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**A STUDY ON THE RELATIONSHIP BETWEEN  
MACROECONOMIC FACTORS AND NUMBER OF IPOs IN  
MALAYSIA**

By

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**UUM**  
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**Thesis Submitted to  
School of Economics, Finance and Banking (SEFB),  
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in Partial Fulfillment of the Requirement for the  
Master of Science (Finance)**



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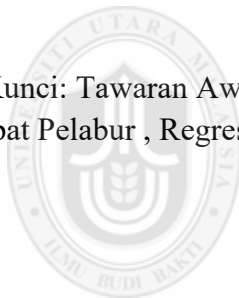
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## ABSTRAK

Kajian ini mengkaji hubungan antara indeks pasaran saham dan kadar pertukaran USD/MYR dengan bilangan tawaran awam awal (TAA) dari tahun 2000 sehingga 2016. Kajian ini dijalankan dengan menggunakan kaedah regresi ko-integrasi and Modal Vektor Pembetulan Ralat untuk mengkaji kewujudan kesan jangka masa panjang dalam hubungan di antara indeks pasaran saham, kadar pertukaran USD/MYR and bilangan TAA. Hasil kajian menunjukkan bahawa kadar pertukaran USD/MYR dan indeks pasaran saham mempunyai kesan ke atas bilangan TAA dalam jangka masa yang panjang. Kadar pertukaran USD/MYR menjunkkan hubungan yang negatif dengan bilangan TAA, manakala indeks pasaran saham menunkukkan hubungan yang positif dengan bilangan TAA. Ini menjukkan bahawa syarikat lebih suka untuk menjalankan TAA apabila kadar pendapatan daripada indeks pasaran saham adalah semakin tinggi. Hubungan negatif antara kadar pertukaran and bilangan TAA menunjukkan bahawa apabila terdapat keruapan dalam kadar pertukaran, syarikat tidak minat untuk menjalankkan TAA. Hasil kajian ini selari dengan teori pendapat pelabur. Dalam jangka masa yang pendek, kadar pertukaran dan indeks pasaran saham tidak mempunyai kesan terhadap bilangan TAA.

Kata Kunci: Tawaran Awam Awal; Indeks Pasaran Saham, Kadar Pertukaran, Teori Pendapat Pelabur , Regresi Kointegrasi , Modal Vektor Pembetulan Ralat

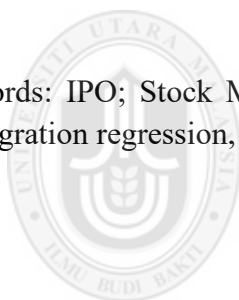


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## ABSTRACT

This study studies the relationship between the stock market index and exchange rate on the number of IPOs in Malaysia from year 2000 to 2016. This study examines the relationship by performing cointegration regression and Vector Error Correction Model to study the short and long-run causal effects between stock market index, exchange rate and the number of IPOs. The findings of the data show that there exists a unidirectional long-run equilibrium causal relationship between the stock market index, exchange rate and number of IPOs in Malaysia where the exchange rate exhibits a negative relationship with the number of IPOs. This shows that higher returns in stock market returns lead to higher number of IPOs on the long run. This implies that business may prefer to list an IPO when stock market returns are high as this may enable the business to obtain higher valuations. Besides, the negative relationship between exchange rate and number of IPOs imply that business may refrain from listing when there is heightened volatility in the exchange rate. This result support the investor sentiment theory. However, in the short run the stock market index and the exchange rate does not have a significant relationship with the number of IPOs in Malaysia.

Keywords: IPO; Stock Market Index, Exchange Rate, Investor Sentiment Theory, Cointegration regression, Vector Error Correction Model



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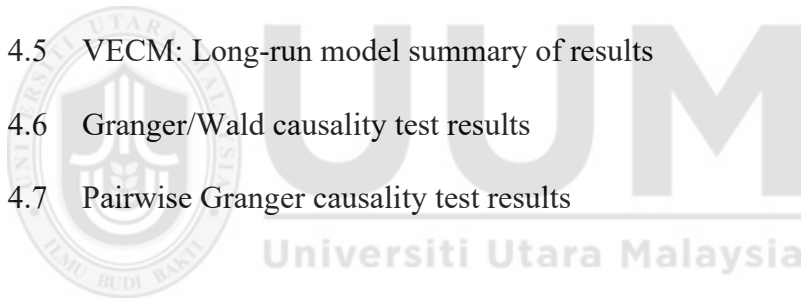
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## LIST OF ABBREVIATIONS

AIC	=	Akaike Information criterion
CPI	=	Consumer Price Index
$\varepsilon$	=	Error term of regression
ECT	=	Error Correction Term
Eq	=	Equation
$H_0$	=	Null hypothesis
$H_1$	=	First hypothesis
$H_2$	=	Second hypothesis
IPI	=	Industrial Production Index
IPO	=	Initial Public Offering
KLCI	=	Kuala Lumpur Composite Index
MYR	=	Malaysian Ringgit
OPR	=	Overnight Policy Rate
SC	=	Schwarz Criterion
US	=	United States
USD	=	United States Dollars
VECM	=	Vector Error Correction Model

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Introduction

Initial public offering (IPO) is an offering of units of ownership in a company to the public in exchange for capital from the public. It is a methodology where a privately held company offers units of ownership to the public. (Kęstutis Ivanauskas, 2015). The public would pay a sum of monies as specified by the underwriters who are underwriting the IPO to obtain units of ownership of a company. The units of ownership are commonly known as shares and stocks. The shareholder is then recognised as an owner of the company and is given voting rights. The shareholders voting rights enable a shareholder to actively participate in key decision making processes in a company. A company that undertakes a public offering obtains capital from the public in exchange of ownership to the company. The capital raised by this exercise is then used for purposes that have been specified in the Initial Public Offering prospectus.

A company would consider an IPO exercise when going through rapid expansion in its business (Youri Jacobi, 2014). Mello and Parsons (1998) mention that companies undertake IPO exercises to increase its' borrowing power due to their dispersed ownership. Raising capital through IPO exercise would be a more cost efficient manner of raising capital under certain circumstances. For example, in a high-interest rate environment, raising capital through equity financing could be a more efficient manner in raising capital. Studies by Alexander Danielsson (2014) shows four motivations for

companies to go public are (i) to reduce cost of capital, (ii) gain an opportunity to capitalise on ownership of the company, (iii) to perform M&A activities. (iv) as a strategic move.

An IPO exercise is a lengthy process in its preparation stage. Firstly, the company needs to decide if it wants to go public. This is followed by choosing the underwriter, then choosing the market, consolidating privately held historical financial statements, seeking capital market regulator's approval, marketing the IPO exercise, determination of price and finally listing of shares on the bourse (Alexander Danielsson et. al., 2014).

Once the shares are fully subscribed, it is then traded on the bourse selected by the company. The shares are then traded on the secondary market by the subscribers of IPO. This enables investors to make a quick profit as buyers would buy the shares anticipating bullish financial performance in the future and sellers would sell it to quickly realise a profit. Some shareholders would prefer to hold the shares as they believe that share price would increase many fold in the future. Decisions to hold or sell share are mainly influenced by investors' sentiments, long term fundamentals of the country's economy and also the fundamentals of the company. The company does not gain any cash proceeds when the shares are being traded on the secondary market. However, its market capital is based on the share price and the volume of shares traded on the secondary market. The secondary market is still useful for a company. If the company decides to issue more shares, via bonus issue, stock split, the new share would be credited into shareholders account which in turn would get traded on the market.

The IPO activities in a country reflect on the vibrancy of a country's capital market. A non-vibrant capital market would impose downside risk on the GDP & employment growth of the country (Weild et. al, 2009).

## 1.2 Background of Study

The Malaysian equity market is the largest in ASEAN region with 905 listed companies as of 2017. Malaysia's weightage in MSCI Asia Pacific index ex-Japan has the highest weightage among ASEAN countries signifying the resilience of the Malaysian capital market which is also regarded as a safe haven among ASEAN peers.

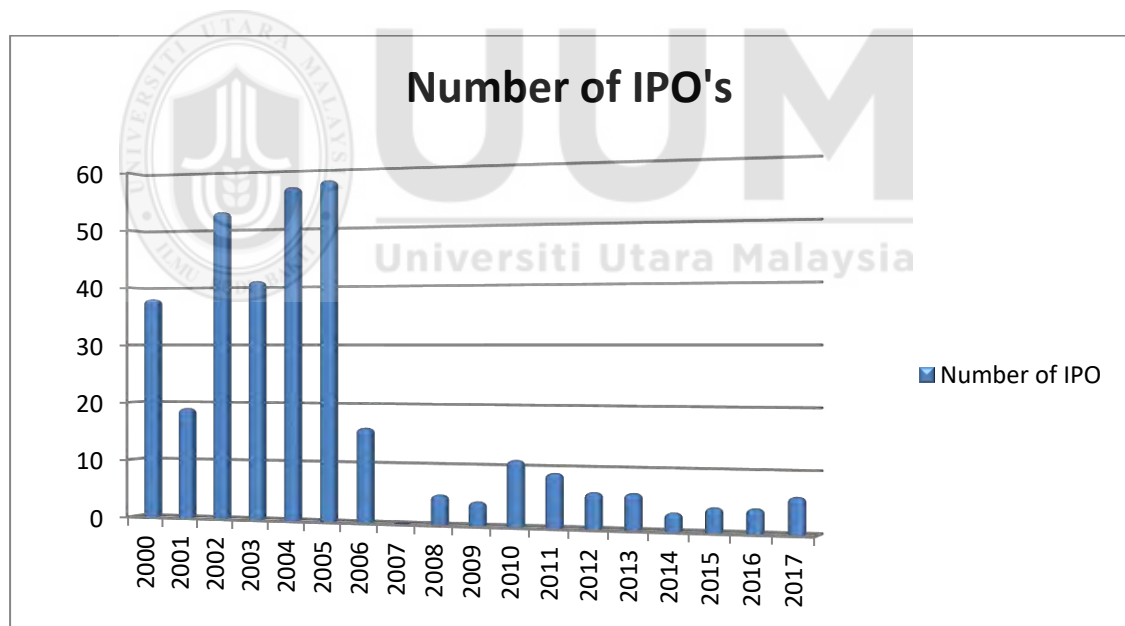


Figure 1.1  
*Annual number of IPOs in Malaysia from 2000 – 2017*  
Source : Bursa Malaysia Berhad

The chart above shows the trend in the number of companies being listed on the local bourse; Bursa Malaysia Berhad. The chart shows that there is a significant break in the trend line in the number of IPO's since 2007. The year 2007 and 2008 saw a financial



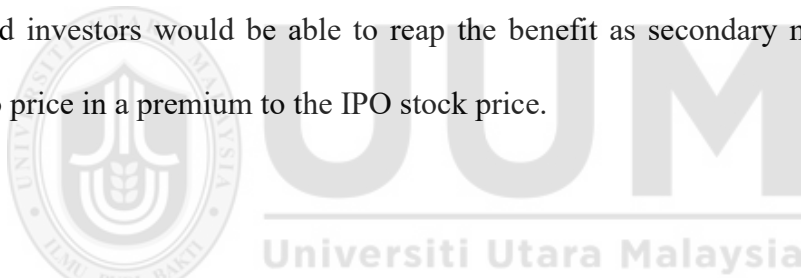
crisis which could have resulted in the companies staying away from raising capital from equity market due to uncertainties in the global outlook. From the year 2000 to 2006, the average number of IPO's was 40 which are significantly higher than the average from 2006 to 2017 which is 5.

The above trend also suggests that in the long term, IPO activities are impacted by domestic and global macroeconomic factors. Despite recovery from the financial crisis in 2008, the IPO activity has not recovered to its level during the 2000 to 2006. This may be due to other factors such as the existence of alternative capital raising avenues such as equity crowdfunding, peer to peer financing, initial coin offerings. Higher investment returns available in other developed economy markets could also be factor that contributed in the lessened IPO activity in the Malaysian capital market. The weaker domestic currency could also deter IPO activities as a weak currency may result in a declining dollar value of the capital raised.

There is extensive literature on the three anomalous behaviour of IPO which is the initial underpricing, clustering and long-term underperformance (Ritter, 1991; Schultz, 2003; Loughran & Ritter, 2004). However, IPO returns are also affected by certain macroeconomic factors as well. The interest rate set by the central bank is a macroeconomic factor that could influence the capital raising landscape in an economy. This is because interest rates would affect cash flows in an organisation and also higher interest rate would deter organisations from raising capital through debt financing as debts would be more costly in the event the central banks raise interest rates. Studies show that macroeconomic factors such as Gross Domestic Product, Inflation rate,

Unemployment rate have an effect on the stock market returns which includes the primary market as well. (Chen et al.1986).

This paper will study the effects and relationships of macroeconomic factors on the IPO returns from Bursa Malaysia. The macroeconomic factors would be interest rates, Malaysia Ringgit vs US Dollars exchange rate, Industrial Production Index, S&P 500 Index, and Consumer Price Index. Investors would generally take a top-down approach to determine the likely hood of making profits from an IPO by first examining the macroeconomic landscape of the country. If major macroeconomic parameters are showing healthy signals, then it is most likely that an IPO would experience a price rally and investors would be able to reap the benefit as secondary market investors begin to price in a premium to the IPO stock price.



This paper intends to investigate the long terms relationship between macroeconomic indicators mentioned with the number of IPOs. Another purpose of this paper is to study whether greater market returns in foreign markets have a significant relationship on the IPO activities in Malaysia. The significance of this study is to enable investors to gauge on the possible returns which would be obtained from participating in IPO by looking at selected macroeconomic data and also to determine whether better returns available at other markets have an impact on Malaysian IPO returns. This paper may also help economist and market regulators to gauge the long term vibrancy of the capital market by looking at selected macroeconomic indicators.

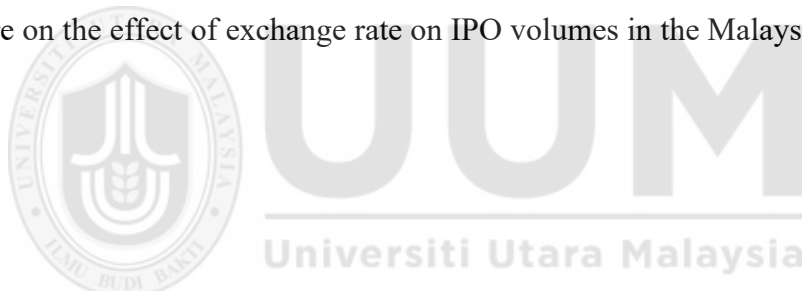
### 1.3 Problem Statement

This study is being conducted to determine how the changes in global macroeconomic indicators would affect IPO activities in the Malaysian capital market. Previous studies have been conducted on the same area of interest. Tran, A. & Jeon, B. (2011) in their studies have mentioned that there is a significant long-run equilibrium relationship between macroeconomic indicators such as interest rates, 10 year U.S. Treasury bond yield with the volume of IPO. Pritpal Singh & Dyal Bhatnagar (2014) study shows that Sensex stock market return has no impact on the IPO returns in India. Eliana Angelini and Matteo Foglia (2018) studies show that volatility and interest rates have a significant impact on the number of IPOs in the UK market.

Given that there have already been studies conducted on the impact of local macroeconomic indicators on capital markets; there is scarce literature that studies the relationship between foreign macroeconomic indicators and the local IPO volume. This is the research gap that this paper intends to address. Foreign macroeconomic indicators may have an impact on the foreign fund flows into the local equity market. Foreign fund flows in the equity market have an impact on the price and volume movements in stocks which indirectly influences the primary market activities such as IPO volume and IPO returns. Hence, this paper suggests that foreign economic indicators need to be included when studying the long term equilibrium relationship between macroeconomic indicators and IPO volume in Malaysia in order to obtain a holistic review.

The macroeconomic variables used as control variables in this study are interest rate, Industrial Production Index, inflation rate, S&P 500 index have been used in previous studies by Chen et al, (1996), Banu Durukan (2002), Ameer (2007), Tran, A. & Jeon, B. (2011).

The relationship between the exchange rate as an independent variable and IPO volume needs to be studied as a depreciating Ringgit against US Dollar may mean that capital raised may depreciate in US dollar terms. This may deter companies to raise capital via equity financing. Exchange rate has been used as independent variables in previous studies by Gunasekarage, Pisedtasalasai, and Power (2004). However, there is scarce literature on the effect of exchange rate on IPO volumes in the Malaysia equity capital market.



The S&P 500 index is a stock market exchange index in the U.S.A. A rallying S&P 500 index may attract investors attention away from emerging markets and into the markets of developed countries. This may cause a change inflow of foreign fund direction; into the developed markets such as the US stock market. This change in direction in fund flow may cause a major sell-off on local equity markets, causing the emerging countries' stock exchange indexes to head downwards. In such situations, companies would not go public, as there might not be any demand from the public for new shares.

## **1.4 Research Questions**

Referring to this study, the following are some of the research questions that are raised

1. Does MYR/USD exchange rate have any effect on the number of IPOs?
2. Does the S&P 500 Index have any effect on the number of IPOs?

## **1.5 Research Objectives**

This paper's objective to analyse the effect of explanatory variables (interest rate, IPI, S&P 500 Index, Palm Oil Spot Price, Consumer Price Index) on the number of IPOs.

1. To investigate the effect of USD/MYR exchange rate on the number IPOs
2. To investigate the effect of S&P 500 index on the number IPOs

## **1.6 Significance of Study**

This study is developed to study the effect of foreign macroeconomic indicators and commodity prices on the IPO volume in Malaysia. This study is important as it bridges the gap that in the current literature pertaining to studies on macroeconomic indicators and IPO volume. Studies have been done in investigating the effect of macroeconomic indicators on the IPO volume. However, there is lack of extensive studies in regarding the effect of macroeconomic indicators on IPO volume in the Malaysian capital market.

Besides, most of the studies have not investigated the effect of foreign macroeconomic indicators on IPO volume. This study covers the research gap by including foreign macroeconomic indicators such as S&P 500 index, and USD/MYR exchange rate as independent variables in this study.

The findings of this study will be useful for investors and regulators of capital markets, as they may be able to gauge the future IPO activities in the capital market. This study would also add value to the existing literature which does not have extensive studies on foreign macroeconomic indicators and commodity prices on IPO volumes.

## **1.7 Organisation of Study**

This study has five chapters. The first chapter presents the background of the study, problem statement & significance of the study. The second chapter presents the empirical review of previous studies and works. The third chapter presents the methodology of data calculation. The fourth chapter will discuss & interpret the findings of this study and the fifth chapter will consolidate the findings and also present suggestions for future studies.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter covers the previous literature pertaining to study of IPO activities. The chapter would be divided into 4 sections. The first section discusses the theories involved and relevant to the study of IPO activities. The second section discusses the dependent variable of this study. The third section reviews the previous studies on the control variables and the fourth section reviews the past studies on the explanatory variables used to study IPO activities in Malaysia.

#### 2.2 Theories Related to Literature

There are a number of theories that are related to the activity of IPO in Malaysia. In this study, the Capital Demand theory and Investor Sentiment theory is reviewed.

##### Capital Demand Hypothesis (Lowry, 2003)

In a study conducted by Lowry (2003), fluctuations in IPO volumes are caused by changes in a firm's aggregate demand. The changes in aggregate demand are influenced by the changes in economic conditions. Mikkelson et al. (1997) conducted a survey of prospectus and his findings show that 85% of firms undertake IPO to raise capital while the remaining is to undertake IPO for other purposes such as to raise

money for new investments, to repay debts or to undertake corporate exercises to provide liquidity to the existing shareholders

Economic conditions change over time and time. However, when economic conditions are favourable and good with high expectations on growth, a company's demand for capital tends to increase. A study conducted by Choe et al. shows that when economic conditions are better, there are more companies seeking IPO.

For example, an increase in domestic demand would translate into an economy wide increase in prices of goods and services which are beneficial to the economy as this may potentially reflect on the increased revenue. Hence, during such favourable economic conditions, companies may choose to seek the cheapest financing available to ramp up the production of goods and services. This may lead to a higher number of companies seeking IPOs.

#### Investment Sentiment Theory

In the study conducted by Rashid Ameer, 2011, as per the investors' sentiments theory, investors' sentiments have a significant relationship with regards to the IPO landscape. Companies would usually seek IPO when investors sentiments are very optimistic. Optimism among investors would also denote that the investors will be willing to take on more risk. Hence during this period where investor sentiments are good, companies seeking IPO may benefit from lofty valuations.

When the stock market index is trending downwards, investors' sentiments would be low. During these periods, investors may undervalue firms and hence valuations would



be low. Consequently, this may impact the number of companies seeking IPO during times when stock market index is low. Studies conducted by Loughran et al., 1994 Rees, 1997; Pagano, Panette, & Zingales, 1998 have shown that investors' sentiments have a significant relationship with the IPO landscape.

### **2.3 Number of IPOs**

The IPO activity in the Malaysian equity market is based on the number of IPO's in on Bursa Malaysia on all markets. The number of IPOs is one of the many indicators used to determine the level of activity in equity capital market. Other indicators include IPO returns (i.e. the first day returns in stock price movements), capital raised by IPO (i.e. total value raised by the IPO). However, based on previous studies most of the studies have used number of IPOs and IPO initial returns as the indicator to study the level of activity on equity capital market. The number of IPOs reflects a broader picture on the equity landscape as it gives a sight into how many firms are raising capital from the equity market. This is suitable for this study the variables used in this study which is macroeconomic variables. Macroeconomic variables are also broad-based variables that indicate the level of economic activity and not centred on company-specific information.

The numbers of IPOs are based on IPO activities of all boards on Bursa Malaysia from the year 2000 until 2017. The same has been used in the study done by Rashid Ameer,2011.

#### **2.4. Empirical studies on Industrial Production Index and number of IPOs**

Past studies on IPO activities have used GDP as one of the many macroeconomic variables in the study. For example, La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997) studies show that there is a strong correlation between GDP and IPO activities. GDP was a significant variable used in explaining the variation in IPO volume fluctuation in a study conducted by Michelle Lowry (2000). In the same study, GDP was used to investigate the hypothesis that capital demands explain IPO volume fluctuations. However, since GDP data is not available on a monthly basis, the Industrial Production Index is used as a proxy for GDP data in this data as used in the study done by Tran and Jeon (2011). As per the neoclassical economic theory, the increase in production index signals an increase in entrepreneurs seeking new capital via capital markets (Flannery & Protopapadakis, 2002). In a study conducted by Tran and Jeon (2011), Industrial production index has a significant relationship with number of IPO as per the Granger casualty test.. A study conducted by Rahsid Ameer (2012) showed that Industrial Production Index has a significant positive relationship with IPO. Angelini and Foglia (2018) study highlighted although stock market volatility had the strongest relationship with number of IPO, industrial production had a long run relationship with the number of IPOs as well.

#### **2.5 Empirical studies on Interest Rate and Number of IPOs**

Interest rates generally are the benchmark indicator for cost of debts. In a study conducted by Ameer (2012) for Malaysian IPO market, the study's findings show that

interest rate has a negative relationship with number of IPOs which explains the existence of “hot” and “cold” IPO regime which are affected by changes in interest rates. Brau et al. (2003) in their study argue that during periods of low-interest rate, companies would prefer using debt to finance takeovers which results in more takeovers and less IPO during low-interest rate periods. This reduces IPOs as acquiring companies may acquire listed entities and seek back door listing. Jovanovic and Rousseau (2004) find that interest rates share a non-monotonic relationship with number of IPOs. They argue that during the high level of interest, high discount rates would be applicable to future cash flows and revenue which subsequently results in interest rate in having a negative relationship with number of IPOs.

## **2.6 Empirical studies on Inflation and Number of IPOs**

Increasing inflation indicates that prices of goods and services are on the rise which is a benefit for business, as stagnating prices are not a favourable landscape for business. However, there is scarce literature available in studying the relationship between inflation and IPO activities. However, ample literature is available on how inflation explains activities in the secondary market. Studies conducted on the Istanbul stock exchange by Nil Günsel et al (2009) show that inflation has a significant relationship with the stock market returns however has very weak explanatory power in explaining the stock market activities. In a study conducted by Coleman and Tettey (2008) on the Ghana stock market, the inflation rate has a negative relationship with the stock market return as higher inflation could also mean higher input cost and reducing purchasing power among consumers which would have an adverse impact on the earnings of

companies. In a study conducted by Tran, A. & Jeon, B. (2011), inflation and long term interest rates have significant relationship in explaining amount of proceeds raised during IPOs. High inflations have an adverse effect on stock markets as demand for goods and services would be low due to high prices. This may reduce private expenditure and consumptions.

## **2.7 Empirical studies on Exchange Rate and Number of IPOs**

The exchange rate refers to the value of the domestic currency when compared to another foreign currency. When the demand for domestic or locally produced goods and services increases, then the demand for local currency would also increase. Simply put, the value of a currency would increase whenever, the demand for the currency increases. The depreciation of Ringgit Malaysia against other currencies would be beneficial to foreign investors as cost of buying shares of listed companies in Malaysia would be cheaper. Currencies with free-floating exchange rates have their values fluctuating where the currency will appreciate and depreciate. When the currencies appreciate, foreign investors would then sell shares of the local stock exchange to realise profit (Asmy, et al., 2009)

The appreciation and depreciation of the currency is determined by comparing the value of Ringgit Malaysia against other currency. In this study, the exchange rate between Ringgit Malaysia and US dollars would be used. This is due to the fact that as globally US dollars is used for trades of goods and services, hence foreign investors would also evaluate Ringgit Malaysia against US dollars. When the value of Ringgit Malaysia

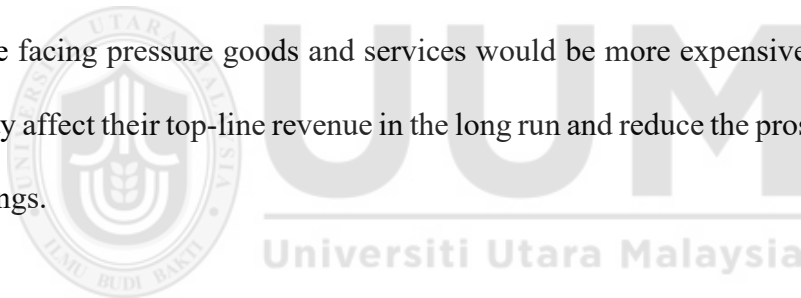
depreciates against US dollars, the exchange rate would be higher. Conversely, a lower exchange rate shows that the Ringgit Malaysia currency is strengthening against the US dollars.

Previous studies have shown that investors' sentiment has a significant impact on IPO activities and IPO activities will be low when investors' sentiments are on a low. Based on the study conducted by Y.-H. Wang et al. (2006), investors' sentiments can be explained by stock market returns and stock market volatility.

Morelli (2002) study shows that stock market volatility can be explained by exchange rate volatility. In the study conducted by Keamey (1998) where variables related to business cycles such as interest rates, exchange rates, inflation level and industrial production is able to explain stock market volatility in Ireland. A study conducted by Javed Iqbal (2012), shows that the exchange rate of Pakistani Rupee with US Dollars had significant impact on the volatility of the Karachi Stock Exchange.

A study conducted by Mao and Kao (1990) showed that appreciation of the home currency had adverse effects on the share price movements for an export-oriented economy and positive effects on import oriented economy. The data used in the study was on monthly basis for 10 years from 1973 to 1983 from 6 different countries. Ajayi and Mougoue (1996) studied the inter-temporal relationship between exchange rates and stock indices from 8 different advanced economies. The data used in this study consisted of exchange rate and stock indices from 8 advanced economies for a short

period. The study was conducted by using casualty test and cointegration test on the variables and concluded that the depreciation of currencies has negative effects on the stock market. In the study conducted by Ong and Izan (1999) to study the relationship between exchange rate and stock prices, they had found that the US share price returns had fully factored in the movements of the French Franc and Japanese Yen. The study had used the non-linear least square method. However, there exists a weak relationship between the US stock indices and the exchange rates. The study concludes that as the currency depreciates, stock market returns would rise. The rise in stock market returns naturally improves the investor's sentiments. As currency appreciates the stock market returns would reduce. A downtrend in stock market returns naturally would further dampen investors' sentiments. This could be due to the fact that export-oriented stocks could be facing pressure goods and services would be more expensive for its' clients. This may affect their top-line revenue in the long run and reduce the prospects of growth in earnings.



Bodart and Reding (2001) in their paper, investigated the relationship between the impact of foreign exchange rates on the stock returns of a set of European countries. The study employed the GARCH model with the sample data spanning over the period from January 1990 until November 1998. The study showed that companies involved in trading business are more sensitive towards exchange rates movements in terms of volatility compared to companies involved in non-trading business such as companies involved in technology sector, companies involved in mining, plantations and services sector. A study conducted by Fang and Miller (2002) showed that there is empirical evidence to show that there is bidirectional causality between the Korean currency and the Korean stock market returns. The depreciation of Korean currency had negative

effects on the Korean stock market and that the volatility of the exchange rate has positive effects on the stock market returns and also that the stock market returns responds to the exchange rate volatility. As their study shows that the stock market reacts negatively towards depreciation in the exchange rate, this confirms the investor sentiment theory whereby investors would sell off stocks when the currency depreciates which causes the prices of stocks to drop resulting in a drop in stock market returns.

Table 2.1

*Summary of literature reviewed pertaining to relationship of exchange rate and stock market performance.*

<b>Authors</b>	<b>Result</b>
Morelli (2002)	Study showed stock market volatility can be explained by volatilities in exchange rate
Kearney (1998)	Used exchange rate, inflation rate, IPI index to explain the Irish stock market volatility
Javed Iqbal and Mariam Javed (2012)	Studies the movements in Pakistani Rupee's exchange rate with US dollar to explain Karachi Stock Exchange's volatility. The models used in the study is EGARCH and GARCH model
Ma and Kao (1990)	Study conducted by Ma and Kao showed that domestic currency appreciation had adverse effects on the stock exchanges of 6 major industrialised countries (i.e United States of America, France, Canada, Italy , Japan and West Germanay). The data used in the study was monthly data of stock indexes from 1973 to 1983.
Ajayi and Mougoue (1996)	Used co- integration and causality tests, the study discovered that depreciation of currency had adverse effects on the stock market. The data used was stock indices and exchange rates from 8 advanced countries from April ,1985 to June, 1991.
Ong and Izzan (1999)	In the study conducted on US stock markets, it is concluded that the depreciation of the currency would have positive effects on the share price and vice

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	<p>versa. The model used in the study was a non-linear least square method to study the relationship between exchange rate and stock prices. The study also showed that there is a weak relationship between the US equity market and exchange rate.</p>
<hr/> <p>Bodart &amp; Reding (2001)</p>	<p>The study conducted by them indicated that companies from the trading sector are more sensitive to exchange rates as compared to companies that belong to non-trade sectors. The data used in this study were stock returns of companies from a set of European countries over a period of 8 years from January 1990 to November 1998. The model used in this study was the bivariate GARCH model.</p>
<hr/> <p>Fang and Miller (2002)</p>	<p>Fang and Miller investigated the effects of daily currency depreciation on Korean stock market returns from 1997 to 2000. By using the Granger causality test and unrestrictive bi-variate GARCH-M model over a period of 3 years, the findings of the study show that there is a (1)bidirectional causality between the Korean stock exchange and the Korean exchange rate. (2) Exchange rate volatility has an effect in the stock market returns</p>

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Universiti Utara Malaysia

## 2.8 Empirical studies on Stock Market Index and Number of IPOs

The stock index is one of the barometers used to measure the performance of the stock market. The index made up of a collection of the selected number of stocks listed on the exchange. The performances of these individual index stocks would be compiled to form the stock market index. A stock exchange may have various indexes to serve the



different needs of the investors. For an instance, in Bursa Malaysia stock exchange the FBMKLCI is the main index used to gauge the entire stock market's performance. However, in order to cater to the investment needs of investors who want to adhere to the Shariah principles, Bursa Malaysia has another index known as the FBM EMAS index which consists of stocks which are Syariah compliant only.

The stock market index serves many purposes besides gauging the stock market's performance. It is also used to gauge investor's sentiments (Ameer, 2012). When the stock index is on a rise, it reflects the optimistic sentiments of investors. The stock index rises as investors resort to buying a larger volume of stocks. This behaviour of investors reflects that investors are optimistic that the share price would rise further in the future. This is also in accordance with the investment sentiment theory which states that the stock market index is one of the tools available to reflect investor sentiments.

The stock market index has been used in many studies to study stock market performance with regards to the secondary market and the primary market as well. This paper will be reviewing the literature and different studies which have used the stock market index to study activities on the primary market. Loughran et al. (1994) studies indicate that there is a positive correlation between prices of stocks and the number of IPOs. This study was done across 15 countries with other variables (i.e. GDP growth rates). A similar study was conducted by Ljungqvist (1995) in Germany showed that there is a significant positive correlation between stock index levels and the number of IPOs whereby there were high number of IPOs when the stock index was high.

Rydqvist and Hogholm (1995) conducted a study on 11 European countries and also enterprises owned by families in Sweden. The findings of this study are similar to other previous studies whereby the number of firms going public is correlated to the stock price returns. However, the study was conducted in a smaller size which consisted of data from 1980 to 1989. In the UK, Rees (1997) studies the relationship between the stock prices and the number of IPOs. The findings show that there is a positive correlation between stock price level and number of IPOs. In a study conducted by Pagona et al. (1998), the IPO clustering phenomena has been used to explain the behaviour between the stock index and frequency of IPOs. The study showed that companies would prefer to go public when stock valuations are high. When stock market valuations are high, companies would take opportunities of this mispricing whereby companies would be overvalued to list new shares and/or go public.

The studies which were conducted before the year 2000 mostly were based on stock prices and stock price returns. Studies done after 2000 were based mostly on stock market indexes. Tran and Jeon (2011) studied the relationship between several macroeconomic variables and IPO activities in the US from 1970 and 2005. The findings of the study show that there is long-run relationship between the IPO activities in the US market and S&P 500 index. The findings were found based in using the Vector Error Correction Model (VECM) and Granger causality. Bakke et. al (2012) studied the relationship between the stock market index and the initial underpricing of IPO stocks. The study shows that there is a positive correlation between the stock market index and the initial underpricing of IPO stocks. The findings were based on data of 5000 US IPO companies. The study also showed that the underpricing is greater

when there is positive public information dominating the market sentiments as opposed to when there is negative news dominating the market sentiments.

In the Asian context, Ameer (2012) studied the relationship between macroeconomic variables in Malaysia on IPO activities in Malaysia. The study tested a hypothesis that the stock index has a significant positive relationship with the number of IPOs in Malaysia. The findings of the study showed that the stock index has a significant positive relationship with the number of IPOs. Based on Tobit regression model, every 1 unit change in the standard deviation of stock market index would result in change of number of IPOs by 39%. Brzeszczynski (2014) studied the relationship between the number of IPO and the stock market index returns in Poland from 1997 to 2008. The findings of the study reveal the significance of lagging the independent variable (i.e. stock market index) by 1 year. When the stock market index returns were delayed by 1 year the correlation coefficient improves from 0.0244 to 0.5683. The findings of the study concluded that the number of IPOs in the stock exchange have a relationship with the stock market index. A similar study was done in Poland in 2015 by Kovandova and Zinecker (2015). The study done by them was based on an extended time series and included more variables. The findings in this study reveal that the stock market index is not an important factor to explain IPO activities in Poland. This is in contradiction to most of the previous studies. However, the authors did not provide any explanation on why their findings contradicted with the majority of the results of previous studies.

All the studies reviewed in this paper showed that stock market indicator has an effect in the IPO activities. This is confirmed with the investment theory which states that IPO activities would increase during a period when investors' are very optimistic.

All the previous studies had used the stock index of their own country to study its effects on the IPO activities in its country. However, stock markets around the world are interconnected with each other through various means of communication. The stock exchanges of developing economies react to the stock market activities in developed countries especially when the stock markets react to negative news which would dampen investors' sentiments worldwide. In view of this, there is almost no study on the relationship of the foreign stock index of developed countries on the IPO activities in developing economies. This paper is intended to address this gap in the literature in studying the relationship between stock index returns of developed countries and IPO activities in emerging economic countries.

Table 2.2  
*Summary of literature reviewed pertaining to relationship of stock market index and stock market performance*

<b>Author</b>	<b>Description</b>
Loughran et al. (1994)	The study conducted by Loughran et al. showed that stock prices are positively correlated to the number of IPOs
Ljungqvist (1995)	In Germany, increased number of IPO activities correlated with high stock index and improved business conditions
Rydqvist and Hogholm (1995)	Study showed that there is no correlation between economic cycles in an economy and IPO activities. However, IPO activities are related to the stock price levels. This study was done using data from 11 European countries
Rees (1997)	In the study conducted in UK, based on OLS model, there is a positive correlation between stock price levels and IPO activities
Pagano (1998)	In a study conducted in Italy, IPO clustering phenomenon was explained and showed that companies tend to go public when the stock price levels are high to exploit the mispricing.

Tran and Jeon (2011)	The study used co-integration analysis to study the effect of macroeconomic variables on IPO activities in US from 1970 to 2005. Using the VECM and Granger causality, they highlighted that there a long run relationship between IPO activities and the S&P index performance.
Bakke, Leite & Thorburn (2012)	The study done by Bakke et al. involved 5000 US IPO companies. The findings of the study showed that there is strong correlation between the IPO returns and the returns of the stock market index. The correlation appears to be more significant when there is positive news rather than negative news.
Ameer (2012)	In the Malaysian IPO landscape, the study conducted by Ameer showed that there is a significant positive correlation between stock market index and IPOs in Malaysia. The study was done based on Tolbit regression model.
Brzeszczyński (2014)	In Poland, the study correlation between stock index and number of IPOs yielded better results when the data of the controlled variable was lagged by one year.
Ivanauskas (2015)	Another study was conducted on smaller sample size in the Baltic islands and the findings showed that there is a positive correlation between the market movements and the under pricing of IPO. This shows that the correlation exists even in a smaller size of sample data.
Kovandova & Zinecker (2015)	Another study conducted in Polish which expanded the time series and macroeconomic indicators showed contrary results. The study showed that stock index did not appear to be an important factor to explain IPO activities in Poland. These findings contradicts with the previous studies.

## 2.9 Conclusion on Literature Review

This chapter has reviewed the past studies relevant to the purpose of this research. It is noted that there some gaps which need to be addressed pertaining to the study of IPO activities specifically in the Malaysian IPO landscape as there has been no studies done to study the effect of stock market index of developed countries in Malaysia and how the USD/MYR exchange rate may impact investor's sentiments which in turn may impact IPO activities in Malaysia.

## CHAPTER THREE

### DATA AND EMPERICAL METHOD

#### 3.1 Introduction

This chapter discusses methods used in this study. This chapter discusses the data collection, description of the sample data collected, development of hypothesis and the research framework used in this study. The econometric models used in the study is also discussed. The aim is to establish if there is any relationship between the number of IPOs and the independent variables used in this study.

#### 3.2 Data

The data used in this study for all the variables are secondary data. The data sourced for IPOs consist of data spanning from 2000 to 2016. The data compiled consist of information on company, sector, IPO price, the closing price of the first day listing on the exchange, number of shares issued board of listing on Bursa Malaysia and listing date on Bursa. There are a total of 390 samples of data on all IPOs. The data has been sourced from Bursa Malaysia, Securities Commission Malaysia and Data Stream. However, the sample data exclude Exchange Traded Fund (ETF), stock derivatives such as warrants, structured warrants, and convertible loan stocks. Data used for the explanatory variables are also secondary data. The data is sourced from the Department of Statistics Malaysia and Bank Negara Malaysia. These data have been compiled to

match the corresponding IPO listings for each month from 2000 to 2016. The sample data includes the period during the global financial turmoil which happened in 2008.

Figure 3.1  
*The number of IPOs in year categorised by sectors*

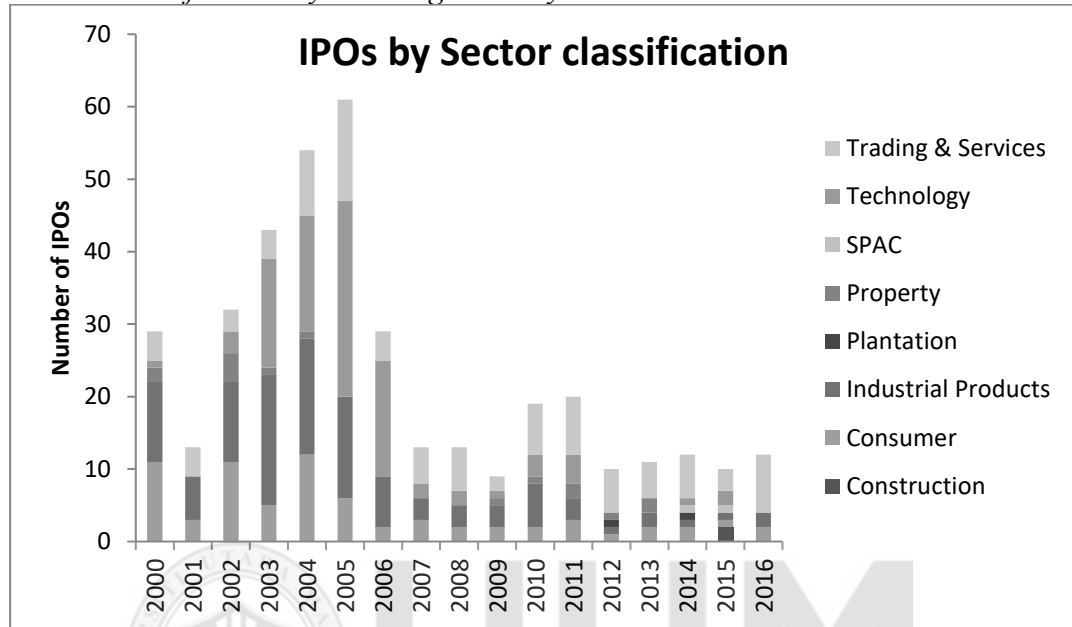
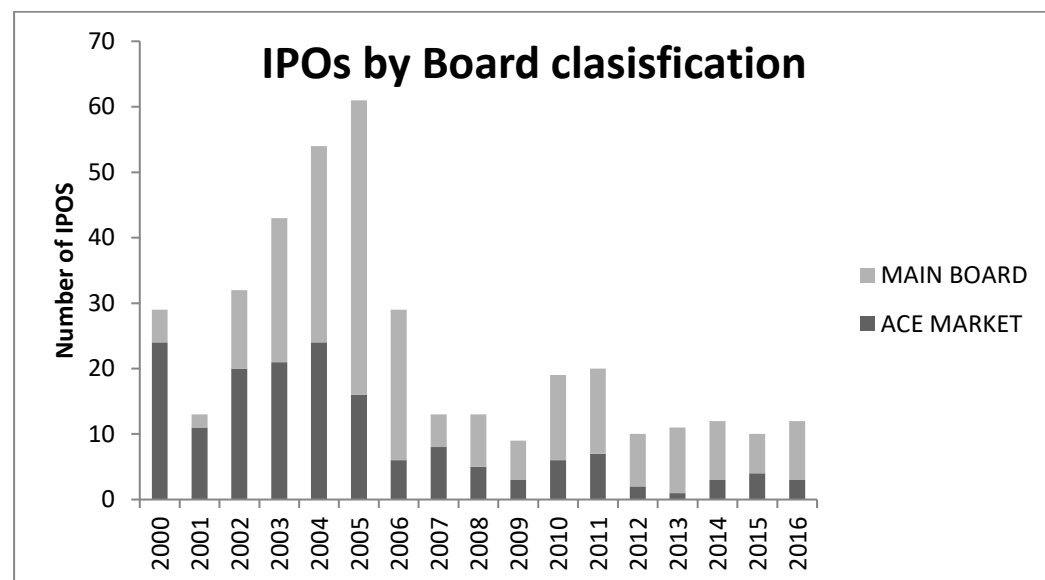


Figure 3.2  
*The number of IPOs in year categorised by sectors*



### 3.3 Sample Description

The sample data used in this study is from 2010 to 2016. The data consists of information related to the IPOs of companies on Bursa Malaysia from 2000 to 2016. The IPO data excluded listing of issuances such as stock warrants, structured warrants, Exchange Traded Funds (ETF) and Real Estate Investment Trusts (REITS) as they share different purposes and characteristics and the issuance of such securities are driven by different factors as compared to the IPOs of companies. For example, the listing of IGB REIT on 21 September 2012 is not included in the sample data. The IPO data consists of 390 IPOs from 2000 to 2016. The IPO data consist of issuance data, issuance size, first day returns, issuance price and board and sector classifications for each IPO. The IPO data is categorised into monthly data based on the issuance date. This is done to obtain a monthly time series on number of IPOs per month.

Table 3.1  
*Yearly IPO distributions data from 2000 to 2016*

<b>Year</b>	<b>Number of IPOs</b>
<b>2000</b>	29
<b>2001</b>	13
<b>2002</b>	32
<b>2003</b>	43
<b>2004</b>	54
<b>2005</b>	61
<b>2006</b>	29
<b>2007</b>	13
<b>2008</b>	13
<b>2009</b>	9
<b>2010</b>	19



<b>2011</b>	20
<b>2012</b>	10
<b>2013</b>	11
<b>2014</b>	12
<b>2015</b>	10
<b>2016</b>	12
<b>Total</b>	<b>390</b>

### **3.4 Dependent Variable Measurement – Number of IPOs**

The dependent variable used in this study is the number of IPOs per month from 2000 to 2016. This data is obtained by compiling the number of IPOs on a monthly basis, beginning from January 2000 to December 2016. The tabulation of number of IPOs are done in a monthly manner, consistent with the methodology used in the study done by Rashid (2012) and Angelini and Foglia (2018). The monthly tabulation of the data forms a time series on a monthly basis from 2000 to 2016.

### **3.5 Independent Variables**

This study focuses on 2 factors that affect the number of IPOs. The 2 independent variables used in this study are the USD/MYR exchange rate and the S&P500 exchange rate. This research will study and measure the effects of the independent variables on the number of IPOs in Malaysia.

### 3.5.1 Exchange rate (USD/MYR)

In this study, the USD/MYR exchange rate is used as an indicator to measure investors' sentiments and its effects on IPO activities in Malaysia. Previous studies done showed that exchange rates have significant effects on the secondary stock market. Studies have also shown that the exchange rates have an effect on the volatility of the secondary market. Hence this study argues that the exchange rate will affect the primary market activities as well. As such the change of exchange rate will be used as one of the independent variables.

% of change in USD/MYR exchange rate index =

$$\left[ \left( \frac{\text{USD/MYR exchange rate for current month}}{\text{USD/MYR exchange rate for the previous month}} \right) - 1 \right] \times 100\% \quad (\text{Eq.3.1})$$

### 3.5.2 Stock market index (S&P 500)

This study uses the S&P500 index as an indicator to measure investors' sentiments. Previous studies have used the domicile stock index as the proxy to investors' sentiment. However, stock markets are well interconnected and information flows quickly (Kovandova, 2015), hence there is a need to study the effect of the foreign stock market index on Malaysian IPO activities. Studies have also shown that returns of the stock market index in developing markets move in tandem with the stock market index in developed nations. Hence, this study proposes that higher returns on the S&P 500 index can be translated into a higher number of IPO activities in Malaysia. The S&P 500 index is similar to Bursa Malaysia's Kuala Lumpur Composite Index (KLCI) whereby it is a

market cap-weighted index. The monthly percentage change in the S&P 500 index will be used in this study.

% of change in S&P 500 index =

$$\left[ \left( \frac{\text{S\&P 500 index for current month}}{\text{S\&P 500 index for the previous month}} \right) - 1 \right] \times 100\%$$

(Eq.3.2)

### 3.6 Control Variables

In this study there are three control variables will be used. They are the Industrial Production Index (IPI), inflation and interest rate.

#### 3.6.1 Industrial Production Index (IPI)

In this study, the Industrial Production Index (IPI) will be used as a control variable. The IPI is a measure of production activity in the country and is used and has been widely used in previous studies as a proxy to measure economic activity. The index measures the production activity in several sectors such as mining, manufacturing, and electricity production. This data is released on a monthly basis in an index form by the Department of Statistics Malaysia. Studies conducted in the past by Flannery & Protopapadakis, (2002), Tran and Jeon (2011), Rashid Ameer (2012) and Agelini and Foglia (2018) have shown that there is a long-run relationship between IPI and number of IPOs. Hence in

this study, the percentage of change in IPI will be used as one of the control variables.

$$\left[ \left( \frac{IPI \text{ for current month}}{IPI \text{ for the previous month}} \right) - 1 \right] \times 100\%$$

(Eq.3.3)

### 3.6.2 Interest Rate

Interest rate is an indicator used to measure the cost of debts. Higher interest rates translate into higher interest payment. Previous studies have shown that interest rates have a negative relationship with IPO activities. In Malaysia, the interest rate is regulated by the central bank, Bank Negara Malaysia and the interest rate is set by them. The central bank's monetary policy committee meets 6 times a year and announces the decisions on to either increase, hold or reduce the interest rates. The interest rates that will be used in this study is the percentage of change in the Overnight Policy Rate (OPR).

$$\left[ \left( \frac{Current \ OPR}{Previous \ OPR} \right) - 1 \right] \times 100\%$$

(Eq.3.4)

### 3.6.3 Inflation

Inflation is an indicator used to measure the movements in the price of goods and services. The increase in inflation is beneficial for business as the increase in prices of goods and services are beneficial for business. Studies conducted

by Tran, A. & Jeon, B. (2011) show that inflation has a significant relationship in explaining the proceeds of an IPO and also argues that high inflation have an adverse effect on stock markets as demand for goods and services may reduce due to high prices. The Consumer Price Index (CPI) will be used as an indicator for inflation. The data is released by the Department of Statistics Malaysia on a monthly basis. For this study the change in CPI will be used for the model.

$$\left[ \left( \frac{\text{Current CPI}}{\text{Previous CPI}} \right) - 1 \right] \times 100\%$$

(Eq.3.5)

### 3.7 Hypothesis Development

Based on the research questions and research objectives mentioned in Chapter 1, 2 hypotheses have been developed for this study. The two hypotheses are supported by relevant literature from prior studies conducted which studied the relationships between number of IPOs and the explanatory variables used in this study.

#### 3.7.1. Stock market index (S&P 500)

The relationship between the stock index and number of IPOs have been covered in previous studies done by Kovandova et al. (2015), Ivansauskas (2015), Brzezczynski (2014), Rashid Ameer (2012) and Bakke et al. (2012). Previous studies have shown that the stock index returns have an effect in the

IPO activities. In the study conducted by Rashid (2012), the stock market index has a significant positive correlation with the IPO activities in Malaysia. This conforms with the investor sentiment's theory. An increasing stock market index indicates investors' optimistic outlook in the stock market. This reflects the optimistic sentiments among investors which is a favourable period for companies to list their shares. Hence, a rising stock market index would result in higher number of IPOs. This finding is consistent with the works of Brzeszczyński (2014), Rashid (2012), Bakke et al. (2012) and Tran and Jeon (2011). Hence this study develops the hypothesis that :

$H_1$  = There is a significant relationship between the returns of the S&P 500 index and number of IPOs

### 3.7.2. Exchange Rate

The relationship between exchange rate and stock market volatility has been examined in the study conducted by Fang and Miller (2002), Bodart and Reding (2001) and Ong and Izzan (1999). These studies show that the appreciation and depreciation of the exchange rate has a significant relationship with stock market volatility. The study conducted by Y.-H. Wang et al. (2006) show that investor's sentiment can be measured by stock market volatility and stock market returns. A volatile stock market may dampen investors sentiments which may result in companies avoiding listing in a volatile environment. Hence in this study, we argue that USD/MYR exchange rate has a significant relationship with the number of IPOs

$H_2$  = There is a significant relationship between the returns of the USD/MYR exchange rate and number of IPOs

### 3.8 Research Framework

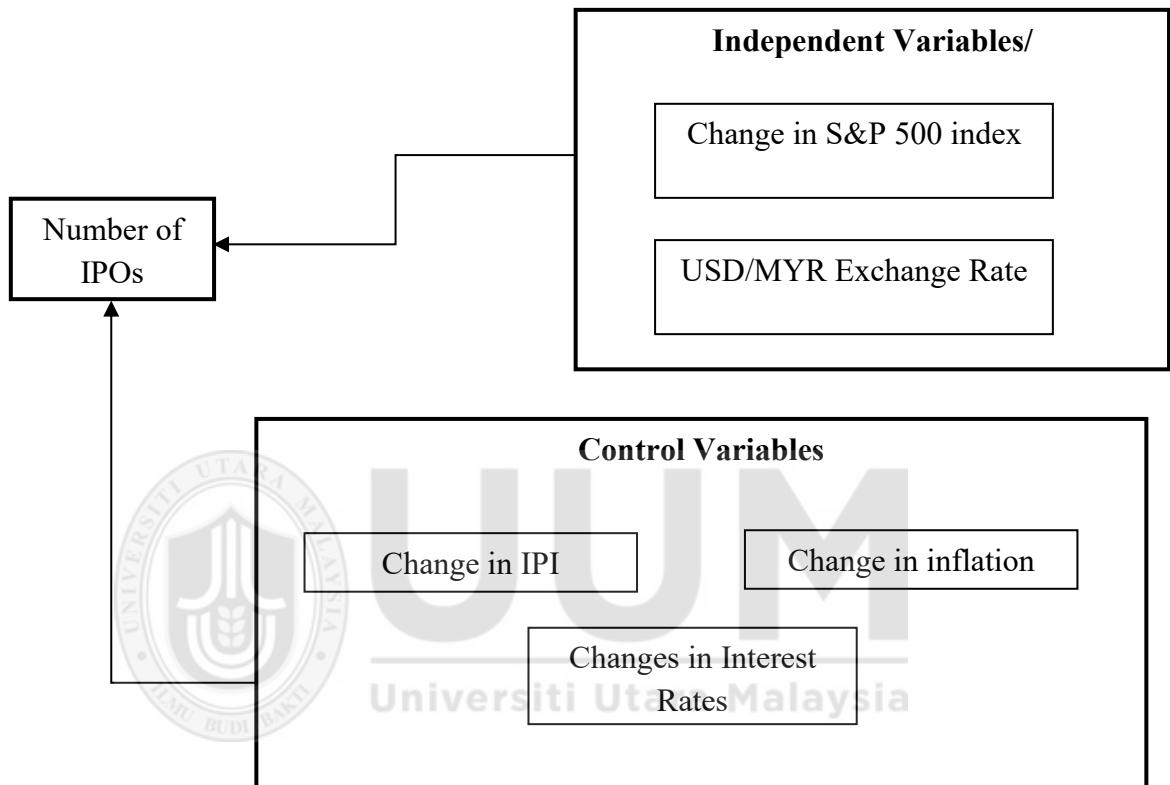


Figure 3.3  
*Relationship between the Dependent Variables and Independent Variables*

### 3.9 Model Specification Framework

In this study a co-integration regression model is used to determine the relationship between each independent variable and the dependent variable i.e. the number of IPOs. The model will also be used to test the hypothesis mentioned in earlier sections of this study. The coefficient of each variable is also determined by using this model. The

coefficient of each independent variable represents the significance of the relationship between each variable and the number of IPOs.

$$num(IPO) = \beta_0 + \beta_1 IPI + \beta_2 CPI + \beta_3 Int + \beta_4 Index + \beta_5 ExRate + \varepsilon$$

(Eq. 3.6)

Where

$\beta_0$	=	The intercept of the regression line
$\beta$	=	The regression coefficients of respective variables,
IPI	=	Change in IPI
CPI	=	Change in Consumer Price Index
Int	=	Change in interest rates
Index	=	Change in S&P 500 index
ExRate	=	Change in USD/MYR exchange rate
$\varepsilon$	=	Error term of regression

### 3.10 Technique of Data Analysis

This section describes the techniques that were used when the analysis of the data was conducted. In this study, the cointegration analysis was used to analyse the data. The data has been subject to various statistical tests to ensure that the data adheres to the pre-conditions set before performing the cointegration analysis.

#### Stationarity Test



The economic and financial data for each independent variable used is tested for the presence of unit root and to determine is the data is non-stationary at unit levels. The test used is the Augmented Dickey-Fuller (ADF) unit root test. The null hypothesis for this test indicates that there is presence of unit roots in the data series for the variable tested. The null hypothesis is rejected if the data is of stationary in nature and there is no presence of unit roots.

The test is done to ensure that data is of non-stationary in nature as co-integration analysis is done on data which is non-stationary. Ordinary least square regression is not a suitable method to regress non-stationary data as it may result in spurious regression with very low Durbin Watson score.

#### Cointegration test

The co-integration test is used to determine if there are long-run relationships between the variables used in this study. The Johansen test is used to test the hypothesis involved in performing the hypothesis tests. The null hypothesis for this test indicates that there is no co-integration among number of IPOs a month with the independent variables used in this study. The Johansen tests the existence of co-integration between number of IPOs and the independent variables based on the 2 tests which are the (1) trace statistics and the (2) maximum eigenvalue statistics.

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^n \ln(1 - \lambda_i) \quad (1)$$

$$\lambda_{max}(r, r + 1) = -T \ln(1 - \lambda_{r+1}) \quad (2)$$

The null hypothesis is rejected if the trace statistics and max eigenvalue is higher than the critical value of 5%

## CHAPTER FOUR

### DATA AND EMPERICAL FINDINGS

#### 4.1 Introduction

This chapter discusses the findings and the analysis for the data involved in the study. This chapter into 5 parts namely the application of the Augmented Dickey-Fuller (ADF) test to ensure that the data is free from the presence of unit roots which may result in spurious regression. The second part will cover the lag length selection criteria using a combination of several criteria. The third section covers the Johansen cointegration test. Section 4 covers the analysis using Vector Error Correction Model (VECM) and the last section covers the analysis on the causality between variables used in this study. The objective of the analysis to study the hypothesis mentioned in the earlier chapters. The chapter ends with a summary of the various analysis done.

#### 4.2 Unit root test

The presence of unit roots in the data results in spurious regression and inaccurate estimates. Hence, in this study, the data was subjected to the Augmented Dickey-Fuller (ADF) test, which tests for the presence of unit root in the data of the variables. This is vital as regression can only be performed on stationary variables. The null hypothesis of ADF test is that the data has presence of unit root. The results of the ADF tests (see table 4.1) show that the null hypothesis is rejected at 5% significance level. Hence all

the variables are stationary at first level difference i.e. I(1) and there is no presence of unit root. This enables further analysis to be performed by using regression.

Table 4.1  
*ADF test results*

Variables	t-statistics	Probability
Number of IPOs	-11.14	0.00
Industrial Production Index (IPI)	-16.96	0.00
Consumer Price Index (CPI)	-13.48	0.00
Exchange Rate	-9.43	0.00
Interest Rate	-7.09	0.00
S&P 500 Index	-13.55	0.00

### 4.3 Lag length selection

The optimum lag length selection is vital in ensuring that the data yields accurate estimates and to prevent loss of degree of freedoms. Hence, in accordance to previous studies, statistical tools have been used to select the optimal lag length. Akaike Information criterion (AIC), Schwarz Criterion (SC) were used to determine the optimal length. Between AIC and SC, the lag with the lowest value was selected as the optimum number of lags. The AIC yielded the lowest value (see Table 4.2) and hence the corresponding lag length of 2 was used.

Table 4.2  
*Optimal lag length selection*

Lag	AIC	SC
0	35.12	35.22
1	20.21	20.91
2	20.17*	21.48
3	20.34	22.24

#### 4.4 Cointegration test

The cointegration test was conducted to study the presence the long-run relationships between the dependent and independent variables. The Johansen and Juselius (1990) test was performed on the data to study the presence of long-run relationships between the number of IPOs per month and the macroeconomic variables. The Johansen test was done based on the 2 lags as recommended by the earlier lag length criteria. The Trace statistics and Max-Eigen value tests were done to study if there is a long run relationship among the variable. The null hypothesis of the test is that there is no cointegrating equations (CE). The test results (see Table 4.3) show that the null hypothesis is rejected at 5% significance level.

Table 4.3  
*Trace statistics and Max-Eigen value statistics*

Hypothesised number of CE equations	Trace statistics	Probability	Max-Eigen statistics	Probability
0	35.12	0.00*	35.22	0.03*
At most 1	20.21	0.10	20.91	0.45
At most 2	20.17	0.17	21.48	0.27
At most 3	20.34	0.38	22.24	0.30

*\* denotes rejection of null hypothesis at 5% significance level*

The null hypothesis that there is no cointegrating regression equation between the dependent and independent variable is rejected at 5% significance level. The Trace and Max-Eigen statistics indicate that there is one cointegrating equation between number of IPOs and macroeconomic variables. This confirms that there is a long run equilibrium relationship between the dependent variable and independent variables as in the long run there is a stationary relationship among the variables.

#### **4.5 Vector Error Correction Model (VECM)**

The Johansen cointegration test indicates that there is a long-run equilibrium among the variables. Hence, further analysis was performed to study the short run relationships among the variables and to also study the speed of adjustment whenever the data moves away from the long-run equilibrium path.

Table 4.4  
*VECM: Short-run model summary of results*

Variables	Coefficients
$ECT_{t-1}$	-0.63
$Num\_of\_IPOs_{t-1}$	-0.17
$CPI_{t-1}$	0.17
$Exchange\_Rate_{t-1}$	-0.63
$Interest\_Rate_{t-1}$	0.25
$IPI_{t-1}$	0.008
$S\&P500\_Index_{t-1}$	0.002

Table 4.5  
*VECM: Long run model summary of results*

Variables	Coefficients
$Num\_of\_IPOs_{t-1}$	-0.17
$CPI_{t-1}$	0.12
$Exchange\_Rate_{t-1}$	-1.52
$Interest\_Rate_{t-1}$	0.28
$IPI_{t-1}$	-0.008
$S\&P500\_Index_{t-1}$	0.0007

Table 4.4 and shows that the Error Correction Term (ECT) value is negative in value. This indicates that the model is converging in long term. The ECT value explains that previous period's deviation from the long run equilibrium is corrected at an adjustment speed of 63%. The short run model also indicates that a percentage change in CPI is associated with 0.17% increase in number of IPOs. Similarly, a one percentage change in IPI is associated with a 0.008% increase in number of IPOs. One per cent change in

interest rate is also associated with a 0.25% increase in number of IPOs. Furthermore, one percentage change in exchange rate may cause the number of IPOs to reduce by 0.64% and lastly a percentage change in S&P 500 index may cause the number of IPOs to increase by 0.0017%. The  $R^2$  of the model is 0.42. This indicates that 42% of variation in the number of IPOs can be explained by the macroeconomic variables used in this study. The model's F-statistics is 19.79 which indicates that the variables used in this model is significant to explain the changes in number of IPOs.

In the short run model, the exchange rate displays a negative relationship with the number of IPOs. This indicates that volatility in exchange rate results has a negative impact on the number of IPOs.

The interest rate displayed a positive relationship with the number of IPOs in the short run model. This is tandem in with the findings of Brau et al. (2003), whereby higher interest may encourage more take-overs rather than listing an entity on the stock exchange.

The S&P 500 index displayed a positive relationship with number of IPOs in the short run ceteris paribus. This indicates that higher stock indexes in the US market contributes to higher number of IPOs. This finding is in tandem with the works of Brzeszczyński (2014), Rashid (2012), Bakke et al. (2012) and Tran and Jeon (2011). However, based on the co-efficient assigned by the model, the S&P 500 index can only explain 0.17% of the variance in the number of IPOs which is relatively lower as

compared to other variables used in the model. This finding differs with the previous study which had greater significance. This is possibly due to the fact that previous studies used local stock indexes, while this study uses foreign stock index.

The short-run and the long-run model displayed the correction mechanisms and the significance of the variables used in explaining changes in the dependent variable (i.e. number of IPOs). Hence, further analysis was done to study the causation of the independent variables and dependent variables.

#### **4.6 Causality**

A 3 way causality test was done to determine the causality and the direction of causality of the independent variables with respect to the dependent variables. The 3 way tests are t-statistics test of each variable in the short-run model, the Granger/Wald causality test and Pairwise Granger Causality test.

The t-statistics of independent variables in the short term indicate the significance of the variables in the short term. None of the variables were significant in the short-run model. However, the ECT term and the 1 period lagged dependent variable was significant at 5% significance level. Overall the short-run model is significant at 5% significance level as indicated by the model's F-statistics.



Table 4.6  
Granger/Wald causality test results

Variables	Probability
CPI <sub>t-1</sub>	0.15
Exchange_Rate <sub>t-1</sub>	0.79
Interest_Rate <sub>t-1</sub>	0.86
IPI <sub>t-1</sub>	0.53
S&P500_Index <sub>t-1</sub>	0.49

The Granger/Wald causality test is done to study the causality in the short term. The null hypothesis for each variable is that the variable does not Granger/Wald cause number of IPOs. The results of the test (see Table 4.6) show that the null hypothesis is failed to be rejected at 5% significance level and hence in the short-run none of the variables Granger/Wald cause number of IPOs.

Table 4.7  
Pairwise Granger causality test results

	Obs	F-Statistic	Prob.
CPI does not Granger Cause NUMBER_OF_IPOS	203	7.85702	0.0056
NUMBER_OF_IPOS does not Granger Cause CPI		6.95752	0.0090
EXCHANGERATE does not Granger Cause NUMBER_OF_IPOS	203	5.92322	0.0158
NUMBER_OF_IPOS does not Granger Cause EXCHANGERATE		0.53799	0.4641
INTEREST_RATE does not Granger Cause NUMBER_OF_IPOS	203	4.39623	0.0373
NUMBER_OF_IPOS does not Granger Cause INTEREST_RATE		0.81312	0.3683
IPI does not Granger Cause NUMBER_OF_IPOS	203	23.2854	3.E-06
NUMBER_OF_IPOS does not Granger Cause IPI		2.95396	0.0872

S_P_500_INDEX does not Granger Cause NUMBER_OF_IPOS	203	6.01708	0.0150
NUMBER_OF_IPOS does not Granger Cause S_P_500_INDEX		2.85924	0.0924

The Pairwise Granger causality test is done to study the long term causality of independent variables on the number of IPOs. This study is also provides the direction of causality. The null hypothesis of the test states that the variable does not Granger cause number of IPOs in the long run. The results of the test (see Table 4.7) show that, the null hypothesis is rejected at 5% significance level and thus all variables Granger cause number of IPOs in the long term. Exchange rate, interest rate and the S&P 500 index displays unidirectional causality with number of IPOs, while CPI and IPI displays bidirectional relationship with the number of IPOs. At 10% significance level, S&P 500 index has bidirectional causality with number of IPOs, where S&P 500 index Granger causes number of IPOs and vice versa.

Based on the analysis conducted, the objective of the study is achieved whereby the relationships and significance of exchange rate and S&P 500 index on the number of IPOs has been obtained. There exist a long run relationship between S&P 500 index and exchange rate and number of IPOs. In short run the variables do not Granger cause number of IPOs. However, in the long run, both variables have unidirectional causation and Granger causes number of IPOs.

The controlled variables displayed similar observations, whereby there exist a relationship in the long term only. These findings are in tandem with previous studies.


## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This is the final chapter which will summarise the empirical findings. It will also explain on the limitations faced in this study and future recommendations with respect to this subject.

#### 5.2 Summary of results



The purpose of this study is to explore the relationship between macroeconomic variables and IPO activities in Malaysia (i.e. measured by number of IPOs per month). The study macroeconomic variables such as Consumer Price Index, Industrial Production Index, interest rate, exchange rate, and stock market returns. The control variables are Consumer Price Index, Industrial Production Index, interest rate while the independent variables are exchange rate and stock market returns. This study investigates the effect of exchange rate, stock market returns of foreign developed markets on number of IPOs. For this study, the S&P 500 index has been used to measure stock market returns of a foreign developed economy.

Data used in this study has 201 observations consisting of monthly data of all the variables from year 2000 until 2016. Cointegration regression and VECM was used to study the data. The findings of the analysis show that the regression model is a significant model and converges in the long-run. It also indicates that there is a long-run Granger causal relationship between number of IPOs and the macroeconomic variable. The control variables also displayed long-run causal relationship with number of IPOs. This finding is consistent with the findings of many of previous studies.

The exchange rate displayed a significant long run unidirectional causal relationship with the number of IPOs thus supporting the H<sub>1</sub> which states that the exchange rate has significant relationship with the number of IPOs. The exchange rate has a negative relationship with the number of IPOs. This indicates that volatility in exchange rate have negative effects the number of IPOs. This finding is consistent with the findings of Ma and Kao (1990) and Ajayi and Mougoue (1996). This is probably because volatility in exchange rate negatively impacts investor sentiments which in turn also negatively affects the IPO activities.

The S&P 500 index displayed positive long-run causal relationship with the number of IPOs. This finding is consistent with previous studies by Tran & Jeon (2011), Bakke, Leite & Thorburn (2012) and Ameer (2012). This is because stock market returns directly impacts investors' sentiments. This study adds value to the previous studies as the findings show that foreign market stock returns have significant long-run relationship with IPO activities in Malaysia.

### **5.3 Limitations of this study**

One of the objectives of this study was done to study the relationship between foreign developed stock market indices with IPO activities. However, there was scarce literature in this area. Previous studies were mainly on the effects of local stock market returns on the IPO activities. However, stock markets in emerging economies are not immune to the stock market returns of foreign developed economies. Hence the need to explore the empirical evidence to ascertain if a relationship exist. The scarcity of literature results in absence of direct findings to compare with.

### **5.4 Future recommendations**

Capital markets have grown and now there are many other means of raising capital apart from raising capital via IPO. The emergence of equity crowdfunding, peer to peer financing, initial coin offering (ICO) are some of other means of raising capital. Hence, further research is needed to study if IPO activities are affected by the emergence of channels to raise capital in the Malaysian capital market.

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