharju and Niskanen (2001), Kedia and Mozumdar (2003), Elliott et al. (2003), Aabo (2006), Nguyen and Faff (2006), Clark and Judge (2009), Vivel Búa et al. (2015), and Bae and Kwon (2013) find evidence that companies use FC debt to hedge FC risk.

purposes resulting on average in 15.1 % value discount for Korean companies. Clark and Judge (2009), on the other hand, find no value premium with only FC debt in the UK market.

The empirical evidence on the value effect of using FC derivatives and FC debt simultaneously also seems mixed. In the UK market, Clark and Judge (2009) examine the impacts of short-term financial instruments (forwards, futures, options) and long-term financial instruments (swaps and FC debt) on value for non-financial companies. Relying on FC debt, according to Clark and Judge's (2009) findings, yields no value premium. However, if FC debt and derivatives are combined, Clark and Judge (2009) find their value premium on average around 14 %.

## 2.4 Operational Hedging Theories

Operating exposure describes the impact of unexpected changes in exchange rate on the cash flows related to a company's assets and liabilities (Carter et al., 2003). Due to their cost-prohibitive and difficult to reverse nature, adaptations of long-term operating policy are more efficient if implemented within a company's network of subsidiaries. Multinationals, however, hedge their long-term exposures by using different operational strategies. According to Gleason et al. (2005), financial strategies complement operational hedging strategies since these strategies determine how to hedge a company's total exposure both in the short- and long-term, respectively.

To cope with long-term exposure, Carter et al. (2003), define operational hedging as a mechanism for combining marketing and production strategies in companies' operating units. They also note that operational hedging strategies involve operational flexibility and geographical diversification. Operational flexibility enables multinational companies to forecast and react to changes in market conditions (Cohen & Huchzermeier, 1999). Thus, having operational flexibility helps multinational

companies to possess portfolios of real options not typically available to domestic companies (Carter et al., 2003). In the absence of perfect capital markets, however, multinational companies utilize these options as operational hedging tools to reduce the volatility in company payments (Chowdhry & Howe, 1999; Hommel, 2003). Ding, Dong, and Kouvelis (2007) note that real options increase company value under exchange rate uncertainty known as "exploiting uncertainty" (p. 486).

Different real options in operational hedging strategies include shifting input sources, shifting production locations or factors of production, launching new products, pricing flexibility, and withdrawing from foreign markets when deemed necessary. For instance, shifting input sources as a real option enables multinationals to switch purchasing inputs from foreign or domestic suppliers, or from different foreign suppliers considering the foreign exchange volatility effects and their relative costs.

Similarly, as another real option, shifting production locations enables multinationals to mitigate their production cost volatilities as they vary significantly among countries (De Meza & Van der Ploeg, 1987). To increase the effect of shifting production locations on company value, Kogut and Kulatilaka (1994) and Capel (1997), identify different factors including reduction in the correlation among marginal costs between different operating units, high product standards, low substitution costs between locations, and high exchange rate fluctuations. The pricing flexibility that enables multinationals to exploit exchange rate uncertainties and production costs relative to output prices constitutes another real option (Andrén, 2001; Bodnar, Dumas, & Marston, 2002; Koutmos & Martin, 2003).

Operational hedging through geographical diversification also allows multinationals to offset unexpected changes in FC exchange rates, and hence reduce

their cash flow volatility. Diversified operational flexibility provides opportunities for multinational companies to decrease the average marginal costs of foreign manufacturing due to cost structure flexibility, and increases values (Cohen & Huchzermeier, 1999; Kogut, 1983). Geographically dispersed companies that seek to grow their specific assets in foreign markets also take advantage of the economies of scale to diminish the average marginal production costs across multinational networks (Caves, 1971; Hymer, 1976). Tax advantages in some countries also generate values for multinationals operating in those countries. Thus, multinationals can benefit from tax differences across countries (Errunza & Senbet, 1981, 1984).

Kogut and Kulatilaka (1994) note values of geographically dispersed companies increase with flexible ownerships of foreign operating units, the discretion of differences in operating regulations, the consumers' markets across countries, and the market exchange rates' volatility where foreign subsidiaries operate. Conversely, Reeb, Kwok, and Baek (1998) argue that multinationality can lower company value due to higher systematic risk and agency problems in geographically dispersed companies.

## 2.5 Empirical Evidence about Value Effects through Operational Hedging and Its Interaction with Financial Hedging

Having operations in different countries, geographically dispersed companies face multiple FC risks relative to domestic companies. Multinationals mitigate different FC risks by using financial and operational hedging (Allayannis et al., 2001; Gleason et al., 2005; Kim et al., 2006), and natural hedging through geographical diversification. Focusing on whether operational hedging substitutes or complements financial

hedging, studies typically evaluate their combined value effects.[7] The previous empirical evidence find that operational hedging alone does not increase value ( Allayannis et al., 2001; Allayannis et al., 2003; Gleason et al., 2005; Danisman and Demirel, 2019; Vivel Búa et al., 2015). For instance, Allayannis et al. (2001) show that operational hedging alone does not improve value while combining it with financial hedging creates a value premium range of 6.6−21% for the US multinational companies. Like Allayannis et al. (2001), Gleason et al. (2005) find operational hedging not adding value, whereas FC derivatives creating a value premium in the US high-technology companies. Furthermore, Vivel Búa et al. (2015) find that operational hedging strategies do not generate value for currency-exposed non-financial companies in Spain, while both FC derivatives and FC debt do so. In contrast, Kim et al. (2006) show that both operational and financial hedging strategies boost value under the rubric of hedging instruments for the US multinationals and operational hedging alone generates a value premium range of 4.8−17.9 %. According to Kim et al. (2006)'s findings operational and financial hedging are complementary strategies to manage foreign exchange risk in the way that operational hedging is used to reduce economic exposure or variability of long-term cash flows to exchange rate changes. On the other hand, financial hedging is used to reduce transaction exposure or variability of short-term cash flows to exchange rate changes. Danisman and Demirel (2019) find that both financial and operational hedging fail to create value for Turkish non-financial companies.

[7] Allayannis et al. (2001) show that operational hedging is not an effective hedging substitute for financial hedging. Besides, Gleason et al. (2005) provide evidence that financial hedging reduces short-term exposure and operational hedging reduces long-term exposure, thus serving as complementary risk management strategies.

## 2.6 Currency Hedging a Common Practice for Multinationals

Hedging FC risk is a common practice among multinationals due to higher risk exposure. The empirical evidnce show the positive effect of hedging practice on reducing or eliminting currency exposure (Allayannis & Ofek, 2001; Carter et al., 2003; Crabb, 2006; Hagelin & Pramborg, 2004; Jorion, 1990; Kim et al., 2003; Ramsamy, 2004).

According to Carter et al. (2003) US multinationals use forward contracts to reduce FC risk exposure. Similarly, Kim et al.'s (2006) findings support the complementary nature of financial and operational hedging strategies for the US companies with foreign sales or foreign exports. According to Kim et al. (2006) although the US operationally hedged companies (companies with foreign sales) are exposed to higher FC risk, their natural hedge and flexibility in their production and marketing strategies related to exchange rates changes result in the lower levels of FC derivatives than that for exporting companies. Similarly, Crabb (2006) show that the US multinationals with foreign assets exposure to exchange rate employ hedging more than ones with foreign sales exposure. According to Pantzalis, Simkins, and Laux's (2001) findings the ability to construct operational hedges leads to lower currency exposure for the pooled sample as well as for the companies with positive exposure (net importers) and negative exposure (net exporters) in the US multinationals.

## 2.7 Factors Demotivate Malaysian Companies to Use Derivatives

Variability of Ringgit is a major concern for many Malaysian companies trading or operating internationally. During the financial crises 1997 and 2008 many Malaysian companies suffered FX losses due to devaluation of Ringgit Malaysia against some major currencies of their trading partners like US Dollar

and British Pound. The poor assessment and management of FX risk was a lesson for Malaysian companies to undertake hedging practices more actively. The question is that what factors might discourage Malaysian companies to involve in hedging.

According to Ramasamy's (2000) findings larger companies are more exposed to FX volatility, however, Malaysian multinationals do not actively take part in hedging practices due to insignificant FC exposure. The results show that only 38 % of Malaysian multinationals face significant exposure to exchange rate fluctuations. Similarly, Ameer et al. (2011) find that insignificant FC exposure is the most important reason that Malaysian companies not to involve in hedging. Yazid et al.'s (2008) findings also show that 46 % of Malaysian manufacturers do not participate in hedging activities due to insignificant currency exposure and some of manufacturers practice natural hedge such as borrowing in the foreign currency or matching their revenues and expenses in the same currency.

According to Ameer et al. (2011) Malaysian derivatives market is underdeveloped and stands approximately in middle position among the Asian derivatives markets. According to Yazid et al. (2008)

> most of the manufacturers are only familiar with forward contracts. Moreover, the development of these financial instruments is some what stagnant. The banks are slow in offering new products for firms to manage financial risks (p.29).

Ameer et al. (2011) find that all Malaysian manufacturers use only forward contracts to reduce FC risk exposure. According to Ameer et al. (2011) one of the reasons that forward contracts are common among companies is that forward contracts are simple and easy to understand compared to other derivatives contracts (e.g., futures, swaps, options). In addition, lack of expertise in derivatives products might be another reason that Malaysian companies hedge only through

forward contracts and involve less in hedging FC risk using other derivatives instruments.

Despite insufficient FC exposure and underdeveloped derivatives market affect Malaysian multinationals involve less in hedging FC risk, Ameer et al. (2011) find that some other factors including difficulty in understanding of derivatives market and complex derivatives products, lack of expertise, transaction costs of derivatives and high costs of hedging products compared to their benefits, and non-availability of derivatives products explain why Malaysian companies avoid hedging. Similarly, Ameer's (2010) findings show a few Malaysian companies properly understand the advantages of employing derivatives instruments to reduce risks and most of managers are risk averse.

Disclosing information on hedging price fluctuations, according to Demarzo and Duffie (1995), affects Managers' future salaries

> since shareholders already know about the use of derivatives to hedge future cash flows, a slowdown or less-than-expected earnings could trigger a lack of confidence in managerial ability to run the business and cut into managerial remuneration; thus, not disclosing derivatives use could actually benefit risk-averse and self-interested managers.

Prior to International Financial Reporting System (IFRS) adaptation in 2004, according to Ameer et al. (2011) and Chong et al. (2014), public listed companies in Malaysia were required to record derivatives (e.g., forwards, and options) as off-balance-sheet items; disclosing derivatives use were not required in the annual reports. Thus, Malaysian Managers could have withheld hedge accounting information on derivatives use prior to Financial Reporting System 138 (FRS 138) and could take advantage not to disclose hedging (Ameer et al., 2011). According to Ameer (2010) Malaysian managers "should seek the help of consultants and professional bankers to ascertain the risk appetite of their organization before

taking the position in the derivatives market".

# Chapter 3

# DATA AND METHODOLOGY

## 3.1 The Characteristics of Sample and Data Collection Procedures

The sample consists of non-financial multinational companies listed on the Bursa Malaysia Main Board. As per literature (e.g., Dunning, 1973), Malaysian multinational companies reflect business entities with operations in more than one country. These companies have foreign assets and operate through active subsidiaries in foreign countries. The subsidiary is a separate entity whose stock is owned by another company usually called parent company or holding company. If the parent company holds more than 20% but less than 50% of ownership interest, this kind of investment of parent company makes the entity as an associate; however, more than 50 % of ownership interest will give the group more control and make the entity as a subsidiary. The sample does not include Malaysian multinationals in financial (SIC codes 6000–6999), utility (SIC codes 4900–4999), and oil (SIC codes 2911–2990) industries for several reasons. As a result of this separation, all banks, insurance companies, financial services, utility, and oil companies are excluded from the sample. Financial companies have different motivations for using derivatives (i.e., speculation, market-making and trading). Meanwhile, utilities are heavily regulated (Akpınar & Fettahoğlu, 2016; Allayannis & Ofek, 2001; Allayannis & Weston, 2001; Allayannis et al., 2012; Ameer, 2009; Chong, Chang, & Tan, 2014), and oil companies' FC risks significantly vary

from companies in other industries (Elliott et al., 2003).[8]

The sample covers the 2004–2018 period. Since Malaysia adopted the International Financial Reporting Standards (IFRS) in 2004, the data collection started in that year. The Financial Reporting System (FRS) was fully compliance with the IFRS in 2008 except several new standards such as FRS 139 among others. Under Financial Reporting Standard 139 (FRS 139) companies are required to measure financial instruments at fair values or deferred as a hedge or as net cash flow in other comprehensive income until expensed.

The initial sample includes 257 Malaysian non-financial multinationals, each of which has a minimum of one active non-financial foreign subsidiary. This number corresponds to roughly 42 percent of listed (active and inactive) non-financial companies operating in the Bursa Malaysia's main market from 2004–2018. The source of information for volumes and types of derivatives contracts and FC debt' currencies, the number of subsidiaries and regions are *all hand-collected* from the annual reports available in the Bursa Malaysia website (http://www.bursamalaysia.com).[9] The total notional values of different types of derivatives included in forwards, futures, options, and swaps are considered as total volume of FC derivatives. The information for financial ratios is collected from Thomson Reuters Datastream. The sample data format is unbalanced panel data.

[8] In his study of the value effects of hedging for Malaysian companies, Ameer (2009) finds significant differences among industries, and examines the value effects for financial and non-financial Malaysian companies separately. Similarly, due to different motivations and possible biases in the estimation results, Ahmad and Haris (2012), and Chong et al. (2014) only consider Malaysian non-financial companies in their FC hedging studies.

[9] In order to find gain or loss on FX transactions, the notes for financial statements are investigated. The profits or losses before taxation section reflects any realised gain or loss in foreign exchange. In order to find profits or losses in FX translations, the consolidated statement of changes in equity section is checked. The profits or losses in FX translation require extraction from foreign exchange translation reserves part.

Yazid et al. (2008) find that 55 % of Malaysian non-financial companies are FC non-hedgers due to insignificant exposure. Hence, to examine the value premium effect of hedging strategies, significantly exposed Malaysian multinationals are identified. For detecting such multinationals, prior studies' methodology is adopted (e.g., Donnelly and Sheehy, 1996; Elliott et al., 2003) and a 20 % cut-off for the company's level of foreign involvement is applied (i.e., the ratio of foreign sales to total sales is greater than or equal to 0.20).

A company is classified as a FC derivatives user (FCDs user) if the company discloses that it uses currency derivatives for hedging purpose. Derivatives holdings may measure speculative activity, not hedging. In 1998 the Financial Accounting Standard Boards (FASB) issued statement No.133 which concluded that "derivatives are assets or liabilities and should be reported in the financial statements," and "fair value is the most relevant measure for financial instruments and the only relevant measure for derivatives" (Allayannis & Weston, 2001). Therefore, FASB requires all companies to state explicitly the reasons behind their use of derivatives (e.g., speculation, financing, hedging). Many companies provide statement such as "derivatives are used for risk management purposes only". If companies use derivatives for other purpose such as speculating, they are excluded from the sample. The final sample consists of 109 Malaysian multinationals that have a minimum of one active non-financial subsidiary in a foreign country and at least a 20 % foreign involvement level, and use derivatives solely for hedging purposes.

## 3.2 Regression Models to Estimate the Value Effects of Currency Hedging

This study uses the following two *main* multivariate models in order to investigate

the effects of hedging strategies on company value. The models were derived from two prominent articles, namely Vivel Búa (2015) and Bae et al (2016).

$$Ln(Q)_{i,t} = \beta_0 + \beta_1 Ln(Q)_{i,t-1} + \beta_2 FC\_DERV_{i,t} + \beta_3 FC\_DEBT_{i,t} + \beta_4 FXPROFIT_{i,t} + \beta_5 LNCOUNS_{i,t} + \beta_6 LNREGNS_{i,t} + \beta_7 DISP\_INDEX\ I_{i,t} + \beta_8 DISP\_INDEX\ II_{i,t} + \sum_{j=1}^{6} \beta_{8+j} X_{j,i,t} + \sum_{k=1}^{K} \beta_{14+k} INDSDY_{k,i} + \sum_{l=1}^{L} \beta_{14+k+l} YEARDY_{l,i} + \varepsilon_{i,t} \quad (1)$$

$$Ln(Q)_{i,t} = \beta_0 + \beta_1 Ln(Q)_{i,t-1} + \beta_2 FC\_DERV_{i,t} + \beta_3 FC\_DEBT_{i,t} + \beta_4 FXPROFIT\_tsa_{i,t} + \beta_5 FXPROFIT\_tsl_{i,t} + \beta_6 LNCOUNS_{i,t} + \beta_7 LNREGNS_{i,t} + \beta_8 DISP\_INDEX\ I_{i,t} + \beta_9 DISP\_INDEX\ II_{i,t} + \sum_{j=1}^{6} \beta_{9+j} X_{j,i,t} + \sum_{k=1}^{K} \beta_{15+k} INDSDY_{k,i} + \sum_{l=1}^{L} \beta_{15+k+l} YEARDY_{l,i} + \varepsilon_{i,t} \quad (2)$$

Where *i* and *t* denote company and year, respectively. $\beta$ is the estimated coefficient and *X* represents a set of control variables.

### 3.2.1 Measurements of Variables

#### 3.2.1.1 Key Variables

In these two equations (1 and 2), a reverse causality might exist between Tobin's Q and hedging, and thus, the potential endogeneity problems may bias the empirical results. Therefore, to rule out any feedback between past company value and current value (Tobin's Q), a dynamic panel methodology includes the lagged company value as an explanatory variable. FC_DERV, FC_DEBT, LNCOUNS, LNREGNS, DISP_INDEX I, and DISP_INDEX II are the key explanatory variables in both equations 1 and 2. The other key explanatory variables include FX profits (losses) ratio (FXPROFIT) in equation 1, and FXPROFIT_tsa and FXPROFIT_tsl in equation 2. FXPROFIT includes both FX profits (losses) on transaction and translation. To separate the effects of FX profits (losses) on transaction and translation, the FX profits (losses) ratio is decomposed into two components in equation 2. FX transaction ratio

Table 3.1: Variable definitions and expected signs

| Variables | Definitions | Expected sign(s) | Measurement (Source) |
|---|---|---|---|
| ***Dependent variable*** | | | |
| Ln(Q) | Ln(Tobin's Q) | | Book value of total debt + market value of equity/book value of total assets (Thomson Reuters Datastream) |
| ***Explanatory variables*** | | | |
| FC_DERV | FC derivatives | +/– | Total notional value of currency derivatives contracts/ total sales (Annual reports) |
| FC_DEBT | FC debt | +/– | Total nominal value of foreign currency debt/ total sales (Annual reports) |
| LNCOUNS | Ln(number of countries) | + | Logarithm of number of countries company operates in (Annual reports) |
| LNREGNS | Ln(number of regions) | + | Logarithm of number of regions company operate in (Annual reports) |
| DISP_INDEX I | Dispersion index I (country based) | + | 1-Hirshman-Herfindahl = $1-(\sum_j (sub_j)^2/(\sum_j sub_j)^2)$ (Annual reports) |
| DISP_INDEX II | Dispersion index II (region based) | + | 1-Hirshman-Herfindahl = $1-(\sum_j (sub_j)^2/(\sum_j sub_j)^2)$ (Annual reports) |
| FXPROFIT | Foreign exchange gains and losses ratio | +/– | FX translation & transaction gains – FX translation & transaction losses/sales (Annual reports) |
| FXPROFIT_tsa | Foreign exchange transaction ratio | +/– | FX transaction/sales (Annual reports) |
| FXPROFIT_tsl | Foreign exchange translation ratio | +/– | FX translation/sales (Annual reports) |
| ***Control variables*** | | | |
| SIZE | Size | +/– | Logarithm of total assets (Datastream) |
| LEVE | Leverage | +/– | Total debt/total assets (Datastream) |
| LIQU | Liquidity | – | Total current assets/total current liabilities (Datastream) |
| PROF | Profitability | + | Net income/total assets (Datastream) |
| GROW_OPP | Growth opportunities | + | One year net sales growth rate (Datastream) |
| FSALES | Foreign sales | +/– | Foreign sales/total sales (Annual reports) |
| INDSDY | Industry dummy | +/– | Manufacturing; service; construction; agriculture, forestry, and fishing; transportation and trade (SIC Codes) |
| YEARDY | Year dummy | +/– | Takes on the value of 1 for each specific year and 0 otherwise (2004-2018) |

(FXPROFIT_tsa) and FX translation ratio (FXPROFIT_tsl) represent its two components. Table 3.1 presents the descriptions and sources of all the variables and their expected signs.

To represent the magnitude of FC_DERV contracts a continuous variable measures the total notional value of FC derivatives contracts scaled by total sales. Several studies use a binary variable as an indicator for the use of derivatives, e.g., Allayannis & Weston (2001), Carter, Rogers & Simkins (2006); Clark & Judge (2009); Clark, Judge & Mefteh (2007); Nguyen & Faff (2007) use dummy variable equal to one for users of derivatives and zero for non-users. One problem to use the dummy variable as a proxy for the use of derivatives is that the dummy variable does not represent the magnitude of foreign currency contracts. As a result, there is no difference between companies hedge fully their FC risk and the ones hedge partially, and, thus both categories are defined as FC hedgers and equal to one. Unlike the dummy variable, a continuous variable between zero and one represents a FC hedger (i.e., only in the case of full hedge is equal to one) and it set to zero for a non-hedger.

The empirical results of Allayannis and Weston (2001), Carter et al. (2006), Clark and Judge (2009), Allayannis et al. (2012), and Vivel Búa et al. (2015) show a positive effect of FC derivatives on company value. However, Nguyen and Fatt (2007) and Khediri (2010) find a negative effect and Guay and Kothari (2003) find no effect of FC derivatives on company value. In the light of the inconclusive empirical evidence and theoretical arguments, either a positive or a negative relationship between FC_DERV and Ln(Q) is expected. Similar to FC_DERV, a continuous variable measures the total nominal value of FC debt contracts. FC_DEBT represents the total notional value of FC debt contracts scaled by total sales. The effect of FC debt on company value is mixed in the literature. For example, Clark and Judge (2009) find no

effect; Vivel Búa et al. (2015) show a positive effect; and Bae et al. (2016) find a negative effect. The FXPROFIT ratio and its two components, FXPROFIT_tsa and FXPROFIT_tsl, represent explanatory variables. A company's gains or losses that stem from exchange rate fluctuations can affect the company's value, as they represent a "non-operating income (or cost)" (Bae et al., 2016, p. 139). According to Bae et al. (2016) the FX profits and losses should be controlled to find out the "true" effect of FC debt on company value (p. 139). Profits or losses in FX transactions occur when an international transaction is recorded at the exchange rate on the transaction date, but the payment is made in the future. Profits or losses in FX translations occur when the parent company translates the foreign assets, liabilities or incomes of foreign subsidiaries into the home currency for financial reporting purposes. FXPROFIT shows the difference between the sum of gains on FX transactions and translations and the sum of losses on FX transactions and translations divided by sales. FXPROFIT_tsa measures the difference between the sum of gains and the sum of losses on FX transaction divided by sales, and FXPROFIT_tsl measures the difference between the sum of gains and the sum of losses on FX translation divided by sales.

In line with prior studies, four proxies, namely, LNCOUNS, LNREGNS, DISP_INDEX I and DISP_INDEX II measure a company's extent of operational hedging in this study (e.g., Allayannis et al., 2001; Danisman & Demirel, 2019; Gleason et al., 2005; Kim et al., 2006; Vivel Búa et al., 2015). LNCOUNS represents the number of countries in which the company operates; LNREGNS shows the number of regions in which the company operates. DISP_ INDEX I measures the *Hirshman–Herfindahl index* of the geographical dispersion of subsidiaries in different *countries*, whereas DISP_ INDEX II represents the *Hirshman–Herfindahl index* of the

geographical dispersion of subsidiaries in different *regions*.[10] Allayannis et al. (2001), Gleason et al. (2005), Vivel Búa et al. (2015), and Danisman and Demirel (2018) find no effect, and Kim et al. (2006) show positive value effects of the operational hedging proxies. Assuming that Malaysian multinationals implement an effective operational hedging strategy, positive relationships between LNCOUNS, LNREGNS, DISP_INDEX I, DISP_INDEX II, and Ln(Q) are expected.

#### 3.2.1.2 Control Variables

In equations 1 and 2, *X* represents a set of control variables including company size (SIZE), leverage (LEVE), liquidity (LIQU), profitability (PROF), growth opportunities (GROW_OPP), and foreign sales (FSALES). Size has an ambiguous impact on company value. For example, Allayannis and Weston (2001), Lang and Stulz (1994) and Vivel Búa et al. (2015) find a negative correlation between company size and Tobin's Q. Conversely, Rossi and Laham (2008), Júnior and Laham (2008) and Bae et al. (2016) find that size has a positive impact on company value. In the light of the inconclusive empirical evidence, either a positive or a negative relationship between SIZE and Ln(Q) is expected for Malaysian multinationals. Natural logarithm of total assets is used as a proxy variable for size of company.

The empirical evidence on the value effect of leverage is also mixed. If leverage causes a fewer interest for the tax payment; the effect of leverage is positive, but if it increases the cost of financial distress or the probability of bankruptcy; the effect is negative. For instance, Allayannis and Weston (2001) and Clark and Judge (2009) find a positive correlation between leverage and Tobin's Q, but Júnior and Laham (2008),

[10] Following Allayannis et al. (2001), Gleason et al. (2005), and Vivel Búa et al. (2015), countries are categorized into nine major regions: Eastern Asia and South Eastern Asia, Latin America and the Caribbean, Australia and New Zealand, Western Africa, Western Asia and Central Asia, Southern Asia, Europe, East and South Africa, and North and Middle Africa.

and Danisman and Demirel (2019) report a negative effect. The ratio of total debt to total assets controls for the leverage effect on company value.

Vivel Búa et al. (2015) find that the effect of liquidity on company value is negative. According to Jensen (1986) free cash flow theory, more liquid companies consider investing in projects with negative present values. The ratio of current assets to current liabilities is used as a proxy for the company liquidity. Profitability, on the other hand, has a positive impact on company value (Allayannis & Weston, 2001). Thus, the more profitable company has a higher Tobin's Q compared to less profitable one. The ratio of net income to total assets controls for the company profitability.

Myers (1977) discuss the impact of future growth opportunities on company value. Employing the hedging strategies reduce the expected cash flows fluctuations for companies with more growth opportunities. Júnior and Laham (2008), Kim et al. (2006), Allayannis and Weston (2001), and Vivel Búa et al. (2015) find that growth opportunities affect company value positively. One-year net sales growth rate is used as a proxy for this variable.

Companies with foreign sales face relatively high FC risk exposures (Allayannis et al., 2001). Therefore, following Allayannis et al. (2001) and Vivel Búa et al. (2015), the foreign sales to total sales (FSALES) ratio measures the FC risk exposure. However, if used as a proxy for operational hedging, this ratio can pose problems since companies can have foreign sales without having foreign assets or operations (Gleason et al., 2005; Kim et al., 2006). The effect of FSALES on company value varies in different studies. Morck and Yeung (1991) and Bodnar et al. (1997) find a positive relationship between foreign sales and value, while Allayannis and Weston (2001), and Denis et al. (2002) report on the negative association between the two variables.

Therefore, this ratio acts as a control variable with either a positive or negative effect on company value depending on the effectiveness of company hedging practices.

Companies operating in different industries have different Tobin's Q and growth opportunities. The industry characteristics rather than hedging may explain the greater value premium of currency hedging in industries with a higher Tobin's Q. Nain (2004) find that if companies employ derivatives to reduce volatility of profits, the motivation to hedge is higher when the motivation to hedge in the industry is high. Results show that a company is more likely to engage in hedging FC risk if many competitors are doing so. According to Nain's (2004) findings a value premium range of 5.18–6.98 % only generated through hedging in industries where currency hedging is common, and, therefore, the market penalizes a non-hedger company with a value discount. In contrast, Jin and Jorion (2006) examine the effects of hedging practice on companies' value for a sample of the US oil and gas producers and finds that the difference between the company value of hedgers and non-hedgers is not significant. Thus, to control for industry-specific effects, this study uses an industry dummy (INDSDY) variable. To capture the industry effects, all companies classify into five industries represented by dummy variables at four-digit SIC codes. These sectors include manufacturing (SIC codes 2000–3999), service (SIC codes 7000–8999), construction (SIC codes 1500–1799), agriculture, forestry, fishing (SIC codes 0100−0999), and trade and transportation (SIC codes 4000–5999). The year dummy YEARDY takes the value of one for each specific year and zero otherwise. It also controls for the effects of unobserved time-varying factors.

## 3.3 Method of Estimation

To conduct dynamic panel estimations, this study uses the GMM estimators, precisely because it controls for both endogeneity and unobservable heterogeneity

problems (Arellano & Bover, 1995; Arellano, 2003). Allayannis and Weston (2001) apply the static linear model in the panel data methodology, specifically the fixed effects estimations which correct for the unobservable heterogeneity but do not control for endogeneity problems.[11] The classical panel data methodologies such as pooled Ordinary Least Squares (OLSs), fixed and random effects models assume that all regressors are strictly exogenous and ignore any feedback between past company value and current FC hedging. However, as a predetermined variable, FC hedging becomes potentially endogenous since it correlates with past realization of the errors.

Assuming Tobin's Q represents company value and a continuous variable measures FC hedging magnitude, Magee's (2009) findings show that if hedging is assumed as an exogenous variable, it has a positive effect on company value and FC derivatives users have a 6.33 % higher value than non-users. However, according to Magee's (2009) findings the results of reverse causality test show that FC hedging is not strictly exogenous and the previous company values affect the current hedging magnitudes. Therefore, after correcting for the endogeneity problems Magee's (2009) findings show that FC derivatives hedging do not add value unlike Allayannis and Weston (2001)'s findings. The classical panel data methodologies cannot work for estimating equations 1 and 2 since estimators are biased and inconsistent due to endogeneity problems. Thus, using a lagged dependent variable as an explanatory variable in a dynamic model setting solves these econometrics problems (Arellano & Bond, 1991).

[11] Moreover, Allayannis and Weston (2001) also apply pooled OLSs estimations; however, these models do not control for the effects of time-invariant company-specific factors on both company value and FC hedging when it exists.

To correct for endogeneity problems and individual heterogeneity, the two alternative estimation methodologies represent the difference GMM and the two-step system GMM. The difference GMM transforms the explanatory variable by differencing and corrects for the endogeneity and the fixed effects problems. However, in difference GMM estimation methodology, if the panel data is unbalanced, a missing dependent variable magnifies the gaps in the transformed data (Roodman, 2009). In this study, the sample data is unbalanced and the difference GMM estimation is not used to avoid the data loss that potentially weakens the estimation results.

Arellano and Bover (1995), and Blundell and Bond (1998), propose the other alternative estimation method: the system GMM methodology. This method uses more instruments and transforms the instruments, thereby improving the efficiency as well as correcting the endogeneity problems. According to Arellano and Bover (1995), the system GMM method reduces the data loss since the differencing methodology subtracts the average of a variable from each observation (i.e., orthogonal deviations) rather than taking the difference from two consecutive observations.

This study uses the two-step system GMM estimation method towards its research goals. This is more robust relative to the one-step GMM, and provides more efficient estimates associated with heteroscedasticity and autocorrelation (AR) problems (Roodman, 2009). In the two-step system GMM estimation, Arellano and Bover (1995) and Blundell and Bond (1998) propose one equation in levels form with differenced instruments (Blundell-Bond estimators) and the second one in differenced form with level instruments (Arellano-Bover estimators).

Arellano and Bover (1995) and Blundell and Bond (1998) propose estimators to correct for the potential endogeneity problems of all regressors using instrumental variables. Given the importance of selecting good contemporaneous instruments in

GMM estimations, according to Arellano and Bond (1991) lags two and up of all regressors in the model are used as instrumental variables. Maximum two lags of all explanatory variables represent instrumental variables in this study. In the two-step GMM estimation, Hansen's (1982) specification test of overidentifying restrictions can test the validity of all instruments. The AR specification tests the assumption of no serial correlation in the error terms in the first-differenced residuals. Failure to reject both specification tests supports the dynamic panel model estimations using the two-step system GMM (Magee, 2009).

# Chapter 4

# EMPIRICAL RESULTS

## 4.1 Descriptive Statistics for Financial Hedging Instruments

Table 4.2 presents the descriptive statistics for using FC derivatives and FC debt as well as the different types of derivatives and debt over the sample period 2004–2018. Panel A in Table 4.2 shows the types of derivatives contracts. The mean derivatives users and non-users turn up to 27.33 % and 72.67 %, respectively. Supported empirically in Panel A showing no use of options and very limited use of futures between 2012 and 2014, Chong et al. (2014) discuss the unavailability of FC futures and options in the Bursa Malaysia derivatives market. The result is consistent with Kim et al. 's (2006) finding that "some globally diversified companies use very limited amounts of financial derivatives for hedging purposes despite higher levels of currency exposure" (p. 836).

With a mean value of 94.45 % of the total volume of derivatives contracts, Panel A (Table 4.2) shows forward contracts as the most popular type for Malaysian multinationals. The results show that Malaysian multinationals prefer using FC forward contracts for hedging FC risk. Similarly, Ameer (2009, 2010), Othman and Ameer (2009), and Chong et al. (2014) find customizable and flexible forward contracts quite popular in Malaysian companies. Accordingly, over-the-counter products heavily dominate the FC hedging market in Malaysia. In contrast, structured forwards and futures contracts as other FC derivatives instruments are not used in high percentages. No company uses options as a FC hedging instrument.

Panel B (Table 4.2) shows the percentages of FC debt users and non-users. The mean percentages of FC users and non-users turn out 31.73 % and 68.27 %, respectively. Panel C shows the descriptive statistics for financial hedging instruments. On average, 17.60 % of multinationals hedge by using only derivatives, 22.47 % use only FC debt, and 10.00 % use both derivatives and foreign debt. Less than half of the multinationals (mean: 49.93 %) do not use any of the financial hedging strategies.

Table 4.3 shows the descriptive statistics for currencies and volumes of FC debt over the 2004–2018 sample period. During this period, the top five mean percentages of FC denominated debt for Malaysian multinationals include 54.82 % in US Dollar, 16.56 % in Pound Sterling, 10.79 % in Singapore Dollar, 4.63 % in Japanese Yen and 3.72 % in Chinese Renminbi. Some dynamic changes occur in these top percentages over time. For instance, in the latest sample year 2018, Pound Sterling loses its second place to Japanese Yen; similarly, Singapore Dollar plummets to the bottom of the list; Qatari Riyal captures the fourth place, and Chinese Renminbi no longer ranks in the top five. In 2018, the top five percentages of the FC denominated debt include 62.50 % in US Dollar, 18.75 % in Japanese Yen, 6.27 % in Pound Sterling, 5.87 % in Qatari Riyal, and 2.39 % in Singapore Dollar. Overall, during the post global financial crisis (GFC) period 2010–2018, Table 4.2 shows that FC debt in US Dollar reaching a peak level of 90.91 % in 2015 heavily dominates.

When the GFC hit Malaysia in 2008 (Table 4.2), Malaysian multinationals borrowed heavily in Singapore Dollar (70.22 %), followed by Chinese Renminbi (10.66 %), Pound Sterling (7.82 %), and the US Dollar (6.68 %). Malaysian multinationals relied heavily on Singapore Dollar as the only capital market accessible to them in that year. Stressing the “deep interdependence” between Malaysia and

Table 4.2: Descriptive statistics for financial hedging instruments

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2004-2018 Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Panel A. FC derivatives*** | | | | | | | | | | | | | | | | |
| Users (non-users) | 28 (66) | 31 (66) | 28 (69) | 31 (68) | 34 (69) | 33 (68) | 31 (69) | 27 (70) | 22 (74) | 20 (72) | 23 (66) | 19 (68) | 21 (66) | 18 (69) | 22 (65) | |
| Observations | 94 | 97 | 97 | 99 | 103 | 101 | 100 | 97 | 96 | 92 | 89 | 87 | 87 | 87 | 87 | |
| Percentage | 30 (70) | 32 (68) | 29 (71) | 31 (69) | 33 (67) | 33 (67) | 31 (69) | 28 (72) | 23 (77) | 22 (78) | 26 (74) | 22 (78) | 24 (76) | 21 (79) | 25 (75) | 27.33 (72.67) |
| Derivatives volume (mean in million RM) | 125 | 75 | 148 | 255 | 281 | 121 | 152 | 114 | 169 | 117 | 77 | 168 | 133 | 46 | 79 | 137.00 |
| Forwards (mean,%) | 100 | 100 | 100 | 100 | 100 | 100 | 85.48 | 64.28 | 82.03 | 86.28 | 98.68 | 100 | 100 | 100 | 100 | 94.45 |
| Futures (mean, %) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.42 | 0.26 | 1.32 | 0 | 0 | 0 | 0 | 0.18 |
| Options (mean, %) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Currency swaps (mean, %) | 0 | 0 | 0 | 0 | 0 | 0 | 3.95 | 5.37 | 8.88 | 0 | 0 | 0 | 0 | 0 | 0 | 1.66 |
| Structured forward contracts (mean, %) | 0 | 0 | 0 | 0 | 0 | 0 | 10.57 | 30.35 | 8.67 | 13.46 | 0 | 0 | 0 | 0 | 0 | 5.73 |
| ***Panel B. FC debt*** | | | | | | | | | | | | | | | | |
| Users (non-users) | 15 (79) | 18 (79) | 20 (77) | 22 (77) | 29 (74) | 25 (76) | 29 (71) | 38 (59) | 38 (58) | 37 (55) | 36 (53) | 35 (52) | 33 (54) | 34 (53) | 35 (52) | |
| Observations | 94 | 97 | 97 | 99 | 103 | 101 | 100 | 97 | 96 | 92 | 89 | 87 | 87 | 87 | 87 | |
| Percentage of users (non-users) | 16 (84) | 19 (81) | 21 (79) | 22 (78) | 28 (72) | 25 (75) | 29 (71) | 39 (61) | 40 (60) | 40 (60) | 40 (60) | 40 (60) | 38 (62) | 39 (61) | 40 (60) | 31.73 (68.27) |
| ***Panel C. Financial hedging*** | | | | | | | | | | | | | | | | |
| Only FC debt users (% in parenthesis) | 11 (12) | 12 (12) | 13 (13) | 15 (15) | 18 (18) | 16 (16) | 18 (18) | 28 (30) | 29 (30) | 27 (29) | 26 (29) | 25 (29) | 22 (25) | 27 (31) | 26 (30) | 20.87 (22.47) |
| Only currency derivatives users (% in parenthesis) | 22 (23) | 25 (26) | 23 (24) | 25 (25) | 24 (23) | 21 (21) | 21 (21) | 14 (14) | 11 (12) | 11 (12) | 12 (14) | 9 (10) | 10 (11) | 11 (13) | 13 (15) | 16.93 (17.60) |
| FC debt and derivatives users (% in parenthesis) | 6 (6) | 7 (7) | 6 (6) | 7 (7) | 11 (11) | 12 (12) | 13 (13) | 13 (13) | 11 (11) | 10 (11) | 10 (11) | 10 (11) | 11 (13) | 7 (8) | 9 (10) | 9.53 (10.00) |
| Non-users (% in parenthesis) | 55 (59) | 53 (55) | 55 (57) | 52 (53) | 50 (48) | 52 (51) | 48 (48) | 42 (43) | 45 (47) | 44 (48) | 41 (46) | 43 (50) | 44 (51) | 42 (48) | 39 (45) | 47.00 (49.93) |

Table 4.3: Descriptive statistics for foreign currency debt

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2004-2018 Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USD Dollar | 62.27 | 61.01 | 33.01 | 27.86 | 11.31 | 6.68 | 30.20 | 76.74 | 59.48 | 82.27 | 86.73 | 90.91 | 76.71 | 75.24 | 62.50 | 54.82 |
| Chinese Renminbi | 0.83 | 1.24 | 18.18 | 23.06 | 8.74 | 10.66 | 4.80 | 0.15 | 0.55 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 3.72 |
| New Taiwan Dollar | 0.84 | 0.87 | 0.52 | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.54 |
| Pound Sterling | 28.36 | 23.50 | 46.36 | 40.53 | 20.26 | 7.82 | 27.96 | 5.99 | 5.85 | 3.69 | | 1.16 | 1.03 | 5.70 | 6.27 | 16.56 |
| HK Dollar | 6.44 | 6.74 | 0.35 | 0.55 | 0.28 | 0.50 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 2.62 | 1.82 | 2.11 | 1.15 |
| Australian Dollar | 1.02 | 1.26 | 0.53 | 0.27 | 0.00 | 0.95 | 2.06 | 0.01 | 5.17 | 2.80 | 2.06 | 2.03 | 0.09 | 1.44 | 1.35 | 1.33 |
| Singapore Dollar | 0.02 | 0.44 | 0.21 | 0.12 | 49.84 | 70.22 | 0.17 | 8.34 | 14.57 | 0.66 | 1.34 | 0.19 | 0.12 | 2.08 | 2.39 | 10.79 |
| Papua New Guinea Kina | 0.07 | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 |
| Vietnam Dong | | 0.07 | 0.05 | 0.24 | 0.22 | 0.35 | 4.27 | 0.26 | 4.41 | 3.32 | 2.49 | 2.79 | 6.61 | 5.59 | 0.02 | 1.64 |
| Philippine Peso | | | 0.01 | 0.02 | 0.01 | 0.01 | 0.05 | 0.01 | 0.01 | | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Euro | 0.08 | | 0.12 | 0.38 | 0.18 | 0.03 | 0.22 | 2.00 | 0.15 | 0.21 | 0.51 | 0.35 | 8.09 | 7.02 | 5.87 | 1.81 |
| Qatari Riyal | | | 0.52 | | | | | | | | | 0.93 | 2.15 | 0.73 | 0.00 | 1.19 |
| Japanese Yen | | | | 3.14 | 5.99 | 1.95 | 25.58 | 5.43 | 7.58 | 5.43 | 5.55 | 0.01 | 0.02 | 0.10 | 18.75 | 4.63 |
| Thai Baht | | | | 3.84 | 2.73 | 0.82 | 1.05 | 0.19 | 0.45 | 0.19 | 0.10 | 1.52 | 2.02 | 0.00 | 0.00 | 0.94 |
| Pakistani Rupee | | | | | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Indian Rupee | | | | | 0.07 | 0.02 | 0.00 | 0.02 | | | | 0.00 | 0.00 | 0.13 | 0.36 | 0.11 |
| Indonesian Rupiah | | | | | 0.36 | | 3.60 | 0.76 | 1.73 | 1.25 | 1.12 | 0.07 | 0.17 | 0.13 | 0.38 | 0.62 |
| South African Rand | | | | | | | | 0.03 | 0.05 | 0.03 | 0.02 | 0.02 | 0.33 | 0.00 | 0.00 | 0.06 |
| Others | 0.01 | 0.02 | 0.00 | 0.01 | | | | | | 0.12 | 0.08 | 0.00 | 0.04 | 0.00 | 0.00 | 0.04 |
| FC debt volume (total in million RM) | 6,189 | 4,770 | 8,012 | 5,264 | 5,055 | 12,618 | 1,382 | 8,861 | 5,197 | 8,246 | 11,212 | 10,948 | 8,224 | 10,630 | 8,737 | 8,397 |

Singapore, Hutchinson and Bhattacharya (2019) highlight

> the economic linkages between Singapore and Malaysia are longstanding, far-reaching, spanning trade in goods and services, as well as foreign direct investments (FDIs) and movement of people. Surpassed only by China and outranking traditional commercial allies such as the United States and Japan, each are the other's second most important trading partner in both cases (p. 1).

## 4.2 Descriptive Statistics and Correlation Matrix

Table 4.4 presents the descriptive statistics for all variables. The mean and median values for Tobin's Q amount to 0.87 and 0.67 respectively. Focusing on hedging strategies, the mean of FC_DERV (0.03) is less than the mean value of FC_DEBT (0.07). However, the FC_DERV's maximum value of 1.56 indicates that the notional value of FC_DERV exceeds the total sales value. As noted in the annual reports, rather than the net notional values the notional values of currency derivatives are available as a caveat for this measure (Vivel Búa et al., 2015). Furthermore, Kerkvliet and Moffett (1991) find that the optimal hedge ratio for multinationals may significantly differ from the traditional values of 0.9 or higher under very common company-specific conditions. They also find the optimal hedge close to the traditional values of 0.9 or higher for multinationals with positive correlation between FC earnings streams and exchange rate changes.

Elliott et al. (2003) find that FC derivatives and debt positively correlate with the FC risk exposure level. According to Géczy et al. (1997), however, while capital market imperfections might seem necessary for optimal derivatives use, they do not provide sufficient conditions, and the ultimate decision of a company to use derivatives depends on the level of its exposure to FC risk and the cost of using derivatives. Similarly, Hagelin's (2003) findings show that larger companies use derivatives more than smaller companies.

Table 4.4: Descriptive statistics for all variables

| Variable | Mean | Median | Standard deviation | Min. | Max. |
|---|---|---|---|---|---|
| ***Dependent variable*** | | | | | |
| Q | 0.87 | 0.67 | 0.72 | –0.65 | 9.56 |
| ***Explanatory variables*** | | | | | |
| FC_DERV | 0.03 | 0.00 | 0.13 | 0.00 | 1.56 |
| FC_DEBT | 0.07 | 0.00 | 0.22 | 0.00 | 2.54 |
| # of COUNS | 3.26 | 2.00 | 3.44 | 0.00 | 28.00 |
| # of REGNS | 1.70 | 1.00 | 0.10 | 0.00 | 7.00 |
| DISP_INDEX I | 0.42 | 0.50 | 0.31 | 0.00 | 0.95 |
| DISP_INDEX II | 0.20 | 0.00 | 0.26 | 0.00 | 0.86 |
| FXPROFIT | 0.038 | 0.00 | 0.29 | −4.32 | 5.22 |
| FXPROFIT_tsa | –0.005 | 0.00 | 0.16 | −4.28 | 0.80 |
| FXPROFIT_tsl | 0.039 | 0.00 | 0.24 | −0.33 | 5.22 |
| **Control Variables** | | | | | |
| Total assets (RM million) | 2,450.00 | 480.00 | 8140.00 | 0.30 | 95,700.00 |
| LEVE | 0.26 | 0.22 | 0.31 | –0.70 | 3.67 |
| LIQU | 2.64 | 1.77 | 5.18 | 0.02 | 100.37 |
| PROF | 0.03 | 0.04 | 0.22 | −3.53 | 6.49 |
| GROW_OPP | 21.45 | 6.72 | 276.54 | −100.00 | 9,572.00 |
| FSALES | 50.85 | 48.77 | 27.36 | 0.00 | 172.72 |
| Manufacturing | 0.70 | 1.00 | 0.46 | 0.00 | 1.00 |
| Service | 0.08 | 0.00 | 0.27 | 0.00 | 1.00 |
| Construction | 0.07 | 0.00 | 0.25 | 0.00 | 1.00 |
| Agriculture/Forestry/ Fishing | 0.04 | 0.00 | 0.20 | 0.00 | 1.00 |
| Trade/Transportation | 0.11 | 0.00 | 0.31 | 0.00 | 1.00 |

The high fixed costs inherent hedging start-up maybe is a reason for small companies to lower implementing hedging policy. Implementing and maintaining hedging programs rely significantly on the economies of scale for larger companies that, compared to small companies, are more prone to using derivatives (Géczy et al., 1997; Graham & Rogers, 2002; Hagelin, 2003). Similarly, the maximum nominal value of foreign currency debt of 2.54 indicates excessive borrowing relative to total sales. However, the annual reports lack available data on the maturity of foreign currency debt. The mean values of COUNS and REGNS amount to 3.26 and 1.70 respectively. The means of the other two operational hedging measures, DISP_INDEX I and DISP_INDEX II are 0.42 and 0.20, respectively.

Table 4.5: Pearson correlation matrix

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LN($Q_t$) | **1** | 1 | | | | | | | | | | | | | | | | |
| LN($Q_{t-1}$) | **2** | 0.69[a] | 1 | | | | | | | | | | | | | | | |
| FC_DERV | **3** | 0.07[a] | 0.07[a] | 1 | | | | | | | | | | | | | | |
| FC_DEBT | **4** | −0.01 | −0.02 | 0.36[a] | 1 | | | | | | | | | | | | | |
| FXPROFIT | **5** | –0.05[c] | –0.05[c] | –0.02 | 0.02 | 1 | | | | | | | | | | | | |
| FXPROFIT_tsa | **6** | 0.03 | 0.01 | 0.01 | 0.01 | 0.55[a] | 1 | | | | | | | | | | | |
| FXPROFIT_tsl | **7** | –0.07[a] | –0.07[b] | −0.03 | 0.02 | 0.82[a] | 0.00 | 1 | | | | | | | | | | |
| LNCOUNS | **8** | –0.02 | 0.00 | 0.14[a] | 0.19[a] | 0.00 | 0.05[b] | –0.03 | 1 | | | | | | | | | |
| LNREGNS | **9** | 0.03 | 0.04 | 0.16[a] | 0.26[a] | 0.04[c] | 0.03 | 0.03 | 0.74[a] | 1 | | | | | | | | |
| DISP_INDEX I | **10** | –0.04 | –0.02 | 0.06[b] | 0.10[a] | 0.01 | 0.05[b] | −0.02 | 0.89[a] | 0.66[a] | 1 | | | | | | | |
| DISP_INDEX II | **11** | 0.03 | 0.03 | 0.06[b] | 0.13[a] | 0.06[b] | 0.03 | 0.05[b] | 0.63[a] | 0.92[a] | 0.64[a] | 1 | | | | | | |
| FSALES | **12** | 0.01 | 0.01 | 0.09[a] | 0.06[b] | 0.06[b] | −0.04 | 0.11[a] | 0.01 | 0.01 | –0.05[c] | 0.00 | 1 | | | | | |
| SIZE | **13** | 0.05[b] | 0.07[b] | 0.18[a] | 0.23[a] | 0.06[b] | 0.06[b] | 0.03 | 0.46[a] | 0.46[a] | 0.30[a] | 0.38[a] | 0.00 | 1 | | | | |
| LEVE | **14** | −0.01 | −0.05[c] | 0.30[a] | 0.31[a] | 0.01 | 0.03 | –0.04 | 0.20[a] | 0.17[a] | 0.13[a] | 0.09[a] | 0.04[c] | 0.08[a] | 1 | | | |
| LIQU | **15** | 0.04[c] | 0.02 | −0.01 | −0.04 | 0.32[a] | 0.00 | 0.39[a] | −0.07[a] | −0.01 | −0.06[b] | 0.00 | 0.04 | −0.11[a] | −0.17[a] | 1 | | |
| PROF | **16** | 0.06[b] | 0.10[a] | 0.05[b] | −0.03 | 0.00 | 0.00 | 0.03 | 0.02 | 0.04 | 0.02 | 0.04 | –0.03 | 0.06[b] | −0.22[a] | 0.05[b] | 1 | |
| GROW_OPP | **17** | 0.07[a] | 0.04 | 0.00 | −0.02 | –0.01 | 0.00 | –0.01 | 0.00 | 0.01 | 0.00 | 0.03 | 0.02 | 0.00 | −0.04 | 0.04 | 0.03 | 1 |

Table 4.5 presents the results of Pearson correlation coefficients for the variables used in the multivariate analysis. LN($Q_t$) represents the log of Tobin's Q including the book value of total debt plus the market value of equity divided by the book value of total assets. LN($Q_{t-1}$) shows the lag one of the log of Tobin's Q. FC_DERV represents total notional value of currency derivatives divided by total sales. FC_DEBT measures total nominal value of foreign debt divided by total sales. FXPROFIT shows the sum of gains on FX transaction and translation minus the sum of losses on FX transaction and translation scaled by total sales. FXPROFIT_tsa measures FX transaction gains minus FX transaction losses scaled by total sales. FXPROFIT_tsl measures FX translation gains minus FX translation losses scaled by total sales. LNCOUNS (LNREGNS) represents the log of the number of countries (regions) where a company operates in. DISP_INDEX I (II) represents one minus the Hirshman-Herfindahl index of the number of countries (regions) where the company operates in. FSALES measures foreign sales divided by total sales. SIZE represents the log of total assets. LEVE shows total debt divided by total assets. LIQU represents total current assets divided by total current liabilities. PROF shows net income divided by total assets. GROW_OPP represents net sales one-year growth rate. [a], [b], and [c] significant at the 1 %, 5 %, and 10 % levels, respectively.

Table 4.5 presents the Pearson correlation matrix, and shows that FC_DEBT, FXPROFIT, FXPROFIT_tsl, LNCOUNS, DISP_INDEX I, and LEVE negatively correlate with Ln(Q), while FC_DERV, FXPROFIT_tsa, LNREGNS, DISP_INDEX II, FSALES, SIZE, LIQU, PROF, and GROW_OPP positively correlate with Ln(Q). For all operational hedging proxies, each two pairs show high correlations. For example, LNCOUNS shows a high correlation with LNREGNS (0.74), along with DISP_INDEX I (0.89) and DISP_INDEX II (0.63), respectively. Therefore, to avoid the multicollinearity problem regressions separately estimate each of these four operational hedging proxies.

## 4.3 Estimation Results and Discussions

Tables 4.6 and 4.7 present the estimation results. In both tables, only Model 1 incorporates the value effects of currency derivatives and foreign debt as financial hedging strategies, while Models 2, 3, 4, and 5 incorporate both financial and operational hedging strategies. For all models in Tables 4.6 and 4.7, all Hansen's p-values are greater than 0.10 and less than one, indicating that all instruments remain valid (Roodman, 2009). Moreover, the null hypotheses of no first-order serial correlation AR(1) and no second-order serial correlation AR(2) for all models seem acceptable.

The results in Table 4.6 (Panel A) show that FC derivatives have a positive effect on the company value. Since not all companies in the sample use FC derivatives (i.e., the ratio of FC derivatives to total sales is not a 1:1 ratio), to calculate the average short-run value premiums of derivatives hedging the estimated coefficients for FC_DERV should be adjusted accordingly. Table 4.2 shows 27.33 % of Malaysian multinationals as the average FC_DERV users over the sample period. For instance, to calculate the average short-run value premiums of derivatives hedging, the

estimated coefficient for FC_DERV in Model 1 is multiplied by the average value of FC_DERV users as a benchmark (i.e., average FC_DERV in Table 4.4 divided by the average FC_DERV users; 0.03/0.2733=0.1097). In Model 1, the coefficient of 0.5527 estimated for FC_DERV results in 8.10 % (i.e., 0.1097 multiplied by $((e^{0.5527}-1)*100)$) value premium for FC_DERV.[12] Subsequently, all estimated FC_DERV coefficients in the following models are multiplied by the benchmark average value of FC_DERV, 0.1097. Therefore, according to Models 2, 3, 4, and 5, the short-run value premiums of derivatives amount to 7.90 %, 8.07 %, 7.86 %, and 8.21 %, respectively.

For long-term effects, one has to consider the short-run statistically significant FC_DERV, and FC_DEBT. Table 4.6 (Panel B) shows the estimated coefficients for the long-run value premiums of financial hedging strategies. Using the same benchmark average value of 0.1097 for FC_DERV, 19.41 %, 18.93 %, 19.38 %, 18.81 %, and 19.80% represent the long-run average value effects for Models 1, 2, 3, 4, and 5, respectively. Overall, on average, one-unit increase in FC_DERV generates a value premium range of 7.86–8.21 % in the short-run, and a value premium range of 18.81–19.80 % in the long-run.

For Malaysian multinationals, we find a high value premium in the short-run compared to previous evidence. Vivel Búa et al. (2015) argue greater transactional risk for some countries, and thus the likelihood of hedging higher risk resulting in higher value premiums. All companies in our sample face significant FC risk due to the 20 % cut-off for foreign sales ratio. Ameer (2010) and Clark and Judge (2009) point out that hedging FC risk results in greater benefits for companies exposed to greater FC risks.

[12] Since the model is log-linear and β is the estimated coefficient, one-unit change in X results in a change in log Y of β units. The value of Y is multiplied by $e^{\beta}$. In other words, one-unit increase in X leads to a $100*(e^{\beta}-1)$ percent change in the dependent variable Y (Benoit, 2011).

Table 4.6: Estimation results on short-term and long-term effects of hedging on company value using FXPROFIT

| Panel A. Short-term effects' results | | | | | |
|---|---|---|---|---|---|
| **Dependent variable: Ln($Q_t$)** | | | | | |
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV, FC _DEBT, FXPROFIT | **(2)** LNCOUNS | **(3)** LNREGN | **(4)** DISP_ INDEX I | **(5)** DISP_ INDEX II |
| Ln ($Q_{t-1}$) | 0.4571*** (7.13) | 0.4587*** (7.06) | 0.4579*** (7.20) | 0.4588*** (7.17) | 0.4581*** (7.26) |
| FC_ DERV | 0.5527** (2.27) | 0.5426** (2.21) | 0.5514** (2.23) | 0.5402** (2.24) | 0.5587** (2.31) |
| FC _DEBT | −0.4771** (−2.26) | −0.4683** (−2.24) | −0.4894** (−2.33) | −0.4641** (–2.31) | −0.4802** (−2.35) |
| FXPROFIT | –0.1340 (–1.06) | –0.1541 (–1.04) | –0.1317 (–0.96) | –0.1515 (–1.02) | –0.1381 (–1.05) |
| LNCOUNS | | –0.0309 (−0.69) | | | |
| LNREGNS | | | −0.00406 (−0.66) | | |
| DISP_INDEX I | | | | −0.0562 (−0.59) | |
| DISP_INDEX II | | | | | −0.0287 (−0.27) |
| SIZE | 0.4824* (1.71) | 0.4878* (1.88) | 0.4550 (1.54) | 0.4866* (1.80) | 0.4620 (1.55) |
| LEVE | −0.2126*** (–2.97) | −0.1990*** (−2.79) | −0.2145*** (–3.01) | −0.2020*** (−2.83) | −0.2131*** (–2.96) |
| LIQU | –0.0060 (–1.31) | –0.0060 (−1.23) | −0.00663 (–1.32) | −0.0059 (–1.25) | –0.0060 (−1.32) |
| PROF | 0.1835* (1.78) | 0.1911* (1.64) | 0.1791* (1.84) | 0.1892* (1.72) | 0.1780* (1.90) |
| GROW_OPP | 0.0001 (1.54) | 0.0001 (1.52) | 0.0001 (1.54) | 0.0001 (1.51) | 0.0001 (1.55) |
| FSALES | 0.0005 (0.40) | 0.0006 (0.44) | 0.0006 (0.40) | 0.0005 (0.40) | 0.0005 (0.41) |
| Manufacturing | 0 | 0 | 0 | 0 | 0 |
| Service | –0.0135 (–0.08) | –0.0112 (–0.06) | –0.0162 (–0.09) | –0.0131 (–0.07) | –0.0156 (–0.09) |
| Construction | –0.0298 (–0.29) | –0.0254 (–0.24) | –0.0193 (–0.17) | –0.0241 (–0.22) | −0.0263 (−0.25) |
| Trade/ Transportation | 0.2195 (1.35) | 0.2247 (1.31) | 0.2021 (1.33) | 0.2198 (1.32) | 0.2108 (1.35) |
| Agriculture/ Forestry/fishing | 0.0283 (0.18) | 0.0203 (0.12) | 0.0383 (0.24) | 0.0212 (0.13) | 0.0275 (0.18) |
| 2005 | 0.1720*** (−3.31) | −0.0771 (−1.53) | 0.0369 (0.89) | 0.0348 (0.79) | 0.0398 (0.94) |
| 2006 | −0.0193 (−0.53) | 0.0790* (1.79) | 0.1886*** (4.08) | 0.1919*** (4.16) | 0.1907*** (4.06) |
| 2007 | 0.0475 (1.06) | 0.1479*** (3.14) | 0.2512*** (5.72) | 0.2584*** (5.79) | 0·2564*** (5.84) |
| 2008 | −0.2089*** (−5.29) | −0.1117** (−2.33) | 0 | 0 | 0 |

Table 4.6 (Continued.)

| | Dependent variable: Ln($Q_t$) | | | | |
|---|---|---|---|---|---|
| | Financial hedging | Operational and financial hedging | | | |
| Variables | (1) FC_DERV, FC _DEBT, FXPROFIT | (2) LNCOUNS | (3) LNREGN | (4) DISP_ INDEX I | (5) DISP_ INDEX II |
| 2009 | −0.0974** (−2.22) | 0 | 0.1109** (2.38) | 0.1129** (2.32) | 0.1140 (2.34) |
| 2010 | 0 | 0.0957** (2.14) | 0.2057*** (5.07) | 0.2100 (5.13) | 0.2091*** (5.19) |
| 2011 | −0.0504 (−1.41) | 0.0447 (0.99) | 0.1593*** (4.21) | 0.1576 (4.00) | 0.1609*** (4.29) |
| 2012 | −0.0995*** (−2.78) | −0.0033 (−0.08) | 0.1076*** (2.89) | 0.1092*** (2.89) | 0·1131*** (3.02) |
| 2013 | −0.0336 (−0.77) | 0.0627 (1.34) | 0.1781*** (3.89) | 0.1750*** (3.78) | 0.1790*** (3.84) |
| 2014 | 0.0357 (0.84) | 0.1305** (2.41) | 0.2454*** (5.82) | 0.2438*** (5.82) | 0.2451*** (5.77) |
| 2015 | −0.0125 (−0.13) | 0.0825 (0.89) | 0.2017** (2.50) | 0.1949** (2.24) | 0.1983** (2.54) |
| 2016 | 0.1069 (0.73) | 0.2016 (1.61) | 0.3154** (2.36) | 0.3153** (2.40) | 0.3159** (2.42) |
| 2017 | 0.1634 (1.07) | 0.2587 (1.80) | 0.3695*** (2.77) | 0.3724** (2.58) | 0.3720*** (2.85) |
| 2018 | −0.1663** (−2.43) | −0.0760 (−0.85) | 0.0392 (0.50) | 0.0366 (0.44) | 0.0425 (0.54) |
| Year Dummies | YES | YES | YES | YES | YES |
| Observations | 1225 | 1222 | 1219 | 1224 | 1223 |
| AR(1) | 0.51 | 0.52 | 0.52 | 0.52 | 0.52 |
| AR(2) | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| Hansen | 0.42 | 0.39 | 0.48 | 0.39 | 0.43 |
| Panel B. Long-term effects' results | | | | | |
| FC_DERV | 1.0182** (2.51) | 1.0023** (2.40) | 1.0173** (2.47) | 0.9984** (2.42) | 1.0311** (2.53) |
| FC_DEBT | –0.8789** (–2.55) | –0.8650** (–2.51) | –0.9029*** (–2.60) | –0.8577*** (–2.58) | –0.8863*** (–2.64) |

Panel A shows the results of two-step system GMM estimations on the short-term effects of hedging strategies on company value. AR(1) is the first-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. AR(2) is the second-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. The values of AR(1) and AR(2) are z-statistics. Hansen (1982) is test of overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null hypothesis that instruments are valid. The values in parentheses are t-statistics.
Panel B shows the long-run effects of FC derivatives and FC debt on company value. The values in parentheses are z-values for the long-run effects. ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

FC_DEBT has a negative value effect in all models in Table 4.6 (Panel A). To calculate the short- and long-run value effects, the same adjustment method used for the estimated FC_DERV coefficients works for estimating the FC_DEBT coefficients. For example, in Model 1, on average, FC debt hedging generates 8.38 % value discount

(i.e., (0.07/0.3173) multiplied by (($e^{-0.4771}$-1)*100)). Following the same adjustment method, in the short-run, on average, the FC debt hedging shows 8.25 %, 8.54 %, 8.19 %, and 8.41 % value discounts in Models 2, 3, 4, and 5, respectively.

Table 4.6 (Panel B) shows the estimated coefficients for the statistically significant long-run values of FC debt hedging. Following the same adjustment method as in the short-run effects, on average, FC debt hedging has 12.90 %, 12.77 %, 13.12 %, 12.70 % and 12.97 % value discounts in Models 1, 2, 3, 4, and 5, respectively.

Overall, on average, one-unit increase in FC_DEBTS generates a value discount range of 8.19–8.54 % and 12.70–13.12 % in the short- and long-run, respectively. The short-run value discounts of FC debt turn out significantly higher than those found in other studies. These results along with the respective outcomes of FC derivatives and FC debt highlight the different value effects for these two financial hedging strategies. This observation underlines the greater value discount magnitudes generated by FC debt hedging compared to the value premium magnitudes generated by FC derivatives hedging in the short-run. However, the premium magnitudes generated by FC derivatives hedging show higher values compared to the value discount magnitudes of FC debt hedging in the long-run.

Interestingly, the Malaysian multinationals' FC debt creates a significant value discount. The value discount can be attributed to improper hedging practices and/or the use of FC debt for financing rather than for hedging purposes. FC debt financing may affect company value negatively because companies are exposed to a higher borrowing risk resulting from an increase in foreign exchange risk, currency and/or liquidity mismatch. When the local currency value depreciates, it magnifies the FC debt value in local currency for companies holding high FC debt for financing, and negatively affecting companies' business performance through currency mismatch

known as the balance sheet effect (Krugman, 1999). Furthermore, FC debt' negative value effect may arise due to liquidity mismatch between FC debt and FC assets. The hard currency FC debt is liquid whereas FC assets such as FDIs are illiquid (Bae et al., 2016).

In Table 4.3, the FC exposure profile of borrowings for Malaysian Multinationals shows that during 2004–2018, Malaysian multinationals borrowed heavily in different currencies including the US Dollar, Pound Sterling, Chinese Renminbi, Singapore Dollar, and Japanese Yen. As shown in Table 4.3, the dynamic variations in the currency types of FC debt for Malaysian multinationals signal the utility of FC debt for financing rather than for hedging purposes. Consequently, using FC debt for financing creates FC risk for the Malaysian multinationals with potential for creating value discount due to MYR depreciation. Figure 1.1 shows US Dollar against Malaysian Ringgit (MYR) currency pair. Right after abandoning the pegged exchange rate regime in July 2005, the MYR value against USD started to fluctuate experiencing periods of value appreciation and deprecation and exposing Malaysian Multinationals to FC risk. Especially, the continuous USD domination of FC debt starting in 2011, and the significant devaluation of MYR against USD starting in 2014 confirm the exposure of the Malaysian multinationals to FC risk (see Table 4.3 and Figure 1.1). Raising FC debt for financing purposes may also affect the company value positively because borrowing in foreign currency seems more cost effective than in local currency due to lower foreign interest rates, larger amounts of debt, agency costs, withholding taxes, and capital controls, among others (Bae et al., 2016). For instance, Figure 4.2 shows BNM overnight policy rate (OPR) has been consistently higher than the USD FED fund rates following the 2008 global financial crisis. The FC_DEBT ratio profile in Table 4.3 and the US Fed Fund rates in Figure 4.2 show that very low

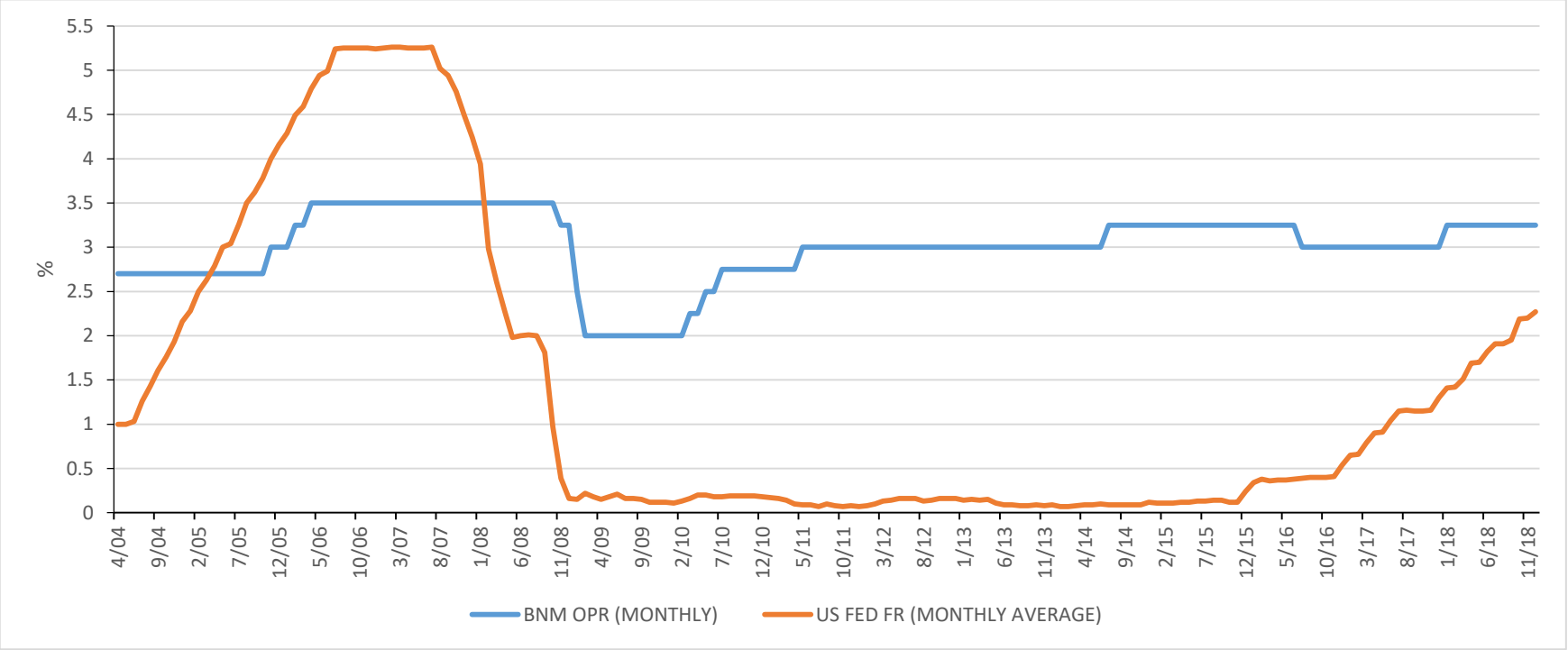


Figure 4.2: BNM overnight policy rates (OPR) and US FED fund rates (2004–2018)

US interest rates motivated Malaysian multinationals to heavily borrow in US Dollar during the 2011–2018 period.

Whether the Malaysian multinationals apply the FC hedging properly constitutes the next potential problem. The sample companies state in their financial statements that they only use derivatives for hedging purposes. Raising FC debt to hedge FC risk exposure by Malaysian multinationals could result in improper hedging practices reflected the negative FC debt effects on their values. In other words, companies raising FC debt for hedging may reduce FC risk exposure, thereby failing to increase the company value due to improper hedging. However, companies can also hold FC debt for financing and employ currency derivatives as hedging tools. Thus, FC hedging with derivatives may not be done correctly, indicating that the hedge ratio is not optimal (i.e., over- or under-hedged) and/or the companies' cost of FC hedging increasing its potential benefits. Bae et al. (2016) state that short term forward contracts provide little protection against FC risk in addition to high hedging cost. Panel A in Table 4.2 shows Malaysian multinationals heavily use forward contracts whereas companies issuing FC debt in long maturities for financing purpose possibly use short forward contracts to hedge FC risk exposure. However, improper hedging or excessive costs of hedging with currency derivatives can affect company value negatively due to the underdeveloped derivatives market in Malaysia. As shown in Table 4.2, the restrictions inherited in Malaysia derivatives market result in limited access to derivatives products, and thus, companies use heavily forwards contracts and some currency swap contracts in the onshore market. In line with this negative value effect of FC debt for Malaysian multinationals, Bae et al. (2016) find that Korean companies using FC debt have lower values than those using local currency debt. Incurring higher risk rather than "inefficient" and "improper" FC derivatives hedging

of FC debt does not explain the negative correlation between FC debt and company value (Bae et al., 2016). Similarly, Allayannis et al. (2003) argue that because Asian derivatives markets have not developed efficiently, FC derivatives that hedge FC debt negatively affect the Asian companies' financial performances. As for the high negative value of FC debt hedging, similar arguments apply to Malaysian multinationals, while seeking direct empirical testing of these arguments seems necessary.

In Table 4.6 (Panel A), Models 2 through 5 show the effects of all operational and financial hedging proxies. To address the multicollinearity problem, Model 2 uses the number of countries; Model 3 the number of regions, and Models 4 and 5 the Dispersion Indexes I and II, respectively. For all operational hedging variables (i.e., LNCOUNS, LNREGNS, DISP_INDEX I, DISP_INDEX II), the coefficients are statistically insignificant. The statistical insignificance result turns in line with Allayannis et al. (2001), Gleason et al. (2005) and Vivel Búa et al.'s (2015) findings. Some reasons might explain why operational hedging has no effect on company value. Multinationals take advantage of economies of scale in the foreign markets, reducing the marginal production cost through foreign subsidiaries; however, operational hedging is used to reduce long-term exposure (economic exposure) and the costs of implementing and maintaining the operational hedging strategies in long-run might offset the benefits of reducing the unexpected changes in exchange rates, and thus operational hedging may affect company value insignificantly. Moreover, Carter, Pantzalis, and Simkins (2001) find that the combined use of operational and financial hedging is associated with decreased exchange rate exposure. The insignificant effects of operational hedging proxies may stem from regressing operational hedging proxies

solely whereas their effects may turn to be significant if interacted with financial hedging (i.e., FC derivatives).

The FXPROFIT coefficients are also statistically insignificant. Results in Table 4.6 (Panel A), show that liquidity, growth opportunities, and foreign sales are statistically insignificant as control variables. Size and profitability show positive impacts in Models 1, 2, 4, and all models respectively, whereas leverage shows a negative effect. The industry sectors do not affect company values as statistically insignificant industry dummies highlight in Table 4.6 (i.e., the benchmark industry is manufacturing). The estimation tables also report on the complete year dummy results. Relative to 2004 benchmark year, the coefficients for years 2005, 2008, 2009, 2012, and 2016 represent statistically significant and negative (see Table 4.6). To a certain extent, these years' dummies capture the significant USD/MYR exchange rate changes and policies in these years as discussed in Section 1.2 and shown in Figure 1.1.

Table 4.7 (Panel A) shows the estimation results when FXPROFIT is broken into two components (FXPROFIT_tsa and FXPROFIT_tsl). Similar to the results in Table 4.6, on average, FC_DERV creates a short-term value premium ranging from 8.03 % to 8.42 % after adjusting for the estimated coefficients. On average, FC_DEBT hedging destroys company value within the range of 7.97–8.30 %. In Table 4.7 (Panel B), the long-run adjusted average value premium of FC_DERV hedging fits within 19.07–20.33 % range, and the long-term adjusted average value discount of FC_DEBT hedging within 12.28–12.73 % range. Thus, on average, one-unit increase in FC derivatives generate a value premium range of 8.03–8.42 % in the short-run, and a value premium range of 19.07–20.33 % in the long-run. On the other hand, one-unit increase in FC debt, on average, generates a value discount range of 7.97–8.30 % in the short-run, and a value discount range of 12.28–12.73 % in the long-run.

FXPROFIT_tsa and FXPROFIT_tsl show statistically significant negative coefficients in line with Bae et al.'s (2016) findings of negative effects of FXPROFIT_tsa and FXPROFIT_tsl on company value. The results also show that operational hedging strategies do not lead to an increase in company value. All control variables except for leverage, profitability, and growth opportunities have no value effects, and the results remain consistent with those shown in Table 4.6. Similarly, the results in Table 4.7 detect no industrial effects. For Table 4.7, relative to 2004 benchmark year, the coefficients for years 2005, 2008, 2009, 2011, 2012, and 2018 are statistically significant and negative. The year effects are also similar to the results found in Table 4.6.

Table 4.7: Estimation results on short-term and long-term effects of hedging on company value using FXPROFIT_tsa and FXPROFIT_tsl

| Panel A. Short-term effects' results | | | | | |
|---|---|---|---|---|---|
| **Dependent variable: Ln($Q_t$)** | | | | | |
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV FC_DEBT, FXPROFIT_tsa, FXPROFIT_tsl | **(2)** LNCOUNS | **(3)** LNREGN | **(4)** DISP_ INDEX I | **(5)** DISP_ INDEX II |
| Ln ($Q_{t-1}$) | 0.4507*** (7.59) | 0.4548*** (7.04) | 0.4499*** (7.65) | 0.4492*** (7.45) | 0.4572*** (7.39) |
| FC_ DERV | 0.5688** (2.06) | 0.5491** (1.99) | 0.5662** (2.02) | 0.5694** (2.08) | 0.5690** (2.12) |
| FC_DEBT | −0.4633** (−2.05) | −0.4561** (−2.06) | −0.4704** (−2.13) | −0.4481** (−2.07) | −0.4674** (−2.11) |
| FXPROFIT_tsa | –0.2256*** (–3.82) | –0.2298*** (−3.68) | –0.2263*** (−4.02) | –0.2281*** (–3.58) | –0.2277*** (–4.06) |
| FXPROFIT_tsl | –0.2747*** (–3.62) | –0.2784*** (–3.27) | –0.2795*** (–3.83) | –0.2820*** (–3.61) | –0.2712*** (–3.58) |
| LNCOUNS | | –0.0420 (–0.37) | | | |
| LNREGNS | | | −0.0735 (−1.09) | | |
| DISP_INDEX I | | | | –0.0867 (−1.17) | |
| DISP_INDEX II | | | | | –0.0212 (–0.17) |
| SIZE | 0.0269 (0.41) | 0.0442 (0.47) | 0.0264 (0.43) | 0.0438 (0.69) | 0.0099 (0.15) |
| LEVE | −0.1539** (−2.37) | –0.1388* (−1.70) | −0.1612** (−2.47) | −0.1396** (−2.20) | −0.1628** (−2.56) |
| LIQU | −0.0040 (–0.67) | −0.0042 (–0.68) | −0.0045 (–0.74) | −0.0043 (–0.70) | −0.0047 (−0.81) |
| PROF | 0.1892** (1.99) | 0.1888* (1.95) | 0.1970** (2.04) | 0.1944** (2.01) | 0.1922** (2.04) |
| GROW_OPP | 0.0002* (1.75) | 0.0002* (1.73) | 0.0001* (1.69) | 0.0002* (1.82) | 0.0002* (1.71) |
| FSALES | 0.0010 (0.76) | 0.0011 (0.73) | 0.0011 (0.76) | 0.0010 (0.77) | 0.0008 (0.57) |
| Manufacturing | 0 | 0 | 0 | 0 | 0 |
| Service | –0.0881 (–0.64) | –0.0651 (–0.43) | –0.0910 (–0.65) | –0.0782 (–0.52) | –0.0853 (–0.61) |
| Construction | −0.0046 (−0.04) | –0.0068 (–0.06) | 0.0048 (0.04) | –0.0032 (–0.03) | −0.0087 (−0.08) |
| Trade/ Transportation | 0.1718 (1.06) | 0.1941 (1.08) | 0.1617 (0.99) | 0.1842 (1.08) | 0.1687 (1.04) |
| Agriculture/ Forestry/Fishing | −0.0086 (−0.05) | −0.0098 (−0.06) | −0.0002 (−0.00) | −0.0223 (−0.13) | 0.0030 (0.02) |
| Year Dummies | YES | YES | YES | YES | YES |
| 2005 | −0.1394*** (−2.72) | −0.1355** (−2.43) | −0.0479 (−0.69) | 0.0742 (1.65) | 0.0769* (1.71) |
| 2006 | −0.0088 (−0.23) | −0.0037 (−0.09) | 0.0838** (1.94) | 0.2064*** (4.05) | 0.2065*** (4.06) |

Table 4.7 (Continued.)

| Dependent variable: Ln($Q_t$) | | | | | |
|---|---|---|---|---|---|
| Financial hedging | | Operational and financial hedging | | | |
| | | | | | |
| Variables | (1) FC_DERV FC_DEBT, FXPROFIT_tsa, FXPROFIT_tsl | (2) LNCOUNS | (3) LNREGN | (4) DISP_ INDEX I | (5) DISP_ INDEX II |
| 2007 | 0.0515 (1.06) | 0.0592 (1.00) | 0.1372*** (3.03) | 0.2691*** (5.64) | 0.2652*** (5.46) |
| 2008 | −0.2144*** (−4.77) | −0.2137*** (−4.14) | −0.1191** (−2.45) | 0 | 0 |
| 2009 | −0.0967** (−2.34) | −0.0941** (−1.99) | 0 | 0.1160** (2.35) | 0.1230** (2.35) |
| 2010 | 0 | 0 | 0.0895** (2.09) | 0.2116*** (4.39) | 0.2161*** (4.54) |
| 2011 | −0.0715* (−1.93) | −0.0663* (−1.83) | 0.0229 (0.54) | 0.1446*** (3.46) | 0.1488*** (3.69) |
| 2012 | 0.1109*** (−2.78) | −0.1051*** (−2.64) | −0.0218 (−0.53) | 0.1018** (2.42) | 0.1089** (2.60) |
| 2013 | −0.0311 (−0.67) | −0.0244 (−0.50) | 0.0638 (1.40) | 0.1806*** (3.68) | 0.1912*** (3.94) |
| 2014 | 0.0340 (0.66) | 0.0397 (0.73) | 0.1288** (2.44) | 0.2478*** (5.18) | 0.2521*** (5.58) |
| 2015 | 0.0138 (0.12) | 0.0193 (0.17) | 0.1086 (1.11) | 0.2276** (2.60) | 0.2297** (2.52) |
| 2016 | 0.1276 (0.76) | 0.1330 (0.79) | 0.2215 (1.44) | 0.3437** (2.34) | 0.3478** (2.28) |
| 2017 | 0.2033 (1.16) | 0.2076 (1.16) | 0.2968* (1.92) | 0.4156*** (2.73) | 0.4224*** (2.76) |
| 2018 | 0.1858*** (−2.65) | −0.1869*** (−2.68) | −0.0904 (−1.02) | 0.0242 (0.27) | 0.0336 (0.39) |
| Observations | 1224 | 1221 | 1224 | 1222 | 1225 |
| AR(1) | 0.56 | 0.57 | 0.57 | 0.57 | 0.57 |
| AR(2) | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 |
| Hansen | 0.17 | 0.14 | 0.18 | 0.16 | 0.17 |

Panel B. Long-run effects' results

| | | | | | |
|---|---|---|---|---|---|
| FC_DERV | 1.0356** (2.31) | 1.0071** (2.20) | 1.0294** (2.27) | 1.0338** (2.30) | 1.0482** (2.41) |
| FC_DEBT | –0.8435** (–2.34) | –0.8366** (–2.35) | –0.8552** (–2.42) | –0.8135** (–2.37) | –0.8611** (–2.43) |

Panel A shows the results of two-step system GMM estimations on the short-term effects of hedging strategies on company value. AR(1) is the first-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. AR(2) is the second-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. The values of AR(1) and AR(2) are z-statistic. Hansen (1982) is test of overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null hypothesis that instruments are valid. The values in parentheses are t-statistic. Panel B shows the long-run effects of FC derivatives and FC debt on company value. The values in parentheses are z-values for the long-run effects. ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

# Chapter 5

# ROBUSTNESS ANALYSIS

## 5.1 Robustness Results

To ensure the robustness of the results, the market-to-book ratio represents another proxy for company value (e.g., Chung & Pruitt, 1994).[13] Table 5.8 shows the robustness results. For all models in Tables 5.8 and 5.9, all Hansen's p-values are greater than 0.10 and less than 1, and thus all instruments remain valid. Moreover, for all models, the null hypothesis of no first-order serial correlation AR(1) does not hold, whereas the null hypothesis of no second-order serial correlations AR(2) remains accepted.

Consistent with the results presented in Tables 4.6, Table 5.8 (Panel A) shows that FC derivatives and FC debt pose positive and negative effects on company value, respectively. Using the same adjustment method for the estimated coefficients of FC_DERV and FC_DEBT in Models 1 through 5, Panel A shows, on average, FC_DERV creates a value premium range of 8.82–8.92 % and FC_DEBT generates a value discount range of 9.08–10.28 %. These magnitudes do not significantly deviate from the magnitudes in Tables 4.6 and 4.7. Similarly, all operational hedging measures are statistically insignificant.

[13] The literature shows different methodologies for constructing Tobin's Q defining the variable as the ratio of a company's market value to the replacement cost of its assets. Studies widely use the simple ratio of the company's market value to the book value of total assets, and Chung and Pruitt (1994) find a high correlation between the simple ratio and the other complex measures of Tobin's Q.

The FXPROFIT coefficients remain statistically significant but negative. Both leverage and profitability are statistically significant, and show negative and positive signs, respectively. Results for these control variables support the results in Tables 4.6 and 4.7. Unlike the result of no industrial effects in Tables 4.6 and 4.7, relative to the benchmark agriculture, forestry, and fishing industry, the estimated coefficients for all industries in Table 5.8 are statistically significant and negative. The estimated coefficients for the long-run effects of FC_DERV and FC_DEBT in Panel B no longer remain statistically significant in any model. Similarly, relative to the benchmark year 2008, all estimated coefficients for all year dummies in Table 5.8 are negative and statistically significant when M/B is used as a proxy for company value.

The robustness results in Table 5.9 for the two components of FXPROFIT also support the results in Table 4.7. On average, FC_DERV creates a value premium range of 9.11–9.39 % while FC_DEBT generates a value discount range of 9.24–9.85 % in the short-run. Once again, operational hedging has no effect on company value. The estimated coefficients of FXPROFIT_tsa, FXPROFIT_tsl, leverage, and profitability are significant similar to the previous findings in Table 4.7. The estimated coefficients for the long-run effects of FC_DERV and FC_DEBT in Panel B no longer remain statistically significant in any model. Similarly, relative to the benchmark year 2008, all estimated coefficients for all year dummies in Table 5.9 remain statistically significant and negative. Like those in Table 5.8, the results in Table 5.9 (Panels A and B) show that FC derivatives and FC debt only have significant positive/negative relationships with Tobin's Q in the short-run, and no effect on company value in the long-run. Robustness results support the main findings that FC derivatives create a positive value effect whereas FC debt generates negative value effect for Malaysian

Table 5.8: Robustness results using market to book ratio as a proxy for company value: FXPROFIT ratio

| Panel A. Short-term effects' results | | | | | |
|---|---|---|---|---|---|
| **Dependent variable: Ln($Q_t$)** | | | | | |
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV, FC _DEBT, FXPROFIT | **(2)** LNCOUNS | **(3)** LNREGN | **(4)** DISP_ INDEX I | **(5)** DISP_ INDEX II |
| Ln ($Q_{t-1}$) | 0.9029*** (17.27) | 0.9006*** (16.85) | 0.9006*** (16.94) | 0.9038*** (16.72) | 0.9057*** (17.27) |
| FC_ DERV | 0.5940** (2.02) | 0.5961** (2.02) | 0.5948** (2.00) | 0.5948** (2.03) | 0.5898** (2.02) |
| FC_DEBT | −0.5382*** (−3.23) | −0.5361*** (−3.21) | −0.5312*** (−3.11) | −0.5301*** (−3.24) | −0.5451*** (−3.15) |
| FXPROFIT | −0.1668* (−1.85) | −0.1826* (−1.88) | −0.1790** (−2.05) | −0.1732* (−1.83) | −0.1705* (−1.95) |
| LNCOUNS | | −0.0052 (−0.26) | | | |
| LNREGNS | | | −0.0092 (−0.24) | | |
| DISP_INDEX I | | | | −0.0186 (−0.29) | |
| DISP_INDEX II | | | | | −0.0388 (−0.41) |
| SIZE | 0.0076 (0.21) | 0.0158 (0.44) | 0.0117 (0.30) | 0.0080 (0.22) | 0.0133 (0.35) |
| LEVE | −0.8590** (−1.99) | −0.8568** (−1.99) | −0.8563** (−2.01) | −0.8580** (−2.00) | −0.8698** (−2.01) |
| LIQU | −0.0074 (−0.81) | −0.0063 (−0.67) | −0.0060 (−0.62) | −0.0080 (−0.85) | −0.0071 (−0.75) |
| PROF | 0.1709** (2.20) | 0.1778** (2.22) | 0.1712** (2.18) | 0.1760** (2.29) | 0.1671** (2.21) |
| GROW_OPP | 0.0002 (0.90) | 0.0003 (0.91) | 0.0003 (0.86) | 0.0003 (0.88) | 0.0003 (0.93) |
| FSALES | 0.0001 (0.21) | 0.0001 (0.29) | 0.0001 (0.20) | 0.0001 (0.27) | 0.0001 (0.22) |
| Manufacturing | −0.5865* (−1.79) | −0.6477** (−2.04) | −0.6101* (−1.78) | −0.5870* (−1.84) | −0.6284* (−1.88) |
| Service | −0.6561* (−2.64) | −0.7199** (−2.04) | −0.6749* (−1.84) | −0.6540* (−1.84) | −0.6841* (−1.89) |
| Construction | −0.6000* (−1.81) | −0.6684* (−1.96) | −0.6151* (−1.74) | −0.6014* (−1.78) | −0.6280* (−1.81) |
| Trade/ Transportation | −0.5688* (−1.82) | −0.6300** (−2.10) | −0.5945* (−1.82) | −0.5660* (−1.87) | −0.6075* (−1.90) |
| Agriculture/ Forestry/Fishing | −0.4145 (−1.19) | −0.4851 (−1.45) | −0.4409 (−1.23) | −0.4139 (−1.20) | −0.4546 (−1.28) |
| Year Dummies | YES | YES | YES | YES | YES |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0.5308*** (6.25) | 0.5184*** (6.18) | 0.5182*** (6.18) | 0.5336*** (6.21) | 0.5293*** (6.23) |
| 2007 | 0.5994*** (7.10) | 0.5851*** (6.88) | 0.5822*** (6.92) | 0.6046*** (7.08) | 0.6015*** (7.17) |
| 2008 | 0 | 0 | 0 | 0 | 0 |

Table 5.8 (Continued.)

| Dependent variable: Ln(Qt) | | | | | |
|---|---|---|---|---|---|
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV, FC _DEBT, FXPROFIT | **(2) LNCOUNS** | **(3) LNREGNS** | **(4) DISP_ INDEX I** | **(5) DISP_ INDEX II** |
| 2009 | 0.4296*** (4.34) | 0.4045*** (4.08) | 0.4101*** (4.26) | 0.4304*** (4.25) | 0.4289*** (4.40) |
| 2010 | 0.6122*** (7.09) | 0.6003*** (6.85) | 0.5960*** (6.70) | 0.6161*** (7.07) | 0.6098*** (7.04) |
| 2011 | 0.4621*** (6.62) | 0.4528*** (6.55) | 0.4495*** (6.54) | 0.4668*** (6.65) | 0.4644*** (6.56) |
| 2012 | 0.4046*** (5.74) | 0.3885*** (5.65) | 0.3861*** (5.80) | 0.4080*** (5.75) | 0.4039*** (5.82) |
| 2013 | 0.5923*** (7.38) | 0.5784*** (7.17) | 0.5775*** (7.22) | 0.5958*** (7.28) | 0.5918*** (7.30) |
| 2014 | 0.5711*** (8.00) | 0.5587*** (7.66) | 0.5568*** (7.81) | 0.5761*** (8.05) | 0.5705*** (8.00) |
| 2015 | 0.4187*** (4.54) | 0.3973*** (4.44) | 0.3978*** (4.52) | 0.4220*** (4.46) | 0.4158*** (4.49) |
| 2016 | 0.4823*** (6.49) | 0.4702*** (6.26) | 0.4691*** (6.26) | 0.4843*** (6.53) | 0.4814*** (6.38) |
| 2017 | 0.5370*** (6.16) | 0.5231*** (6.09) | 0.5172*** (5.97) | 0.5364*** (6.04) | 0.5302*** (5.97) |
| 2018 | 0.2549*** (3.37) | 0.2422*** (3.16) | 0.2428*** (3.14) | 0.2568*** (3.37) | 0.2519*** (3.30) |
| Observations | 1112 | 1109 | 1109 | 1110 | 1111 |
| AR(1) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AR(2) | 0.80 | 0.73 | 0.73 | 0.77 | 0.72 |
| Hansen | 0.43 | 0.37 | 0.41 | 0.38 | 0.45 |

Panel B. Long-term effects' results

| | | | | | |
|---|---|---|---|---|---|
| FC_DERV | 6.1158 (1.49) | 5.9962 (1.46) | 5.9860 (1.49) | 6.1862 (1.42) | 6.2537 (1.44) |
| FC_DEBT | –5.5406 (–1.42) | –5.3920 (–1.41) | –5.3466 (–1.39) | –5.5132 (–1.38) | –5.7802 (–1.36) |

Panel A shows the robustness results of two-step system GMM estimations on the short-term effects of hedging strategies on company value. AR(1) is the first-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. AR(2) is the second-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. The values of AR(1) and AR(2) are z-statistic. Hansen (1982) is test of overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null hypothesis that instruments are valid. The values in parentheses are t-statistics. Panel B shows the long-run effects of FC derivatives and FC debt on company value. The values in parentheses are z-values for the long-run effects. ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

multinationals. However, using M/B as a proxy for company value in Malaysia shows weaker results.

Table 5.9: Robustness results using market to book ratio as a proxy for company value: FXPROFIT_tsa and FXPROFIT_tsl ratios

| Panel A. Short-term effects' results | | | | | |
|---|---|---|---|---|---|
| **Dependent variable: Ln($Q_t$)** | | | | | |
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV, FC _DEBT, FXPROFIT_tsa, FXPROFIT_tsl | **(2)** LNCOUNS | **(3)** LNREGN | **(4)** DISP_ INDEX I | **(5)** DISP_ INDEX II |
| Ln ($Q_{t-1}$) | 0.9573*** (18.32) | 0.9562*** (18.13) | 0.9527*** (17.38) | 0.9510*** (18.31) | 0.9530*** (17.89) |
| FC_ DERV | 0.6044** (1.97) | 0.6114** (2.00) | 0.6183** (2.04) | 0.6123** (1.99) | 0.6135** (1.98) |
| FC_DEBT | –0.5916*** (–3.34) | –0.5844*** (–3.34) | –0.5809*** (–3.37) | –0.5909*** (–3.24) | –0.5900*** (–3.30) |
| FXPROFIT_tsa | –0.3034*** (–5.04) | –0.2966*** (–5.17) | –0.2929*** (–5.05) | –0.3035*** (–6.22) | –0.3048*** (–6.78) |
| FXPROFIT_tsl | –0.1816*** (–2.67) | –0.1853*** (–3.00) | –0.1899*** (–2.84) | –0.1634** (–2.12) | –0.1725** (–2.28) |
| LNCOUNS | | –0.0086 (–0.49) | | | |
| LNREGNS | | | –0.0142 (–0.38) | | |
| DISP_INDEX I | | | | –0.0133 (–0.26) | |
| DISP_INDEX II | | | | | –0.0385 (–0.57) |
| SIZE | 0.0332 (0.11) | 0.0367 (0.12) | 0.0661 (0.22) | –0.0057 (–0.19) | –0.0034 (–0.13) |
| LEVE | –0.7258* (–1.87) | –0.7206* (–1.85) | –0.7189* (–1.86) | –0.7050* (–1.77) | –0.7211* (–1.79) |
| LIQU | –0.0027 (–0.97) | –0.0027 (–0.91) | –0.0024 (–0.79) | –0.0034 (–1.57) | –0.0034 (–1.55) |
| PROF | 0.1272* (1.85) | 0.1305* (1.96) | 0.1249* (1.87) | 0.1093 (1.44) | 0.1174 (1.54) |
| GROW_OPP | 0.0003 (0.97) | 0.0003 (0.94) | 0.0003 (0.94) | 0.0002 (0.74) | 0.0002 (0.75) |
| FSALES | 0.0002 (0.31) | 0.0002 (0.36) | 0.0002 (0.48) | 0.0003 (0.51) | 0.0003 (0.54) |
| Manufacturing | –0.0927 (–1.15) | –0.4324 (–1.56) | –0.4561* (–1.66) | –0.4208 (–1.50) | –0.4402* (–1.71) |
| Service | –0.1607* (–1.89) | –0.4941* (–1.68) | –0.5148* (–1.77) | –0.4936* (–1.65) | –0.5025* (–1.80) |
| Construction | –0.1283 (–1.61) | –0.4713* (–1.71) | –0.4891* (–1.78) | –0.4549 (–1.61) | –0.4655* (–1.79) |
| Trade/ Transportation | –0.1016 (–1.28) | –0.4402* (–1.76) | –0.4576* (–1.83) | –0.4161* (–1.64) | –0.4383* (–1.87) |
| Agriculture/ Forestry/Fishing | 0 | –0.3446 (–1.19) | –0.3686 (–1.23) | –0.3223 (–1.06) | –0.3385 (–1.23) |
| Year Dummies | YES | YES | YES | YES | YES |

Table 5.9 (Continued.)

| Dependent variable: $Ln(Q_t)$ | | | | | |
|---|---|---|---|---|---|
| | **Financial hedging** | **Operational and financial hedging** | | | |
| Variables | **(1)** FC_DERV, FC _DEBT, FXPROFIT_tsa, FXPROFIT_tsl | **(2)** LNCOUNS | **(3)** LNREGN | **(4)** DISP_ INDEX I | **(5)** DISP_ INDEX II |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0.5008*** (4.48) | 0.4918*** (4.60) | 0.4912*** (4.83) | 0.5176*** (4.66) | 0.5118*** (4.66) |
| 2007 | 0.5619*** (5.83) | 0.5452*** (5.67) | 0.5501*** (6.03) | 0.5743*** (6.34) | 0.5762*** (6.34) |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0.3785*** (3.36) | 0.3590*** (3.36) | 0.3580*** (3.50) | 0.4048*** (3.67) | 0.4022*** (3.71) |
| 2010 | 0.5847*** (6.48) | 0.5725*** (6.48) | 0.5787*** (6.82) | 0.5949*** (6.47) | 0.5967*** (6.45) |
| 2011 | 0.3906*** (5.02) | 0.3814*** (4.98) | 0.3864*** (5.28) | 0.4010*** (5.43) | 0.4026*** (5.41) |
| 2012 | 0.3447*** (4.24) | 0.3333*** (4.28) | 0.3284*** (4.33) | 0.3554*** (4.45) | 0.3492*** (4.48) |
| 2013 | 0.5247*** (6.01) | 0.5081*** (6.00) | 0.5108*** (6.31) | 0.5111*** (6.42) | 0.5170*** (6.41) |
| 2014 | 0.5241*** (6.82) | 0.5124*** (6.85) | 0.5187*** (7.09) | 0.5307*** (7.30) | 0.5314*** (7.01) |
| 2015 | 0.3416*** (3.42) | 0.3266*** (3.40) | 0.3345*** (3.64) | 0.3415*** (3.57) | 0.3359*** (3.51) |
| 2016 | 0.4381*** (5.67) | 0.4240*** (5.74) | 0.4260*** (6.18) | 0.4373*** (6.29) | 0.4395*** (6.13) |
| 2017 | 0.5201*** (5.29) | 0.5054*** (5.52) | 0.5039*** (5.54) | 0.5236*** (5.56) | 0.5287*** (5.60) |
| 2018 | 0.1898** (2.43) | 0.1787** (2.41) | 0.1796*** (2.47) | 0.1940*** (2.67) | 0.1963*** (2.67) |
| Observations | 1112 | 1107 | 1106 | 1110 | 1111 |
| AR(1) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AR(2) | 0.93 | 0.98 | 0.98 | 0.88 | 0.91 |
| Hansen | 0.43 | 0.46 | 0.48 | 0.50 | 0.48 |

Panel B. Long-term effects' results

| | | | | | |
|---|---|---|---|---|---|
| FC_DERV | 14.1702 (0.71) | 13.9586 (0.72) | 13.0741 (0.74) | 12.4978 (0.80) | 13.0595 (0.76) |
| FC_DEBT | –13.8711 (–0.77) | –13.3435 (–0.77) | –12.2841 (–0.80) | –12.0597 (–0.88) | –12.5583 (–0.82) |

Panel A shows the robustness results of two-step system GMM estimations on the short-term effects of hedging strategies on company value. AR(1) is the first-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. AR(2) is the second-order serial correlation in the first-differenced residuals, asymptotically distributed *as N(0,1)* under the null hypothesis of no serial correlation. The values of AR(1) and AR(2) are z-statistic. Hansen (1982) is test of overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null hypothesis that instruments are valid. The values in parentheses are t-statistic. Panel B shows the long-run effects of FC derivatives and FC debt on company value. The values in parentheses are z-values for the long-run effects. ***, **, * denote significance at the 1 %, 5 %, and 10 % levels, respectively.

# Chapter 6

# CONCLUSION AND RECOMMENDATION

## 6.1 Conclusion

Many studies have examined the effects of financial and operational hedging on company value. However, with mixed results, these studies typically focus on developed markets. This study examines the value effects of financial and operational hedging for Malaysian multinationals. After controlling for foreign exchange gains or losses, results confirm that, on average, Malaysian multinationals add value ranging from 7.88 % to 8.21 % and from 18.81 % to 19.80 % through hedging by FC derivatives in the short- and long-run, respectively. On the contrary, on average, they destroy value ranging from 8.19 % to 8.54 % and from 12.70 % to 13.12 % through hedging by FC debt in the short- and long-run, respectively. The results also show that the magnitudes of hedging by FC derivatives and FC debt affect company value in opposite directions. Operational hedging does not affect company value although different proxies are used.

The findings have implications for the managers responsible for decision-making in hedging activities. As an open export-dependent economy with a volatile currency, the value premium of FC hedging derivatives sheds new light on the importance of FC hedging in Malaysia. Facing significant foreign exchange risk, Malaysian multinationals in the study have minimum 20 % foreign sales to total sales ratio. However, the descriptive results of the hand-collected sample data on FC hedging show that less than half of multinationals (49.90 %) do not use any financial hedging

strategies (i.e., derivatives and foreign debt). On average, 27.63 % and 72.67 % of Malaysian multinationals are users and non-users of FC derivatives, respectively. Furthermore, standardized foreign currency futures and options currently are not available in the Malaysian derivatives market, and managers heavily rely on forward contracts in the over-the-counter market. On average, 92.43 % of total derivative contracts belongs to forward contracts. FC swaps as long-term financial hedging instruments are used occasionally. For FC debt, the descriptive statistics show that 68.27 % of companies do not use FC debt. Most of FC debt are denominated in the US Dollar, Sterling Pound, and Singapore Dollar.

The value premium result of FC hedging should motivate Malaysian managers to engage in FC derivatives hedging. Malaysian policymakers should enlighten managers on the costs and benefits of hedging, and create awareness for derivatives market and products. Furthermore, Malaysian policymakers should take steps in diversifying derivatives products in the onshore market. However, the same rationale does not apply to FC debt which destroy value for Malaysian multinationals. Malaysian managers must exercise caution in their foreign debt financing activities given the economic, political, operational, and financial risks inherent in the Malaysian economy. Similarly, policymakers should direct companies with regard to the risks involved in FC debt hedging.

## 6.2 Recommendation for Future Studies

Unlike Ameer et al.'s (2011) findings, the results of this study show that the insignificant FC risk exposure is not the reason Malaysian non-financial companies are not actively involved in currency derivatives. Thus, except insignificant FC risk exposure other factors associated with Malaysia's derivatives market and products may discourage Malaysian companies' managers to hedge FC risk through derivatives.

According to Ameer et al.'s (2011) findings some factors such as lack of expertise, difficulty in understanding derivatives market and products, and high transaction costs of derivatives compared to their benefits affects Malaysian companies to involve less in derivatives hedging. Thus, future studies could select samples characterized by any of above factors (i.e., except insufficient FC risk exposure) discussed in Ameer et al.'s (2011) study (e.g., selecting a sample in which all companies managers have enough expertise in the Malaysian derivatives market and products). Investigating which factors motive Malaysian managers to be involved more actively in hedging or discussing the new factors managers may take into account to employ hedging seems encouraging for further studies.

The results of descriptive statistics on financial hedging strategies show that 49.90 % of multinationals do not use any financial hedging strategies. According to Nain's (2004) findings a company is more likely to hedge FC risk if many competitors in its industry are hedgers. Therefore, if a company chooses to remain unhedged while many competitors manage FC risk exposure in that industry, the market penalizes an unhedged company with a lower value. Further study could examine the extent of hedging in different industries and check if non-hedgers suffer a value discount while many rivals managing FC risk.

Future studies also could directly examine reasons behind raising FC debt, namely hedging, financing or speculation motivating Malaysian multinationals. Malaysian multinationals may raise FC debt as a hedging tool or hold FC debt just for financing and employ currency derivatives for hedging. However, it is noteworthy to analyze whether companies hedge FC risk properly or factors contributing to negative value effect of FC debt hedging or financing in Malaysia. Moreover, investigating whether the level of financial development, the effectiveness of good corporate governance

practice in both public and private sector, and the differences in exchange rate regimes explain the value effect differences in hedging practices among countries seems promising.

Further study also could include the macroeconomics variables such as exchange rate, monetary policy, interest rate, inflation rate, and political conditions in the estimation model to evaluate the mediation role of these variables whereas regressing the effect of financial hedging on company value.

## 6.3 Study Limitation

Greatly reducing the sample size to only those multinational companies with significant FC risk exposure (i.e., at least 20 % foreign sales involvement), reflects the key research limitation. Therefore, a further study can include all listed non-financial multinationals, and the value effects of hedging in terms of different ranges of exposures.

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# APPENDIX

**Abstract for the Publication in the Journal of Asian Economics**

# THE EFFECT OF FINANCIAL AND OPERATIONAL HEDGING ON COMPANY VALUE: THE CASE OF MALAYSIAN MULTINATONALS

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## ABSTRACT

This study examines the value effects of financial and operational hedging in a managed floating exchange rate regime with strict limitations on the trading of Malaysian Ringgit for a sample of 109 Malaysian multinationals from 2004 to 2018. Using Tobin's Q as a proxy for company value, the two-step system GMM estimation results show that, on average, derivatives hedging creates a value premium range of 7.88-8.21% in the short-run, and 18.81-19.80% in the long-run. This value premium emerged both after controlling for non-operational foreign exchange profits (losses), and its two components: transaction and translation profits (losses). In contrast, foreign debt hedging, on average, creates a value discount range of 8.19-8.54% in the short-run and 12.70-13.12% in the long-run. No evidence shows value effect for operational hedging though. The positive value effect of derivatives hedging should motivate managers of Malaysian multinationals to hedge foreign currency exposure through derivatives and encourage policymakers to take steps in developing derivatives market and products. However, the negative value effect of foreign debt hedging indicates that it destroys value. This negative effect might reflect two potential causes; higher company risk due to FC debt financing, and improper hedging practices including high

costs of hedging in the underdeveloped derivatives market. These potential causes need further empirical evaluations.

**Keywords:** Financial hedging; operational hedging; company value; foreign currency derivatives; foreign currency debt; Malaysia.

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# The effects of financial and operational hedging on company value: The case of Malaysian multinationals

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## Abstract

This study examines the value effects of financial and operational hedging in a managed floating exchange rate regime with strict limitations on the trading of Malaysian Ringgit for a sample of 109 Malaysian multinationals from 2004–2018. Using Tobin's Q as a proxy for company value, the two-step system GMM estimation results show that, on average, derivatives hedging creates a value premium range of 7.88–8.21 % in the short-run, and 18.81–19.80 % in the long-run. This value premium emerged both after controlling for non-operational foreign exchange profits (losses), and its two components: transaction and translation profits (losses). In contrast, foreign debt hedging, on average, creates a value