THE IMPACTS OF CLIMATE CHANGE ON THE DIVIDEND PAYOUT POLICY: STUDY ON MALAYSIAN PUBLIC LISTED PLANTATION FIRMS

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Abstract

The purpose of this study is to investigate the influences of climate change and firm characteristics on Malaysian plantation companies' dividend payout policy. The sample of this paper took 33 agro firms listed in Bursa Malaysia with 462 firm-year observations over the period of 2003 to 2016. Using Robust Fixed Effects Model, the result of this paper indicates that El Nino positively and significantly influences dividend payout ratio, whereby flood is found to be insignificant positively in impacting Malaysian plantation companies' dividend payout. Besides, firm size, liquidity and financial leverage of agro firms have positive linkage with dividend payout as well. However, profitability and growth opportunity are inversely related to dividend payout ratio. This research contributes to the literature based on the context of Malaysian plantation firms and delivers empirical evidence on the influences of climate change on financial adaptation of plantation firms, namely dividend payout. The findings of the study will be highly beneficial for capital market investors of agro-based companies through understanding about the adjustment of the climate change information in the stock market. The management of plantation companies will get an idea about the dividend need to pay related to the climatic events.

Keywords: El Nino, Flood, Dividend Payout, Plantation Firms, Malaysia

Abstrak

Tujuan kajian ini adalah untuk mengkaji pengaruh perubahan iklim dan ciri-ciri firma pada dasar pembayaran dividen syarikat perladangan Malaysia. Sampel kertas ini mengambil 33 firma agro yang disenaraikan di Bursa Malaysia dengan 462 firman tahun pemerhatian sepanjang tempoh 2003 hingga 2016. Dengan menggunakan Model Kesan Tetap Berkesan, hasil kertas ini menunjukkan bahawa El Nino secara positif dan signifikan mempengaruhi nisbah pembayaran dividen, di mana banjir didapati tidak penting secara positif dalam memberi kesan kepada pembayaran dividen syarikat perladangan Malaysia. Di samping itu, saiz firma, kecairan dan leverage kewangan firma agro mempunyai hubungan positif dengan pembayaran dividen. Walau bagaimanapun, keuntungan dan peluang pertumbuhan adalah terbalik secara songsang dengan nisbah pembayaran dividen. Penyelidikan ini menyumbang kepada kesusasteraan berdasarkan konteks firma perladangan Malaysia dan menyampaikan bukti empirik mengenai pengaruh perubahan iklim terhadap penyesuaian kewangan firma perladangan, iaitu pembayaran dividen. Penemuan kajian ini sangat bermanfaat bagi pelabur pasaran modal syarikat berasaskan pertanian melalui pemahaman mengenai penyesuaian maklumat perubahan iklim di pasaran saham. Pengurusan syarikat perladangan akan mendapat gambaran mengenai keperluan dividen yang harus dibayar berkaitan dengan peristiwa iklim.

Kata kunci: El Nino, Banjir, Pembayaran Dividen, Firma Perladangan, Malaysia

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List of Abbreviations

ASE	Athens Stock Exchange
BM&FBOVESPA	Brazilian Mercantile and Futures Exchange & São Paulo Stock Exchange
CDSB	Climate Disclosure Standards Board
ENSO	El Niño Southern Oscillation
GCC	Gulf Co-operation Council
GDP	Gross domestic product
KSE	Karachi Stock Exchange
LM	Lagrangian Multiplier
MENA	Middle East and North Africa
NSE	Nairobi Securities Exchange
OLS	Ordinary Least Squares
PSX	Pakistan Stock Exchange
SSE	Saudi Stock Exchange
UNFCCC	United Nations Framework Convention on Climate Change
USA	United Stated of America

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter describes the area of the research along with Malaysian Agriculture Sector, problem statement, and then research questions will be stated as below, follow by discussing the significance and scope of the study.

1.2 Background of the Study

According to the United Nations Framework Convention on Climate Change (UNFCCC), climate finance is defined as the fund used to decrease emissions, improve sinks of ozone depleting substances and diminish vulnerability of, as well as upsurge the flexibility of mortal and ecological systems to harmful drawback of climate change (UNFCCC, 2014). Climate finance is the broadest form that represents the fund that being used to all projects and activities that support climate mitigation and climate adaptation. However, the main focused area here is adaptation finance. Adaptation finance is the fund that supports to implement the adaptation actions towards the negative impacts of the changes of climate. There are various types of adaptation finance tools can be used to decrease the risk and loss in profitability due to the adverse impacts by bad climate, for instance, equity market risk premium, crop sharing, insurance, future options, income stabilization programs by the government (Alam, Siwar & Al-Amin, 2010).

In case of public limited agro or plantation company, they need to spend money in three stages for the climate change adaptation. At the first stage, they need to spend

money for core infrastructural and physical adaptation such as changing production techniques and approaches, upgrading the stakeholders' knowledge (such as producers, labours, storage and packaging), infrastructural changes as well as innovation. Secondly, they need to bear the cost of maintaining financial performance or profitability such as change or adjustment in the accounting system, maintain extra reserve fund, more insurance payment, high cost of borrowing and diversify asset portfolio. Finally, as the ultimate objective of manager in an organization is to maximize shareholder wealth by maintain stock price stability in market, these companies must ensure extra risk premium or pay extra cost of equity by paying more dividend (Alam et al., 2010).

As measuring the first two types of cost related to the adaptation are very vast work, this paper only studies for the third option to measure the adaptation finance related to the equity market risk premium and/or extra cost of equity only. The equity market risk premium is the average return that stockholders require in order to accept the higher fluctuation of the stock price that affects their returns (Harper, 2017). The changes of the climate in global has become the risk for investor to invest in relevant companies and therefore the equity market risk premium is required for the compensation related to the higher risk and huge volatility of the equity (Murray, 2015; Bhadada, 2015). Moreover, due to the climate changes, the plantation companies are get into more risky business and the probability in failing the business is increasing in the long term and hence the stock prices are lower where higher equity market risk premium is required or higher dividend is required. This extra risk premium and/or extra cost of equity are the cost of adaptation. By spending this cost, plantation companies can maintain stock market performance. To finance this extra

risk premium and/or extra dividend, companies need to follow different approaches, which are mostly related the initial two stages of adaptation cost like diversifying asset portfolio, spending from special reserve fund, distributing more dividend and investing less.

1.2.1 Malaysian Agriculture Sector

Malaysia's geographical area and tropical climate provide Malaysia a wide range of agriculture resources like palm oil, rubber, paddy, kenaf, cocoa and others raw materials to export. Agriculture sector stands a significant role in Malaysia economy and palm oil is the main product that contributed the most to the GDP growth rate as Malaysia generates more revenues from exporting of palm oil to other countries. In 2015, the ranking of Malaysia as a palm oil producer in the world is second largest behind Indonesia which the amount of palm oil was produced was 19.9 million tonnes whereas Indonesia able produced more 13.5 tonnes palm oil than Malaysia to the world, which was 33.4 million tonnes and stands as the largest global palm oil producer (Green Palm, 2016).

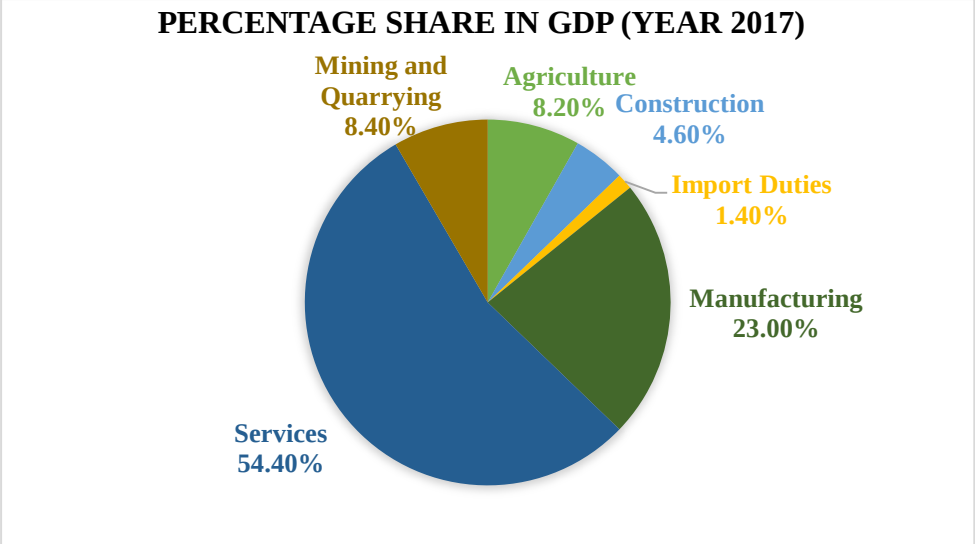

Figure 1.1
Percentage Share in GDP (Year 2017)
Source: Bank Negara Malaysia and Department of Statistics Malaysia

Figure 1.1 illustrations the measurement of share of different sectors to Malaysia's GDP in percentage such as agriculture, construction, import duties, manufacturing, services as well as mining and quarrying in 2017. The total GDP of Malaysia in 2017 is RM 1,173.6 billion and services sector is the major sector that contributes 54.4 percent of the total GDP. Second large sector is manufacturing which contributes 23 percent. Agriculture sector contributes 8.2 percent to the GDP in 2017 which is also a significant part to the national economy.

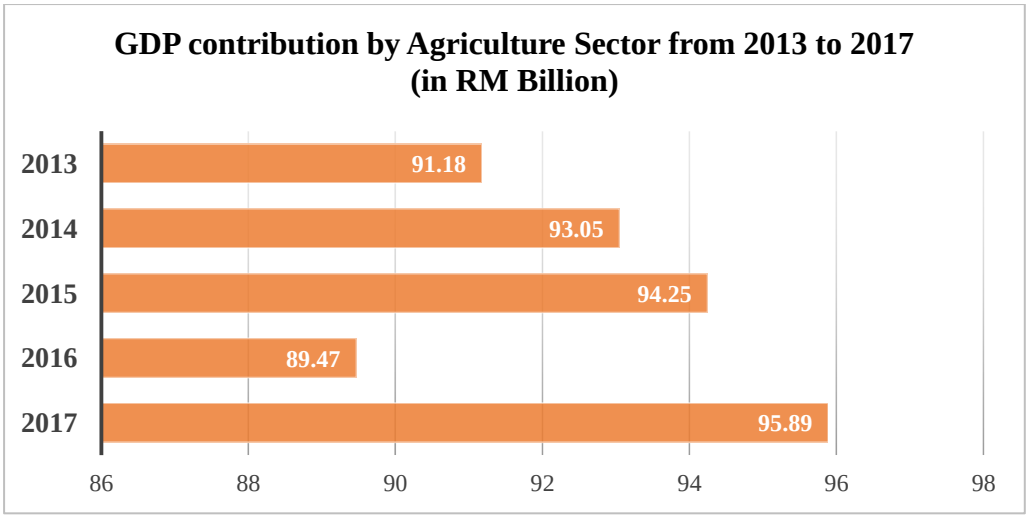

Figure 1.2
GDP contribution by Agriculture Sector from 2013 to 2017
Source: Bank Negara Malaysia and Department of Statistics Malaysia

Figure 1.2 illustrates the GDP contribution by agriculture sector in Malaysia in absolute amount for the recent five years. The amount of sharing to the GDP was increasing from year 2013 to year 2015 by 3.37 percent to RM 94.25 billion but it has decreased approximately RM 4.78 billion of GDP in 2016 to RM 89.47 billion. However, it has increased back 7.18 percent in 2017 which was in total of RM 95.89 billion.

1.3 Problem Statement

Most of the researchers found that climate change affects agricultural production and crop yield (e.g., Alam et al. 2010; Alam, Siwar, Molla & Toriman, 2011; Rosenzweig, Tubiello, Goldberg, Mills & Bloomfield, 2002; Kurukulasuriya & Rosenthal, 2003; Ibrahim & Alam, 2016). Some studies addressed temperature and rainfall impacts on major crops and palm oil (Baker & Allen 1993; Paterson, Sariah & Lima, 2013; Paterson, Kumar, Taylor & Lima, 2015; Shabani, Kumar & Taylor, 2012). El Nino Southern Oscillation (ENSO) is the climate phenomenon that affects the variability of

the global temperature which led to the climate changes such as heavy rain and severe drought that reduce the productivity in plantation firms as well as declining in country's overall economic health (Cirino, Féres, Braga & Reis, 2015; Berry & Kozaryn, 2008; Kovats, Bouma, Hajat, Worrall & Haines, 2003; Cashin, Mohaddes & Raissi, 2017). Flood is another climatic hazard that happens suddenly which caused damage of crop production, infrastructure, lands and houses, as well as economic loses (Morris & Brewin, 2014; Piao, Ciais, Huang, Shen, Peng, Li, Zhou, Liu, Ma, Ding, Friedlingstein, Liu, Tan, Yu, Zhang & Fang, 2010).

Therefore, climate change considers as an important factor of affecting agro/plantation firm performance. However, declining in crops production would be one of the reasons of declining firm's profitability which supposed to upsurge the fluctuation of stock price. Although the stock price fluctuates seriously, affected firms will inject additional capital expenditure or some firms with government assistance as a relieve package and insurance cover will distribute dividend to the investors in the fact that compensate the loss in share price. This action can slow down the fluctuation of stock price and enhance the future performance of firms. However, only few literatures are available on this issue such as Worthington and Valadkhani (2004) and (Alam et al., 2010).

It would appear that the climate change has direct impacts on the financial industry and insurances through property damages (Davey, Huddleston & Brookshaw, 2011). However, this impact tends to be underappreciated by the market. In 2014, the pricing for soft commodities indicated that the market was only pricing in a 20 percent probability despite meteorologists predicting a 60 to 70 percent probability of El Nino

occurring (Stathers, 2015). Further study shows El Nino has gigantic effect over the financial markets and derivatives markets over the world for soft commodities like Rice, Wheat, Sugarcane, Soya bean, Brunt Oil, and hard commodities like Gold and Copper (Periasamy & Satish, 2016). Another study showed that there is influence of natural disasters on the composite stock market in Japan but not available in US (Wang & Kutan, 2013). Furthermore, Luo (2012) also discovered extremely little and insignificant influence on six distinct national stock market indices. Besides, Worthington (2008) revealed that there is no statistically significant effect from catastrophes on the Australian stock market. Next, Asongu (2013) found that there is no evidence of spill-over in international foreign exchange markets as well. In contrast, Worthington and Valadkhani (2004) detected unusual return which is significant on the Australian stock market, and Bourdeau-Brien and Kryzanowski (2017) found catastrophes have influence on returns in US market which is also statistically significant. However, when hurricanes, floods, winter storms happened and temperature changed extremely, the local stock returns increase more than double compare to normal time. All of these studies were conducted on the overall market indexed. However, this study will be conducted on the Malaysian plantation companies and will find out the dividend related to the volatility.

1.4 Research Questions

Based on the problems, this paper considers the following questions.

1. What are the impacts of El Nino on the dividend payout policy of Malaysian plantation firm?
2. What are the impacts of flood on the dividend payout policy of Malaysian plantation firm?

1.5 Research Objectives

The overall drive of this study is to examine the impact of climate change on dividend payout policy of Malaysian plantation firms.

The following specific objectives will answer the above questions

1. To examine the impacts of El Nino on the dividend payout policy of Malaysian plantation firm.
2. To investigate the impacts of flood on the dividend payout policy of Malaysian plantation firm.

1.6 Significance of the Study

This paper will reveal new empirical knowledge about the financial practices of plantation firms related to climate change adaptation in the stock market. Besides, this study will find the reflection of the impacts of climate change on investor's behaviour in the Malaysian capital market. The findings of the study will be highly beneficial for capital market investors of agro-based companies through understanding about the adjustment of the climate change information in the stock market. The management of plantation companies will get an idea about the dividend need to pay related to the climatic events. Furthermore, this research will also contribute to the literature based on the context of Malaysian plantation firms and delivers empirical evidence on the influences of climate change on financial adaptation of plantation firms, namely dividend payout.

1.7 Scope of the Study

This study is exclusively conducted to analyse public listed plantation companies in Bursa Malaysia. This study is using secondary data to analyse the influences of climate change and firm characteristics on the dividend payout policy of Malaysian plantation firms. Data collected from DataStream, Bursa Malaysia, The World Bank database, Climate Prediction Center from USA and Department of Statistics Malaysia. There is total of 43 plantation companies listed in Bursa Malaysia as at July 2018. However, this paper is employing a sample of 33 listed agro firms for the period of year 2003 to year 2016 due to the availability of data. This paper considered the most significant determinants of dividend payout policy after identified from previous empirical literature such as El Nino, flood, profitability, leverage, liquidity, firm size and growth opportunity.

1.8 Organization of the Study

This study consists of five chapters. Chapter one is the introduction that clarifies the background of the study and states the problem statement, research questions, research objectives of the study as well as indicates significance and scope of the study. Secondly, Chapter Two reviews the literature and empirical evidence of the study related to the research topic. Third chapter details the methodology used in the study that consists of sample size, data collection method, research framework, hypothesis of the study, variables measurement and method of data analysis. Next, Chapter Four is the demonstration of results and discussion that statistical analysis and findings of the study will be described. Chapter five which is the final chapter finalize the study and suggests some recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Relevant literature related to the independent variables and dependent variable of the study will be discussed in this chapter. The objective of this chapter is to deliver previous empirical evidence of factors affecting firm's dividend policy.

2.2 Underpinning Theory

The underpinning theories will be stated in this paper include Modigliani Miller Dividend Irrelevance Theory, Bird in Hand Theory, Signaling Theory and Agency Theory stated as below.

2.2.1 Modigliani Miller Dividend Irrelevance Theory

This theory from Miller & Modigliani (1961) states that the dividend policy is unrelated to investor as investor would not care much about the dividend policy of a company. This is because investors able to generate their own cash flow or return by selling off the stock under the assumptions of no taxes, no transaction costs and no uncertainty existed. Hence, investors would not take dividend policy as a consideration in purchasing stocks or stock price will be stimulated when the dividend payout is high (Miller & Modigliani, 1961).

2.2.2 Bird in Hand Theory

Lintner (1962) and Gordon (1963), however, argue that dividend policy is very significant for stockholders where the risk of uncertainty able to reduce if the

dividend payment is paid in current instead of in future. Besides, the stock value also will increase with the dividend payment due to the confidences of investors who receive dividend payment. Thus, this theory stated that investors prefer to receive the dividend payments which will also have significant impact on stock price.

2.2.3 Signaling Theory

Signaling theory indicates that the dividend policy express the information of the firm performance where high dividend payment to investors shows and signals that the firm is performing well and have better future, whereas no dividend or low dividend payments indicates that the firm has negative future stock performance. In other words, dividend policy will change based on the future prospects of the company (Bhattacharya, 1979; Miller &Rock, 1985).

2.2.4 Agency Theory

Agency theory explains the shareholders and company management might have differences in goals in turn leads to a problem due to the shareholders unable to acquire the information or reason about the decision or actions done by management. In addition, the goals of shareholders invest in a company is to expect the capital growth in current stage. However, management might retain the earning in order to expand a business where it affects the short-term profitability and stock price reduce (Mitnick, 1974 & Ross, 1973).

2.3 Empirical Evidence

Previous studies considered many variables to examine the factors influencing firm's dividend policy. This study considers most relevant predictor variables, such as El Nino, flood, profitability, leverage, liquidity, firm size and growth opportunity to study the influences of climate change on adaptation cost measured by dividend payout ratio.

2.3.1 Climate Change and Dividend Payout Ratio

This section will discuss the literature related to El Nino, flood, dividend payout ratio climate change and sustainable stock exchange.

2.3.1.1 El Nino and Dividend Payout Ratio

El Nino Southern Oscillation (ENSO) is the climate occurrence that affects the variability of the global temperature that originated in the tropical eastern Pacific Ocean which led to the climate changes in many regions such as heavy rain and severe drought (Cirino et al., 2015). Cirino and others (2015) found that the agricultural productivity in the Notheast region of Brazil such as corn and bean suffered approximately 50 percent losses that impose the socioeconomic consequences which led to rises in food price and reducing in income. This result is supported by the finding of Selvaraju (2003) that the author discovered the significant negative relationship between foodgrain production and El Nino. The author analyzed the relationship by employing the data for the period 1950 to 1999 and found that the increasing in El Nino reducing the foodgrain production. In addition, in the study of Cashin, Mohaddes and Raissi (2017), they found that there are mixed results of the

relationship between El Nino and real economic activity in different countries. There is positive relationship between El Nino and real economic activity in Argentina, Canada, China, Chile, Europe, Singapore Thailand and USA, whereas El Nino is inversely related to the real economic activity in the countries such as Australia, Brazil, Indonesia, Peru, Philippines, and South Africa.

There are few researches examine the relationship between El Nino and economy as well as between El Nino and stock market, but not specific in dividend payout. Smith and Ubilava (2017) had examined the relationship between El Nino and economy growth by using 55 years data from year 1961 to 2015 in 69 developing countries and the authors found that there is regime-dependent nonlinear relationship between El Nino and economy growth with negative sign, where the economy growth reduced one-to-two percent with 1 °C deviation increase in sea surface temperature in El Nino event. Besides, Rahman, Abdullah, Balu and Shariff (2013) found that the crude oil palm production and stock level will decrease during the El Nino event, but the crude oil palm price will increase 10.2 percent due to the shortage of production in Malaysia. In other words, there are negative relationships between El Nino and both crude oil palm production and stock level. However, there is positive relationship between El Nino and crude oil palm price. Nonetheless, there is a study conducted by Blotenburg (2017) discovered that El Nino has no impact on the stock market in some developed countries such as Australia, France, Germany, Italy, Japan, New Zealand, The Netherlands and the USA.

2.3.1.2 Flood and Dividend Payout Ratio

Flood is the natural hazard that happens suddenly and considered as the third most damaging globally after storm and earthquakes (Wilby & Keenan, 2012). Piao and others (2010) stated that flood has very direct impact on the agriculture production that can lead to the economic losses. The flood occurred in Yangtze basin has brought damage to the crops productions as well as the land and houses which incurred US$20 billion losses (Piao et al., 2010). Besides, the flooding in Somerset in south western England has damage the agricultural productions in the spring 2012. Drainage systems and field infrastructure as well as the damage of soil brought a longer period to recover and these impacts incurred huge costs and loss in revenue to the farmers as well as economic losses (Morris & Brewin, 2014).

However, there are very few studies examine the relationship between floods and dividend payout policy, but there are more researches conducted to examine the relationship between natural disaster and stock market return. There is a study conducted by Zhou and Botzen (2017) found that the impact of typhoons and floods on firms' growth in term of capital, labors and valued added is significantly positive in short run. However, the authors found that typhoons and floods have stronger positive impact on the labors and valued added growth for the firm with more financial constraints but not in capital growth, where the financial constraints stated in the study is dividend payment (Zhou & Botzen, 2017). Furthermore, the result of the reaserch conducted by Koerniadi, Krishnamurti and Tourani-Rad (2016) shows that floods has positively influence the cumulative market return. Nevertheless, Worthington and Valadkhani (2004) found there is a significant relationship between bushfires, cyclones, earthquakes and market return in Australian equity market, but

the authors did not find any significant association between flood and market return which are including dividend and capitalization changes in Australian equity market.

2.3.1.3 Climate Change and Sustainable Stock Exchange

Climate Disclosure Standards Board (CDSB) had prepared a report regarding climate change and sustainable stock exchange in year 2014. In the report, it stated that the stock exchanges act to address climate change in the light of the fact that climate change has direct and forthcoming effects for stock exchanges and financial markets through the segments of world and nation economy, businesses, customers, investors and security (CDSB, 2014). Climate change had disrupted on agriculture and food production that resulting in huge losses in many areas such as Texas, Guatemala, India and the United States (International Finance Corporation, 2010; Amado, Adams, Coleman & Schuchard, 2012; Grossman, Waskow, Coleman, Scharn, Adrio, Coburn & Henson, 2011; New Climate Economy, 2014). The fluctuation of supply and demand that affected by the climate change will lead to the impact on the prices and also the competitiveness of investment (CDSB, 2014). Climate change leads to a negative effect in revenue as well as the availability, price and quality of input that resulting of inefficiency, poor output and lack of performance of assets as well as rise in operating and maintenance costs (CDSB, 2014). Besides, companies will need to inject additional capital expenditure and increase the budget for mitigation of climate change in term of corporate practice, risk management, as well as the equipment that meet the environmental requirement (CDSB, 2014).

Firms that listed on stock exchanges in Malaysia, Toronto, Johannesburg, Korea, Brazilian Mercantile and Futures Exchange & São Paulo Stock Exchange

(BM&FBOVESPA), and Bombay exchanges are required or encouraged to start taking action to mitigate climate change by introducing policy as well as reveal the material sustainability and environmental information, for instance, energy standard, carbon trading scheme, and greenhouse gas emissions reporting fundamentals (CDSB, 2014). Moreover, stock exchanges have also developed indices either in partnership with other stock exchanges or independently to categorize the firms that meet sustainability standards or specific subsets such as FTSE4Good IBEX index, BM&FBOVESPA exchange Corporate Sustainability Index (ISE), FTSE KLD Global Climate 100 Index, The DAX Global Sarasin Sustainability Germany Index, The Dow Jones Sustainability Indices, The FTSE4Good Environmental Leaders Europe 40 Index and others (CDSB, 2014). In addition, Oslo Børs' green bonds are issued in order to serve as climate adaptation finance and climate research purpose to ensure the environment sustainability (SSE, 2016).

2.3.2 Firm Characteristics and Dividend Payout Ratio

This section will discuss the previous literature regarding firm characteristics such as profitability, leverage, liquidity, firm size, growth opportunity and dividend payout ratio.

2.3.2.1 Profitability and Dividend Payout Ratio

Firstly, Rehman and Takumi (2012) employed a sample for the year of 2009 with 50 public listed companies listed in Karachi stock exchange 100 Index and they found that there is a positive and significant relationship between profitability and dividend payout ratio. It indicates that firms with higher profitability will have higher dividend

payout ratio to be paid to the investors. In addition, similar result was found by Issa (2015). Issa (2015) employed a sample of 284 firms that are listed in Malaysian stock market for 10 years from year 2002 to year 2011 which resulted that profitability is significantly affected dividend payout at pooled data level for all sectors with positive sign. Besides, Kajola, Desu & Agbanike, (2015) employed panel data methodology with 25 non-financial listed companies in Nigerian Stock Exchange over the period of 1997 to 2011 to test the factors of dividend policy decisions and found that profitability is significantly positive associated with dividend payout. This finding is supported by Jabbouri (2016) where the researcher used panel data analysis to study on the sample of 2,149 firm with yearly basis observations from 533 firms across ten countries in Middle East and North Africa (MENA) emerging markets from 2004 to 2013 and found profitability is significantly positive influenced the dividend payout. Al-Malkawi, Twairesh and Harery (2013) studied on 69 firms listed on the Saudi Stock Exchange (SSE) from 2005 to 2011 and discovered high profitability firms tend to pay higher dividends to its investors. The studies conducted by Abor and Bokpin (2010), Denis and Osobov (2008) as well as Benavides, Berggrun and Perafan (2016) also reported profitability is positively influence the dividend payout.

However, Mui and Mustapha (2016) conducted a research with a title of "Determinants of Dividend Payout Ratio: Evidence from Malaysian Public Listed Firms" reported that there is an insignificant negative relationship between profitability and dividend payout, which explained the firms with high profitability incline to pay less dividend. In the study of Rafique (2012) also found an insignificant association between dividend payout and profitability of the firms in Karachi, which might due to the different dividend policies implemented by developed and

developing countries where developing countries tend to not use a stable dividend policy. Mirza and Azfa (2010) found that profitability is insignificant positively linked to dividend payout. There were mixed findings exist in previous studies on profitability and dividend payout.

2.3.2.2 Leverage and Dividend Payout Ratio

There are numerous studies were conducted regarding to the association between leverage and dividend payout ratio. Fakhra, Sajid, Muhammed, Shafiq and Madiha (2013), Kajola et al. (2015), Rehman and Takumi (2012) carried out the studies on the association between leverage and dividend payout ratio and reported leverage is positively and significantly bond with dividend payout ratio. In other words, firms with higher leverage are more likely to pay higher dividend.

Contrary, applying the sample of 2,149 firm yearly basis observations from 533 firms from ten countries in Middle East and North Africa (MENA) emerging markets from 2004 to 2013, Jabbouri (2016) discovered a significant negative linkage between leverage and dividend payout ratio. This outcome is similar with the finding of Al-Malkawi et al. (2013) who also reported that leverage is negatively allied with dividend payout in the Saudi context. Among other researchers, Afza and Hammad (2011), Faccio, Lang and Young (2001), Papadopoulos and Charalambidis (2007), Aivazian, Booth and Cleary (2003) as well as El-Essa, Hameedat, Altaraireh and Nofal (2012) found that debt ratio (leverage) negatively influences dividend payout, which means that more leveraged companies are likely to pay lower dividends.

However, various scholars found the evidence wherein leverage is not significant factor in influencing dividend payout. For instance, Mui and Mustapha (2016), King'wara (2015), Mirza and Azfa (2010), Ahmed and Javid (2009), Abor and Bokpin (2010), Rafique (2012) did not found any significant linkage between leverage and dividend payout.

2.3.2.3 Liquidity and Dividend Payout Ratio

Employing a sample comprises of 320 nonfinancial public listed firms from Karachi Stock Exchange during the period of 2001 to 2006 and used extended version of Lintner dividend model, Ahmed and Javid (2009) identified there is positive linkage between liquidity and dividend which indicates that companies with higher market liquidity tend to pay more dividends. This result is consistence with study of Patra and Poshakwale (2012) on "Determinants of corporate dividend policy in Greece". The authors gathered a total of 945 firm yearly basis observations from 63 listed firms in Athens Stock Exchange (ASE) from 1993 to 2007 for the study. The result presented that liquidity has very strong positive impact on the dividend payout. In the researches of Thanatawee (2011), Mui and Mustapha (2016), and Jabbouri (2016) found that liquidity have significant positive linakge with dividend payout of public listed companies in Thailand stock market, Malaysia stock market and MENA stock market respectively. The study of Issa (2015) also came out with the same result in the sample of 284 listed companies that are listed in Bursa Malaysia where more liquid firms tend to pay higher dividends due to excess of cash.

Al-Taleb (2012) argued that liquidity has negative linkage with dividend payout. The author examined the free cash flow hypotheses and employed 60 publicly traded firms

in Amman Stock Exchange during the period of 2007 to 2011. This result is reinforced by Naceur, Goaied and Belanes, (2006) who also found a significant and negative linkage between liquidity and dividend payout by analysing the sample of 48 Tunisian listed firms during the period 1996–2002. Alam and Hossain (2012) also found the negative relationship between liquidity and dividend that explained more liquid firms tend to cut or pay less dividends in both UK companies listed in London Stock Exchange and Bangladeshi companies.

However, some scholars, such as Fakhra et al. (2013), Kajola et al. (2015), Naeem and Nasr (2007) found liquidity have insignificant relationship between liquidity and dividend policy.

2.3.2.4 Firm Size and Dividend Payout Ratio

Rafique (2012) conducted a study with the goal of investigating the elements that affect the dividend payout policies for the public listed non-financial firms in KSE100 stock market. The author employed a sample of 53 companies from 11 sectors from 2005 to 2010 and found that firm size is significantly positive related to dividend payout ratio. The positive result shows firms with larger size tend to increase the dividend payout rather than cut or decrease the dividend payout. Besides, Thanatawee (2011) collected 784 observations from 287 firms listed on the SET between 2002 and 2008. The outcome of the study indicates that there is significant positive relationship between firm size and dividend payout. In addition, employing 25 listed industrial companies in Amman stock exchange with 1225 observations from 2005 to 2011, El-Essa (2012) examined the impact of the firm size dividend policy decisions. Based on the analysis, the result show larger firm size has greater impact on the dividend. These

positive results are supported by a study conducted by Al-Kuwari (2009) as well. Al-Kuwari (2009) examines the factors of dividend policies of 191 non-financial public listed companies in the Gulf Co-operation Council (GCC) countries' stock exchanges for the period 1999 to 2003 and found a significantly positive relationship between the firm size and dividend policies. The positive linkage between firm size and dividend payout policy is also in line with an increasing number of the studies of prominent scholars (Chen and Dhiensiri, 2009; Al-Malkawi et al., 2013; Al-Nawaiseh, 2013; Kajola et al., 2015; Mui and Mustapha, 2016; Issa, 2015; Jabbouri, 2016).

However, there are some researchers reported that there is negative association between firm size and dividend payout. Afza and Hammad (2011) conducted study with the aim of investigating the influence of firm specific features on corporate dividend payout decision in emerging economy of Pakistan by employing the data of 100 companies listed in KSE stock exchange from 2005 to 2007. The result of the analysis shows that firm size is negative associated and very significant to the dividend payout which indicates larger firm might tend to retain their earning for future projects or building up their reserve for confronting the dramatic deterioration in world economy. This finding likewise associated with the finding of Hoque (2017). The author studied on a sample of 701 Romanian non-financial firms listed on the Bucharest Stock Exchange Market years observations over the period 2007 to 2016 and highlighted that firm size significantly influences dividend payout as measured by ordinary least square (OLS) method with negative sign. Furthermore, Jin (2000), Anil and Kapoor (2008), Afza and Hammad (2011), Musiega, Alala, Douglas, Christopher and Robert (2013), Abdulkadir, Abdullah and Wong (2016) and Cristea and Cristea (2017) revealed similar result where firm size is negative related to dividend payout.

In other words, larger firms consider paying low dividend or sometimes cutting dividend for future investment.

Yet, few researchers confirm that is not significantly associated with dividend payout (e.g., Kaźmierska-Jóźwiak, 2015; Khan & Ahmad, 2017). There are mixed results shown above about the relationship between firm size and dividend payout.

2.3.2.5 Growth Opportunity and Dividend Payout Ratio

Imran (2011) identified that the sales growth is significant and positively influence the dividend payout policy, as measured by dividend per share. The author studies on 36 public listed Pakistani engineering firms on KSE over the period of 1996 to 2008. Based on the panel techniques such as OLS, fixed effects and random effects approach, the author found growing firms will not cut or decrease the dividend payout. This finding is consistence with the result of Issa (2015) that the author also reported there is a positive and significant connection between dividend payout and growth opportunity. Besides, by employing a sample of 30 listed companies on Nairobi Securities Exchange (NSE) over the period of 2007 to 2011, Musiega et al. (2013) discovered growth opportunity of a firm is positive correlated with the dividend payout. In other words, the firm with more growth opportunity are likely to increase the dividend payout.

In contrast, there are many studies stated that the affiliation between growth opportunity and dividend payout as well. Firstly, Khan and Ahmad (2017) conducted a study with the title of "Determinants of Dividend Payout: An Empirical Study of Pharmaceutical Companies of Pakistan Stock Exchange (PSX)" to test the influence

of determinants on dividend payout by analyzing the sample data of five years financial data of listed pharmaceutical companies from year 2009 to 2014. The authors found growth opportunity is significant inversely related to dividend payout. Secondly, Gill et al. (2010) also found the association between growth opportunity and dividend payout is significant negatively related. They analyze the study by employing 266 financial data of public listed companies in 2007 from Securities and Exchange Board of USA. The study shows the rapidly growing firms required to retain excess cash for business development instead of paying dividend. In addition, Amidu and Abor (2006) examines the factors of dividend payout of 22 public listed firms in Ghana during the period of 1998 to 2003 and found statistically significant and negative linkage between growth opportunity and dividend payout. These negative relationship results are also supported by Kania and Bacon (2005), Baker and Powell (2012), King'wara (2015) and Jabbouri (2016).

Nevertheless, a number of prominent scholars, for instance, Kajola et al. (2015), Rafique (2012), Al-Malkawi et al. (2013), Ahmed and Javid (2009), as well as Zameer, Rasool, Iqbal and Arshad (2013) found that there is insignificant relationship between growth opportunity of a firm and dividend payout policy.

2.4 Chapter Summary

This chapter discusses about dividend payout policy which supported by literature. Empirical evidence shows various findings between predictor variable and explained variable. Some findings positive significant whereby some studies show negative significant relationship There are some other studies reported insignificant relationship between same independent variable and dependent variable.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents research framework to examine the impact of El Nino, flood, profitability, leverage, liquidity, firm size, growth opportunity and on dividend payout ratio of Malaysian listed plantation firms. Besides, this chapter also discusses about the hypotheses development, variables measurement, sample size, data collection method, and methodology are used to analysis the panel data set.

3.2 Research Framework

Figure 3.1 illustrates the research framework of this study. The research framework consists of all independent variables and dependent variable. The following research framework is developed based on previous studies such as Alam et al. (2010), Zhou and Botzen (2017), Rehman and Takumi (2012), Jabbouri (2016), Ahmed and Javid (2009), Rafique (2012) and Imran (2011), whereby the research framework developed to examine two categories of independent variables which are climate change and firm characteristics on the dependent variable. The climate change variables include El Nino and flood, whereas firm characteristics include profitability, leverage, liquidity, firm size and growth opportunity.

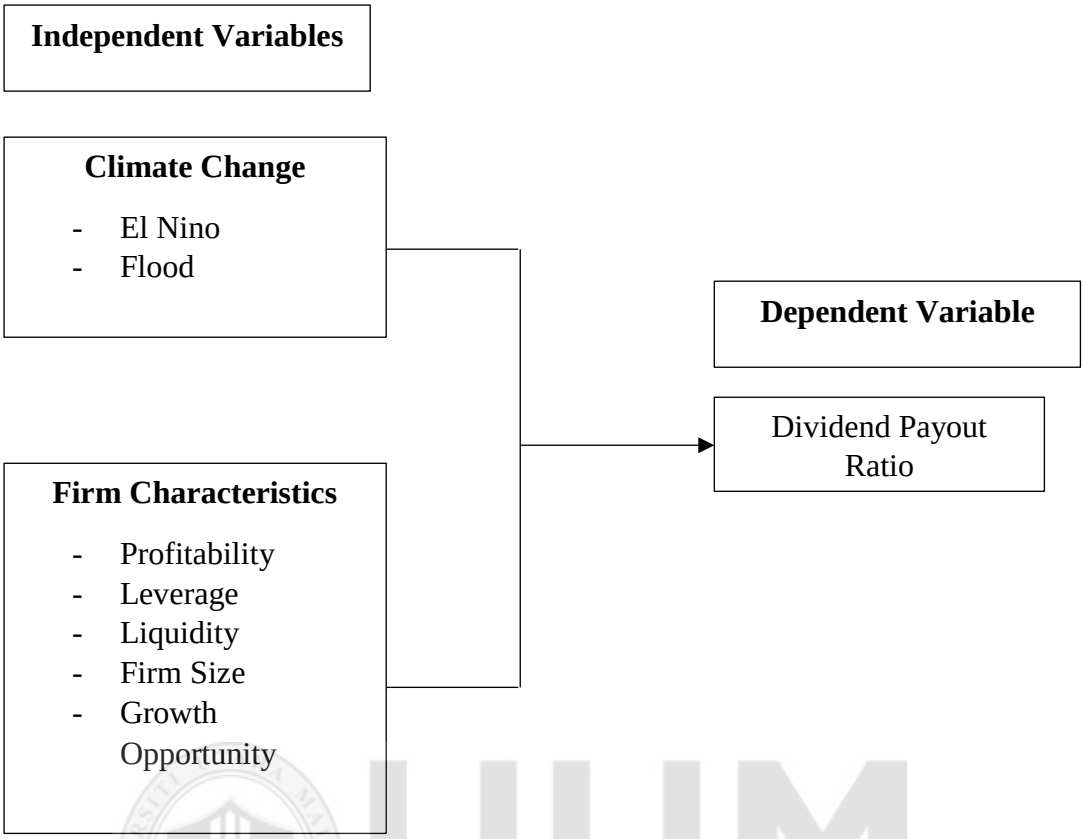

Figure 3.1

Research Framework

3.3 Hypotheses Development

Hypothesis 1

Significant association between dividend payout ratio and El Nino is existed

Hypothesis 2

Significant association between dividend payout ratio and flood is existed

Hypothesis 3

Significant association between dividend payout ratio and profitability is existed

Hypothesis 4

Significant association between dividend payout ratio and leverage is existed

Hypothesis 5

Significant association between dividend payout ratio and liquidity is existed

Hypothesis 6

Significant association between dividend payout ratio and firm size is existed

Hypothesis 7

Significant association between dividend payout ratio and growth opportunity is existed

3.3.1 Climate Change

There are very few previous empirical studies examine the relationship between climate change and dividend payment. Most of the studies were conducted on the overall market index and firm performance. The hypothesis for climate change developed based on the previous studies stated below.

3.3.1.1 El Nino

The hypothesis for El Nino is based on the studies conducted by Alam et al. (2010), Murray (2015) and Bhadada (2015) as climate change adaptation should be implemented due to the negative impact of climate change on the firm performance and stock market, whereby paying extra dividend one of the climate change adaptation. Hence, the first hypothesis is that the existing of El Nino events will have significant impact on dividend payment.

3.3.1.2 Flood

Zhou and Botzen (2017) found that floods have stronger significant positive impact on the labors and valued added growth for the firm with more dividend payments and Koerniadi et al. (2016) found that flood have significant relationship with the cumulative market return which includes dividend. Therefore, the second hypothesis in this paper is significant relationship between flood and dividend payout is existed.

3.3.2 Firm Characteristics

There are some previous studies explore how the firm characteristics have impacts on dividend policy. The firm characteristics are includes profitability, leverage, liquidity, firm size and growth opportunity. The hypothesis developed for firm characteristics based on the literatures written as following.

3.3.2.1 Profitability

There are many researchers found the relationship between profitability and dividend payout ratio is significant positive such as Rehman and Takumi (2012), Issa (2015),

Kajola et al. (2015), Jabbouri (2016) and Al-Malkawi et al. (2013), whereby they proved that firms with high profitability would distribute high dividend payment. Thus, the third hypothesis is there is significant association between profitability and dividend payout ratio.

3.3.2.2 Leverage

For the independent variable leverage, however, most of the previous literatures discover the significant negative linkage with dividend payout ratio, for instance, Jabbouri (2016), Al-Malkawi et al. (2013), Afza and Hammad (2011), Faccio et al. (2001), Papadopoulos and Charalambidis (2007), as well as Aivazianet al. (2003). Therefore, this research paper suggests the fourth hypothesis is leverage has significant relationship with dividend payout ratio.

3.3.2.3 Liquidity

Besides, the studies conducted by Ahmed and Javid (2009), Issa (2015), Poshakwale (2012), Thanatawee (2011), Mui and Mustapha (2016), and Jabbouri (2016) discovered that firm liquidity is significant positive associated with dividend payout ratio. In other words, the higher the firm's liquidity, the higher the dividend payout being distributed. Hence, the fifth hypothesis will be there is significant linkage between liquidity and dividend payout ratio.

3.3.2.4 Firm Size

The significant positive association between firm size and dividend payout ratio was found by Thanatawee (2011), Al-Nawaiseh (2013), Kajola et al. (2015), Mui and

Mustapha (2016) and Al-Kuwari (2009), which emphasize that the larger the firm, the higher the dividend payment will be paid to the investors. Thus, the sixth hypothesis in this paper suggests that the significant association between firm size and dividend payout ratio is existed.

3.3.2.5 Growth Opportunity

Last but not least, majority of the researchers such as Khan and Ahmad (2017), Gill et al. (2010), Amidu and Abor (2006), Kania and Bacon (2005), Baker and Powell (2012), King'wara (2015) and Jabbouri (2016) discovered that the growth opportunity have significant and negative impact on the dividend payout policy of a company. Thus, the seventh hypothesis in this paper stated that growth opportunity have significant connection with dividend payout.

3.4 Variables and Measurement

This section covers dependent variable and independent variables and their measurements.

3.4.1 Dependent Variable

Dependent variable is the main intention of research where by dividend policy is the dependent variable in this paper. Based on literature, firm's dividend policy is measured by using dividend payout ratio. The dividend payout ratio is the ratio of that show the percentage of the earning paid out to shareholders in dividend. In this study, dividend payout ratio is calculated as dividend over net income, which used in previous research (e.g. Khan & Ahmad, 2017; Gill et al., 2010; Thanatawee, 2011).

$$Dividend\ Payout\ Ratio = \frac{Dividend}{Net\ Income}$$

3.4.2 Independent Variables

Independent variable is a variable that remains stand alone and does not change by alternate variables. Independent variable influences dependent variable. Independent variables of this study are profitability, leverage, liquidity, firm size, growth opportunity, El Nino (dummy) and flood (dummy).

3.4.2.1 Climate Change Measurement

El Nino

El Nino Southern Oscillation (ENSO) is the climate event that affects the unpredictability changes of the global winds and sea surface temperature that originated in the Pacific Ocean which led to the climate changes and associated with catastrophes such as heavy rain and severe drought (Cirino et al., 2015). El Nino is also a dummy variable in this study where value of 1 for El Nino, 0 otherwise.

Flood

Flood is the natural disaster that happens led to the economic losses in a country (Morris & Brewin, 2014). All the crop production, drainage systems, damage of soil quality, infrastructure, houses and lands incurred huge costs to recover (Piao et al., 2010). Flood is a dummy variable in this study where value of 1 for flood, 0 otherwise.

3.4.2.2 Firm Characteristics Measurement

Profitability

Profitability ratio is a term that measures business's ability of a company to generate earnings compared to all expenses and costs. Return on assets is used in this study as many scholars used ROA as the proxy of profitability (e.g. Thanatawee, 2011; Gill et al., 2010; Fakhra et al., 2013).

$$ROA = \frac{Operating\ income}{Total\ assets}$$

Leverage

Leverage ratio is a term which measures company's capital structure. Leverage ratio is calculated by using different formulas. Debt to equity ratio is used in this study to measure leverage which used in previous research (e.g. Rehman & Takumi, 2012; Gill et al., 2010, Khan & Ahmad, 2017).

$$Debt\ to\ Equity = \frac{Total\ Liabilities}{Total\ Shareholders'\ Equity}$$

Liquidity

Liquidity is the degree of a firm has current assets available to meet its short-term obligations. High liquidity means there is more assets available to be paid as dividend. Liquidity is measured by current ratio which is same as the previous studies (Khan & Ahmad, 2017; Kajola et al., 2015; Mui & Mustapha, 2016):

$$Current\ ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

Firm Size

According to many previous researchers (Mui & Mustapha, 2016; Khan & Ahmad, 2017; Thanatawee, 2011), natural logarithm of the firm's total assets can be the proxy of firm size.

$$Firm\ Size = \ Natural\ Logarithm\ of\ Total\ Assets$$

Growth Opportunity

High growth firm earn more profit. This study uses annual sales growth as a proxy of growth opportunity of a firm as it used in previous studies as well (Zameer et al., 2013; Imran, 2011; Gill et al., 2010).

$$Growth\ Opportunity = \ Percentage\ Change\ in\ Total\ Sales$$

Table 3.1 Summary of Variables, Measurements and Expected Sign

Variables	Notion	Measurements	Sources	Expected Sign
El Nino	ELN	Value 1 = existed, Value 0 = otherwise	Alam et al. (2010), Murray (2015) and Bhadada (2015)	Positive (+)
Flood	FLD	Value 1 = existed, Value 0 = otherwise	Zhou and Botzen (2017) and Koerniadi et al. (2016)	Positive (+)

Profitability	PROF	Return on Assets	Rehman and Takumi (2012), Issa (2015), Kajola et al. (2015), Jabbouri (2016) and Al-Malkawi et al. (2013)	Positive (+)
Leverage	LEV	Debt to equity	Jabbouri (2016), Al-Malkawi et al. (2013), Afza and Hammad (2011)	Negative (-)
Liquidity	LIQD	Current ratio	Ahmed and Javid (2009), Issa (2015), Poshakwale (2012) and Thanatawee (2011)	Positive (+)
Firm Size	LnSIZE	Natural Logarithm of Total Assets	Mui and Mustapha (2016) and Al-Kuwari (2009)	Positive (+)
Growth Opportunity	GROP	Percentage Change in Total Sales	Khan and Ahmad (2017), Gill et al. (2010), Amidu and Abor (2006), Kania and Bacon (2005), as well as Baker and Powell (2012)	Negative (-)

3.5 Sample

This study mainly focuses on plantation firms where the objective of this study is to examine the determinants of the dividend payout of plantation firms in Malaysia. There are total 43 plantation companies listed in Bursa Malaysia as at July 2018 but this study considered data for 33 plantation companies 14 years from 2003 to 2016 due to the inaccessibility of data for some companies. Table 3.2 illustrates the sample list of firms under plantation category in Bursa Malaysia.

Table 3.2
List of Plantation Companies

Malaysian Public Listed Plantation Firms	
1. Astral Asia Bhd	18. Kretam Holdings Bhd
2. BLD Plantation Bhd.	19. Kwantas Corporation Bhd
3. Cepatwawasan Group Bhd	20. Malpac Holdings Bhd
4. Far East Holdings Bhd	21. MHC Plantations Bhd
5. Felda Global Ventures Holdings Bhd	22. NPC Resources Bhd
6. Genting Plantations Bhd	23. Negri Sembilan Oil Palms Bhd
7. Golden Land Bhd	24. Pinehill Pacific Bhd
8. Gopeng Bhd	25. PLS Plantations Bhd
9. Harn Len Corporation Bhd	26. Riverview Rubber Estates Bhd
10. Hap Seng Plantations Holdings Bhd	27. Sungei Bagan Rubber Company (Malaya) Bhd
11. IJM Plantations Bhd	28. Sin Heng Chan (Malaya) Bhd
12. Inch Kenneth Kajang Rubber Public Ltd Co	29. TDM Bhd
13. Innoprise Plantations Bhd	30. TH Plantations Bhd
14. IOI Corporation Bhd	31. TSH Resources Bhd
15. Jaya Tiasa Holdings Bhd	32. United Malacca Bhd
16. Kuala Lumpur Kepong Bhd	33. United Plantations Bhd
17. Kluang Rubber Company (Malaya) Bhd	

3.6 Data Collection

Secondary data are collected from various reliable sources in this study. The historical financial data of the plantation companies are gathered from DataStream and Bursa Malaysia. Besides, the data of El Nino events are collected from Climate Prediction Center from USA as well as the data regarding flood collected from FloodList.

3.7 Panel Data Analysis

To examine the relationship between independent variables and dependent variable, pooled OLS is run on the sample data to calculate the result and show the relationship between variables. Pooled OLS regression analysis is a simple linear regression model that minimizes the sum of squared error terms from the regression line to best fit the function with the sample data. A linear regression formula will be formed by placing the data of independent variable and dependent variable into the equation, while the value of y-intercept and x-coefficients will be given. The simple linear regression formula being used in this research as following:

$$Y_{it} = \alpha_i + \beta' \ X_{it} + \varepsilon_i$$

Where;

Y_{it} Represent the dependent variable for the cross-section unit i at time t, where $i = 1....n$ and $t = 1.....n$

X_{it} Refer to independent variable or manipulating variable where the changes of α values will influence the values changes of Y.

α_i Refer to the intercept term

β' Represent the slope term or gradient of the estimated regression line

ε_{it} Denote as the residual or error term

Operational model for the above general equation is presented below.

$$DIV_{it} = \beta_0 + + \beta_1 ELN_{it} + \beta_2 FLD_{it} + \beta_3 PROF_{it} + \beta_4 LEV_{it} + \beta_5 LIQD_{it} + \beta_6 LnSIZE_{it} + \beta_7 GROP_{it} + \varepsilon_{it}$$

Where:

DIV = Dividend Payout Ratio for company i in period t;

ELN = El Nino for company i in period t;

FLD = Flood for company i in period t;

PROF = Return on Assets for company I in period t;

LEV = Leverage for company i in period t;

LIQD = Liquidity for company i in period t;

LnSIZE = Total Assets for company i in period t;

GROP = Growth Opportunity for company i in period t;

β = Coefficient to be estimated

ε = Error term

i = 1, 2, 3 …n, which means cross sectional units

t = 1, 2, 3 …t, are the time periods

After that, the equation above will be tested by using both fixed effects model and random effect model in this paper. Firstly, fixed effect model undertakes that the single consequence of α_i is associated with response variable X_{it}. Secondly, random effect model presumes single consequence α_i is not associated with the response variable X_{it}. According to Gujarati and Porter (2010) and Wooldridge (2006), the error term in random effects will then become ($\mu_i + \varepsilon_{it}$), by which μi is the exact random effects component for the dataset which is parallel with ε_{it} excluding with μ_i, for each dataset there is a single draw that is considered in the regression.

3.8 Diagnostic Tests

Diagnostic tests are implemented in this paper is to check accuracy of employing a model to run the equation and solve the problem of the study.

3.8.1 Breusch and Pagan Lagrangian Multiplier Test

Breusch and Pagan LM test is being employed in order to test the random effects model to decide pooled OLS model or random effect model is suitable to apply in this study. The interpretation of probability chibar^2 is that null hypothesis is rejected when p value is less than 0.05 and proclaimed that the data is significantly which mean random effects models is more suitable and will be chosen in this paper instead of pooled OLS regression model.

3.8.2 Hausman Test

The Hausman specification test on the other hand examines random effects model and fixed effects model to indicates which model is more appropriate for this research. The interpretation of probability chi^2 is that null hypothesis is rejected when p value is less than 0.05 and proclaimed that fixed effects models is more suitable due to the difference in coefficients are systematic and thus will be chosen fixed effects models in this paper instead of random effects model.

3.8.3 Variance Inflation Factors (VIF)

Multicollinearity can be detected by Variance Inflation Factors (VIF) in regression analysis, where multicollinearity problem cause the variance of regression coefficient being overestimated and unfavourably influence the regression result. Hence, VIF is

tested in order to calculate whether the VIF value is exceeded value 10 as it shows there is multicollinearity problem if VIF value exceeds value 10.

3.8.4 Wooldridge Test

Wooldridge test is employed in this paper to identify whether there is autocorrelation in the panel data. Autocorrelation defines as the correlation between the values of the same variables is based on related substances. There is autocorrelation in the data if the P value is less than 0.05 where null hypothesis is rejected. Null hypothesis denotes as no autocorrelation is existed in the panel data.

3.8.5 Breusch-Pagan / Cook-Weisberg Test and Modified Wald Test

Heteroskedasticity problem can be checked by Breusch-Pagan / Cook-Weisberg Test and Modified Wald Test. Heteroskedasticity discusses that the variance of errors is not the same for all variables and the result of Breusch-Pagan / Cook-Weisberg Test and Modified Wald Test indicates that null hypothesis refers to the homoscedastic existed whereas alternative hypothesis shows that heteroscedasticity problem existed. Hence, is the profitability chi^2 is less than 0.05, null hypothesis is rejected.

3.9 Chapter Summary

This chapter enlightens the dependent and explained variables employed in this paper. Research framework and hypotheses also have been established after the consideration of previous empirical literature to examine the relationship between predictor variables and explained variable. Furthermore, this chapter also describes models being employed to examine data.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter explains the data analysis, results and discussion the findings of this research. The panel data set of this study is analyzed by employing STATA version 14.2.

4.2 Descriptive Statistics

Table 4.1 illustrates the summary of the descriptive statistics of the dataset in this study where consists of the number of observations, mean, minimum, maximum as well as the standard deviation of the independent variables and dependent variable.

Table 4.1

Descriptive Statistics

Variables	Number of Observations	Mean	Standard Deviation	Min	Max
DIV	462	26.3825	22.8762	0.0000	99.8100
ELN	462	0.2857	0.4522	0.0000	1.0000
FLD	462	0.3571	0.4797	0.0000	1.0000
PROF	462	5.3580	5.6757	-15.1100	39.6700
LEV	462	57.2575	78.8195	-175.82000	446.88
LIQD	462	8.3348	19.1345	0.0262	252.7381
LnSIZE	462	17.8268	6.0750	3.1781	23.8948
GROP	462	0.1869	0.6658	-0.9845	7.2226

Mean value of DIV is 26.3825 where minimum and maximum values are 0.0000 and 99.8100 respectively which show that the average of dividend payout ratio that

Malaysian plantation companies able to distribute is 26.38 percent. Besides, the mean value of 5.3580 of PROF indicates that average Malaysian agriculture companies able to manage the return on assets at 5.36 percent. Table 4.1 also shows the average financial leverage and liquidity of the firms are 57.2575 and 8.3348 respectively where indicates that the average of firms' total debt to equity is 57.26 percent as well as the firms have 8.3348 times ability to meet their short term obligations. Furthermore, growth opportunity's mean value of 0.1869 represents the average sales of Malaysian plantation firms increasing by 18.69 percent each year. Lastly, the mean of El Nino is 0.2857 and the mean of flood is 0.3571.

4.3 Correlation Matrix

Correlation describes the mutual relationship between two variables where indicates the way of one variable affects another variable. Table 4.2 illustrates the relationship between independent variables and dependent variable. In the correlation matrix table, the firm size and growth opportunity are inversely related to dividend payout ratio. On the other hand, the profitability, financial leverage, liquidity, El Nino and flood are positively related to dividend payout ratio. Besides, the firm size, growth opportunity, financial leverage and liquidity are positively related to El Nino but profitability is negatively related to El Nino. The flood also has negative relationship with the profitability and financial leverage but positively related to other variables. Besides, there is no multicollinearity existed as none of the correlation is above 0.8 based on Table 4.2.

Table 4.2

Correlations Matrix

	DIV	PROF	LEV	LIQD	LnSIZE	GROP	ELN	FLD
DIV	1.0000	0.0143	0.2164*	0.0857	-0.1015*	-0.0665	0.1889*	0.0406
		(0.7599)	(0.0000)	(0.0658)	(0.0292)	(0.1536)	(0.0000)	(0.3843)
PROF		1.0000	0.1059*	0.0071	-0.2118*	-0.0843	-0.1677*	-0.1713*
			(0.0228)	(0.8789)	(0.0000)	(0.0702)	(0.0003)	(0.0002)
LEV			1.0000	0.2526*	-0.2854*	-0.0098	0.0273	-0.0106
				(0.0000)	(0.0000)	(0.8330)	(0.5578)	(0.8205)
LIQD				1.0000	-0.1480*	-0.0223	0.0054	0.0039
					(0.0014)	(0.6331)	(0.9081)	(0.9330)
LnSIZE					1.0000	0.0822	0.0289	0.0014
						(0.0774)	(0.5356)	(0.9756)
GROP						1.0000	0.0229	0.0077
							(0.6228)	(0.8690)
ELN							1.0000	0.1886*
								(0.0000)
FLD								1.0000

4.4 Regression Analysis

Table 4.3 demonstrates the panel data regression analysis results and indicates the significance level of independent variables such as profitability, financial leverage, liquidity, firm size, growth opportunity, El Nino and flood toward dividend payout ratio by employing three types of models which are pooled OLS regression, fixed effects model and random effects model.

Table 4.3
Regression Analysis Result of Pooled OLS, Fixed Effects and Random Effects Model

	Dividend Payout Ratio		
VARIABLES	Pooled OLS	Fixed Effects	Random Effects
ELN	9.432804***	6.280438***	8.923346***
	(2.334366)	(2.02675)	(1.932767)
FLD	0.4805392	0.276349	-0.13456
	(2.201242)	(1.798976)	(1.81784)
PROF	0.052227	-0.21749	-0.26918
	(0.190371)	(0.186337)	(0.181926)
LEV	0.0553035***	0.0138	0.0309765*
	(0.0139606)	(0.02136)	(0.018722)
LIQD	0.0347087	0.1080757*	0.083843
	(0.0556162)	(0.059842)	(0.057359)
LnSIZE	-0.1514687	7.045309***	-0.0077
	(0.1806056)	(1.918736)	(0.407972)
GROP	-2.196576	-1.811563	-2.05293
	(1.549384)	(1.297919)	(1.310145)
Cons	22.89091***	-101.2932***	23.37186***
	(4.151086)	(34.34975)	(8.183235)
Observations	462	462	462
Number of Company	33	33	33
F / Chi^2 Value	6.25	7.02	25.95
Prob > F / Chi^2	0.0000	0.0000	0.0000

Note: The values in parentheses are standard errors. ***, **and * denote significance level at 1%, 5% and 10% respectively.

Analysis reveals a positive and statistically significant relationship between the El Nino and dividend payout ratio using the whole three models in this paper at 1 percent significance level whereby it strongly proves that the existence of El Nino will increase the firm's dividend payout ratio.

The pooled OLS and fixed effects models give a positively relationship between the variables of flood and dividend payout ratio but random effects model shows a negatively relationship between flood and dividend payout ratio. Nonetheless, whole three models in this paper indicate that there is no statistically significant relationship between the existence of flood and dividend payout ratio.

Profitability is positively related to dividend payout ratio in pooled OLS where the profit of a firm increase will lead the dividend payout ratio increase. Besides, it is negatively related to dividend payout ratio in fixed effects and random effects models which demonstrates that the increase of a firm's profit will decrease the dividend payout ratio. However, it is statistically insignificant related to dividend payout ratio in all models pooled OLS, fixed effects and random effects.

Financial leverage of a firm is positive and statistically significant with dividend payout ratio in pooled OLS at 1 percent significance level and 10 percent significance level in random effects model. It shows that the more the financial leverage managed by a company, the more dividend payout ratio will be given. However, financial leverage is statistically insignificant related to dividend payout ratio in fixed effects model.

Liquidity is positively associated with dividend payout ratio in all pooled OLS, fixed effects and random effects models where the increase in firm's liquidity will increase the dividend payout ratio. However, there is only fixed effects model shows that liquidity is significantly related to dividend payout ratio at 10 percent significance level and it is statistically insignificantly with dividend payout ratio in pooled OLS and random effects models.

Pooled OLS and random effects models show that the firm size has negative relationship with dividend payout ratio which indicates that the increase in firm size will lead to decrease in dividend payout ratio but it is not statistically significant related. However, firm size is significant positively associated in fixed effects model at 1 percent significance level, meaning that the increase in firm size will lead to an increasing in firm's dividend payout ratio.

Growth opportunity is not statistically significant and negatively associated with dividend payout ratio in fixed effects models. In addition, pooled OLS and random effects models also demonstrates negative linkage between growth opportunity and dividend payout ratio but no significant relationship exists between growth opportunity and dividend payout ratio as well.

4.5 Breusch and Pagan Lagrangian Multiplier and Hausman Test

Table 4.4 demonstrates the finding of LM test and Hausman test.

Table 4.4
Breusch and Pagan LM Test and Hausman Test

		Dividend Payout Ratio
Breusch and Pagan LM test	prob>chibar^2	0.0000
Hausman test	prob>chi^2	0.0016

According to the Table 4.4, prob>chibar^2 of Breusch and Pagan LM test is less than 0.05 for dividend payout ratio that proves random effect model is better than pooled OLS model. Besides, prob>chi^2 of Hausman test is less than 0.05 for dividend payout ratio. Thus, it evidently suggests that fixed effects model is more appropriate over random effects models for this research. Overall, based on these two tests, fixed effects model is better than both pooled OLS and random effect model in this analysis.

4.6 Post Estimation Diagnostic Tests

Table 4.5
Post Estimation Diagnostic Test

	Mean	Dividend Payout Ratio
Multicollinearity (VIF)	1.09	
Serial Correlation		0.1142
Heteroskedasticity		0.0000

Table 4.5 indicates that the outcome of Variance Inflation Factor (VIF), Wooldridge Test and Modified Wald Test. Firstly, the mean value of VIF in multicollinearity test is 1.09. This means there is no multicollinearity problem existed as the VFI mean value 1.09 is less than 10. Besides, serial correlation is analyzed by using Wooldridge Test in this paper and the result shows that the prob>F of Wooldridge Test is 0.1142,

which is more than 0.05. Therefore, the model is free from autocorrelation. Additionally, heteroscedasticity problem in fixed effects model is tested by Modified Wald Test, which shows the prob>chi^2 is 0.0000 and declared that heteroscedasticity problem in fixed effects model is existed as the prob>chi^2 is less than 0.05. Due to the heteroscedasticity problem, fixed effect with robust standard error is adopted to resolve the problems of heteroscedasticity.

4.7 Fixed Effect Model with Robust Standard Error

From the analysis of LM test and Hausman test, fixed effects model affirmed as the most suitable model. However, fixed effects model with robust standard error is implemented at the final stage of analysis in order to fix the heteroscedasticity problem. The final result of this paper is written as below.

Table 4.6
Robust Fixed Effects Model

	Fixed Effects Model
	Dividend Payout Ratio
VARIABLES	
ELN	6.280438***
	(1.779454)
FLD	0.2763489
	(1.411701)
PROF	-0.2174888
	(0.1419681)
LEV	0.0137997
	(0.0290379)
LIQD	0.1080757
	(0.1111978)
LnSIZE	7.045309*
	(3.508912)
GROP	-1.811563
	(1.411216)
Cons	-101.2932
	(63.12639)
Observations	462
Number of Company	33
F-Value	5.71
Prob > F	0.0002

Note: The values in parentheses are standard errors. ***, **and * denote significance level at 1%, 5% and 10% respectively.

The result obtained from robust fixed effects model discloses a significant positive relationship between El Nino and dividend payout ratio at 1 percent significance level. It indicates each El Nino event will increase 6.2804 units in dividend payout ratio. The positive link between El Nino and dividend payout ratio can be attributed to government assistance to the affected firms as a relieve package or may be due to insurance cover to enhance their future performance. Therefore, intervention after the incidence can cause increase in productivity. This is because high dividend payout able to stabilize the fluctuation of stock price by slowing down the trading of stocks

by investors. Investors would like to hold the shares and receive the high dividend payment. Hence, the selling of stocks at low price can be reduced which maintain the market value of company. In addition, high dividend is distributed to investors after the event of El Nino in order to compensate the risk of investors who are holding the shares as well. Thus, dividend policy makers are able to manage one of the risks of company confronting El Nino event by distributing high dividend to investors according to the result above. Furthermore, when the stock price and market value of the companies are under control, management able to quickly settle the damage of crop production and continue operation as usual. Besides, companies will need to inject additional capital expenditure and increase the budget for mitigation of climate change in term of corporate practice, risk management, as well as the equipment that meet the environmental requirement (CDSB, 2014). Thus, hypothesis H_1 is accepted.

Flood is insignificant positively impacting the dividend payout ratio under fixed effects model. Despite no empirical evidence supporting the positive relationship, this finding can be interpreted as flood disaster causes increases the ratio of cash dividend payment of the affect agro firms. This may not be unconnected to proactive measures taken by those firms that already had experience of the catastrophe to enhance their performance and cash dividend payment. However, finding in this paper shows insignificantly relationship between flood and dividend payout ratio which mean flood is not the important factor in determining dividend payout ratio. This might because the major crop production is palm oil and the level of damage of crop production caused by flood is considered not that high due to the palm trees able to tolerant with the flooding at less than a week (Iles, 1993). Besides, palm trees have rambling roots, a wiry trunk and frond shape leaves that able to secure them to stand

stable in a place and avoid being pulled over by grabbing of water. Thus, the production of palm oil and profitability would not be affected much if the flooding is less than seven days. Flood might have impact on the production and profitability of plantation firms if the event is more than a week. Hence, hypothesis H_2 is rejected.

Table 4.6 shows that profitability of firm has negative but insignificant relationship with dividend payout ratio which shows that profitability is not a crucial determinant in dividend payout decision. This result is in line with Mui and Mustapha (2016) and Rafique (2012) who also found an insignificant negative association between profitability and dividend payout. Based on Rafique (2012), firms in developing countries tend to retain the earning and not implement the stable dividend policy as firms in developed countries. This relationship can mean that when firms share value increases, they adjust their dividend decision and focused on re-investing the profit. Thus, hypothesis H_3 is rejected.

Financial leverage of a firm is positively related to dividend payout ratio but the relationship between leverage and dividend payout ratio is insignificant. This finding is identical with Mui and Mustapha (2016), King'wara (2015), Mirza and Azfa (2010), Ahmed and Javid (2009), Abor and Bokpin (2010) and Rafique (2012) where they also found leverage is not significant factor influencing the dividend payout. Positive sign can be explained that the company incurs more debt to finance the assets instead of dilute the percentage of ownership and able to generate more income and cash flow to distribute dividend. Hence, the hypothesis H_4 is rejected as well.

Interestingly, the impact of liquidity on dividend payout ratio is positive but not statistically significant. An increase in 1 unit of liquidity of a firm will increase 0.1081 unit of dividend payout ratio. The findings can be deduced that liquidity has a crucial role on firms' investment allowing them to fulfill their short-term obligations. This is in support by the studies of Fakhra et al. (2013), Kajola et al. (2015), Naeem and Nasr (2007) that explain that firm with more liquidity does not mean that dividend payment will be paid higher to the investors due to excess of cash. Hence, the dividend payment is not based on the firm's availability of liquidity as firm's liquidity is not a strong determinant of dividend payment stated in the result of this paper. Hypothesis H_5 is rejected.

Firm size is significantly and positively associated with dividend payout ratio at 10 percent significance level which indicates that every 1 unit of financial size of a firm increase will result 7.0453 unit of dividend payout ratio of the firm to increase. This finding is parallel with the result of Rafique (2012), Thanatawee (2011), El-Essa (2012), Al-Kuwari (2009), Chen and Dhiensiri (2009), Al-Malkawi et al. (2013), Al-Nawaiseh (2013), Kajola et al. (2015), Mui and Mustapha (2016), Issa (2015) and Jabbouri (2016) where explains that larger firm tends to pay more dividend to the investors. This signifies the size of firms is crucial to be considered by investors before taking investment decision. The larger firms are mostly diversified applying advanced technologies in their production and operations. Hence, hypothesis H_6 is accepted.

Furthermore, the relationship between growth opportunity and dividend payout ratio is negatively related but not statistically significant related. Negative linkage can be

explained that growing company tend to retain the earning for business expansion whereas mature company would like to pay more dividend to investors. This finding is consistent with the finding of Kajola et al. (2015), Rafique (2012), Al-Malkawi et al. (2013), Ahmed and Javid (2009), and Zameer et al. (2013) who also revealed the relationship between growth opportunity and dividend payout ratio is insignificant. Hence, this study rejects hypothesis H_7.

4.8 Summary of Hypothesis Testing

Table 4.7
Summary of Hypothesis Testing

Hypothesis	**Findings**	**Accept/Reject**
H_1: Significant association between dividend payout ratio and El Nino is existed	Positive Significant	Accepted
H_2: Significant association between dividend payout ratio and Flood is existed	Positive Insignificant	Rejected
H_3: Significant association between dividend payout ratio and profitability is existed	Negative Insignificant	Rejected
H_4: Significant association between between dividend payout ratio and leverage is existed	Positive Insignificant	Rejected
H_5: Significant association between dividend payout ratio and liquidity is existed	Positive Insignificant	Rejected
H_6: Significant association between dividend payout ratio and firm size is existed	Positive Significant	Accepted
H_7: Significant association between dividend payout ratio and growth opportunity is existed	Negative Insignificant	Rejected

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the outcomes of this paper. Furthermore, limitation of the study will be stated and recommendation for future research will be suggested in the end of this paper.

5.2 Summary of Findings

This paper investigates the effect of climate change and firm characteristics on the Malaysian agro firm performance. The paper uses El Nino, flood, profitability, financial leverage, liquidity, firm size and growth opportunity as explanatory variables while dividend payout ratio is the dependent variables representing firm payout policy with a sample of 33 plantation firms from 2003 to 2016 making 462 firm-year observations. The result of the robust fixed effects model of this paper uncovers that El Nino has a positive impact on dividend payout ratio. This shows how critical is the climate change on the agro firms performance. The rest of random effects model and pooled OLS regression indicate that El Nino has positive linkage on dividend payout ratio of the agro firms respectively as well. In addition, the impact of flood disaster on dividend payout ratio is, however, insignificant positive for the entire models of this paper. Moreover, the robust fixed effects model shows that firms' profitability has a negative and statistically insignificant impact on dividend payout ratio. Besides, financial leverage of a firm also has a positive insignificantly association with dividend payout ratio. A positive but insignificant linkage is found between liquidity and dividend payout ratio respectively. Another interesting result is

the positive impact of firm size on dividend payout ratio dependent variables for the fixed effects model employed whereby it indicate the larger the firm, the higher the dividend payout. However, growth opportunity has a negative impact on dividend payout ratio for the agro firms under the entire models employed. From the outcome of the most appropriate models in this paper - robust fixed effects model, the independent variables that have significant relationship with dividend payout ratio dependent variable are El Nino and firm size, whereas the independent variables that have insignificant association with dividend payout ratio are profitability, leverage, liquidity, growth opportunity and flood.

5.3 Research Contributions

There is no empirical literature studied about the direct impact of climate change determinants such as El Nino and flood on dividend payout ratio of agro firm. Hence, this study proves that El Nino has significantly effects on firms' dividend payout. This research reveals new empirical knowledge about the financial practices of Malaysian agro/plantation firm related to climate change adaptation in the stock market, namely dividend payout.

5.4 Policy Implications

The findings of the study will be highly beneficial for capital market investors of agro-based companies through understanding about the adjustment of the climate change information in the stock market. Investors would understand the risk of investor to purchase the stock of Malaysian agro-based companies will be compensated by the dividend payments due to the climate change events. Besides, the management of agro/plantation companies will get an idea about the dividend need to

pay related to the climatic events in order to enhance the stock market value of company and enhance the future firm performance. Management also able to maximize the shareholders' wealth by distributing dividend payment based on the climate change.

5.5 Limitations of the Study

There are some limitations in this paper although it has contribution to the literature. Firstly, this research is only analyzing Malaysian public listed agro firms. It might have different findings if examine the plantation companies in other countries. Besides, financial factors and climate factors are being used in the analysis in this study whereby it might have other more relevant determinants to determine the firms' dividend payout. All of these limitations can be eliminated with enough of time and accessibility of data sources.

5.6 Recommendation for Future Research

From a policy perspective, the managers of the agro firms should implement proper policies to enhance their firm's performance taking into consideration both climate change and firms qualities which can induce the future investment in agro-based firms. This paper focuses on climate change and firms' characteristics using Malaysia as a case study thus the findings cannot be generalized to the entire factors predicting firm performance. Future studies can explore additional factors and broaden the scope by including other variables and the countries in the South-East Asian region to justify the findings of this paper.

References

Abdulkadir, R. I., Abdullah, N. A. H. & Wong, W. (2016). Dividend Payment Behaviour and its Determinants: The Nigerian Evidence. *African Development Review*, 28(1), 53-63.

Abor, J., & Bokpin, G. A. (2010). Investment Opportunities, Corporate Finance, and Dividend Payout Policy: Evidence from Emerging Markets. *Studies in Economics and Finance*, 27(3), 180-194.

Afza, T., Hammad, M. (2011). Do Mature Companies Pay More Dividends? Evidence from Pakistani Stock Market. *Mediterranean Journal of Social Sciences*, 2 (2)

Ahmed, H. and Javid, A. Y. (2009): The Determinants of Dividend Policy in Pakistan. *International Research Journal of Finance and Economics*, 29, 110-125.

Aivazian, V., Booth, L. & Cleary, S. (2003), Do Emerging Market Firms Follow Different Dividend Policies from U.S. Firms? *Journal of Financial Research*, 26,371–387.

Alam, M.M., Siwar, C., & Al-Amin, A.Q. (2010). Climate Change Adaptation Policy Guidelines for Agricultural Sector in Malaysia. *Asian Journal of Environmental and Disaster Management*, Vol. 2(4), 463– 469.

Alam, M.M., Siwar, C., Molla, R.I., Talib, B., Toriman, M.E. (2011). Paddy Farmers' Adaptation Practices to Climatic Vulnerabilities in Malaysia. *Mitigation and Adaptation Strategies for Global Change*, 17(4), 415-423.

Alam, M & Hossain, M.E (2012). Dividend Policy: A Comparative Study of UK and Bangladesh Based Companies. *IOSR Journal of Business and Management*, 1(1), 57-67.

Al-Kuwari, D (2009). Determinants of the Dividend Policy in Emerging Stock Exchanges: The Case of GCC Countries. *Global Economy & Finance Journal*, 2(2), 38-63.

Al-Malkawi, H. A. N., Twairesh, A. E., & Harery, K. (2013). Determinants of the Likelihood to Pay Dividends: Evidence from Saudi Arabia. *Journal of American Science*, 9(12), 518-528.

Al-Nawaiseh, M. (2013). Dividend Policy and Ownership Structure: An Applied Study on Industrial Companies in Amman Stock Exchange. *Journal of Management Research*, 5(2), 83.

Al-Taleb, G. (2012). Measurement of Impact Agency Costs Level of Firms on Dividend and Leverage Policy: An Empirical Study. *Interdisciplinary Journal of Contemporary Research Business*, 3 (10), 234-243.

Amado, J. C., Adams, P., Coleman, H., & Schuchard, R. (2012). PREP Value Chain Climate Resilience: A Guide to Managing Climate Impacts in Companies and Communities. *Partnership for Resilience and Environmental Preparedness.*

Amidu, M., & Abor, J. (2006). Determinants of Dividend Payout Ratios in Ghana. *The Journal of Risk Finance*, 7(2), 136-145.

Anil, K., & Kapoor, S. (2008). Determinants of Dividend Payout Ratios: A Study of Indian Information Technology Sector. *International Research Journal of Finance and Economics*, 15, 63-71.

Asongu, S. (2013). Globalization and Financial Market Contagion: Evidence from Financial Crisis and Natural Disasters. *African Governance and Development Institute Working Paper*, 13/035.

Baker, J.T., Allen, Jr.L.H. (1993). Contrasting Crop Species Responses to CO2 And Temperature: Rice, Soybean and Citrus. *Vegetatio*, 104/105, 239-260.

Baker, H.K., Powell, G.E. (2012). Dividend Policy in Indonesia: Survey Evidence from Executives. *Journal of Asia Business Studies*, 6(1), 79-92.

Benavides, J., Berggrun, L., & Perafan, H. (2016). Dividend Payout Policies: Evidence from Latin America. *Finance Research Letters*, 17, 197-210.

Berry, B. J., & Okulicz-Kozaryn, A. (2008). Are There ENSO Signals in The Macroeconomy? *Ecological Economics*, 64(3), 625-633.

Bhadada, G. (2015). What is the Relationship between Equity Risk Premium and Stock Prices?

Bhattacharya, S. (1979). Imperfect Information, Dividend Policy and 'The Bird in the Hand' Fallacy. *Bell Journal of Economics 10*, 259–270.

Bourdeau-Brien, M. & Kryzanowski, L. (2017). The Impact of Natural Disasters on the Stock Returns and Volatilities of Local Firms. *The Quarterly Review of Economics and Finance*, 63, 259-270.

Blotenburg, T. (2017). The Effect of El Niño on Stock Markets (Master Thesis). Erasmus University.

Cashin, P., Mohaddes, K., & Raissi, M. (2017). Fair Weather or Foul? The Macroeconomic Effects of El Niño. *Journal of International Economics*, 106, 37-54.

Chen J. and Dhiensiri N. (2009), Determinants of Dividend Policy: The Evidence from New Zealand, *International Research Journal of Finance and Economics*, Issue (34), 18-28.

Cirino, P. H., Féres, J. G., Braga, M. J., & Reis, E. (2015). Assessing the Impacts of ENSO-related Weather Effects on the Brazilian Agriculture. *Procedia Economics and Finance,* 24, 146-155.

Climate Disclosure Standards Board (CDSB). (2014). Climate Resilient Stock Markets: Climate Change Reporting Proposals for Adoption or Support by Stock Exchanges.

Cristea, C., & Cristea, M. (2017). Determinants of Corporate Dividend Policy: Evidence from Romanian Listed Companies. *MATEC Web of Conferences*, 126, 04009.

Davey, M., Huddleston, M., Brookshaw, A. (2011). Global Impact of El-Nino and La-Nino: Implications for Financial Markets. *Adviser Report for the Lighthill Risk Network.* UK: Met Office.

Denis, D. J. & Osobov, I. (2008), Why Do Firms Pay Dividends? International Evidence on the Determinants of Dividend Policy. *Journal of Financial Economics*, 89 (1), 62-82.

El-Essa, M.S, Hameedat, M.M, Altaraireh, J.A & Nofal, M.A (2012). A Worthy Factors Affecting Dividends Policy Decisions: An Empirical Study on Industrial Corporations Listed in Amman Stock Exchange. *Interdisciplinary Journal of Contemporary in Business*, 4(5), 614-622.

Faccio, M., Lang, L. H., & Young, L. (2001). Dividends and Expropriation. *American Economic Review*, 91(1), 54-78.

Fakhra, M, Sajid, G, Muhammed, T. K, Shafiq, U. R & Madiha, K (2013). Factors Influencing Dividend Payout Decisions of Financial and Non-Financial Firms. *Research Journal of Finance and Accounting*, 4(1), 35-46.

Gill, A., Biger, N. and Tibrewala, R. (2010). Determinants of Dividend Payout Ratios: Evidence from United States. *The Open Business Journal*, 3, 8-14.

Gordon, M. J. (1963). Optimal Investment and Financing Policy. *Journal of Finance*, 264-272.

Green Palm. (2016). Top Palm Oil Producing Nations Jan - Dec 2015.

Grossman, D., Waskow, D., Coleman, H., Scharn, E., Adrio, B., Coburn, J., & Henson, R. (2011). Physical Risks from Climate Change: A Guide for Companies and Investors on Disclosure and Management of Climate Impacts. *Boston: Ceres with Oxfam America and Calvert Investment.*

Gujarati, D. N., & Porter, D. C. (2010). *Essentials of econometrics* (4th ed.). New York: McGraw-Hill.

Harper, D. (2017). The Equity-Risk Premium: More Risk for Higher Returns.

Hoque, A. (2017). Impulse of Dividend Payment Decision: Evidence from Pharmaceutical Industry in Bangladesh. *International Journal of Financial Research*, 9(1), 219.

Ibrahim, A. Z., & Alam, M. M. (2016). Climatic Changes, Government Interventions, And Paddy Production: An Empirical Study of The Muda Irrigation Area in Malaysia. *International Journal of Agricultural Resources, Governance and Ecology*, 12(3), 292.

Iles, J. (1993). Effects of Flooding on Trees. *Horticulture and Home Pest News*, 112.

Imran, K. (2011). Determinants of Dividend payout Policy: A Case of Pakistan Engineering Sector. *The Romanian Economic Journal*, 14(41), 47-60.

International Finance Corporation. (2010). Climate Risk and Financial Institutions – Challenges and Opportunities.

Issa, A. I. F. (2015). The Determinants of Dividend Policy: Evidence from Malaysian Firms. *Research Journal of Finance and Accounting*, 6(18).

Jabbouri, I. (2016). Determinants of corporate dividend policy in emerging markets: Evidence from MENA stock markets. *Research in International Business and Finance*, 37, 283-298.

Jin, Z. (2000). On the Differential Market Reaction to Dividend Initiations. *The Quarterly Review of Economics and Finance*, 40(2), 263-277.

Kajola, S. O., Desu, A. A., & Agbanike, T. F. (2015). Factors Influencing Dividend Payout Policy Decisions of Nigerian Listed Firms. *International Journal of Economics, Commerce and Management*, 3(6), 539-557.

Kania, S. L. & Bacon, F. W. (2005). What factors motivate the corporate dividend decision? *American Society of Business and Behavioral Sciences E-Journal*, Vol. 1, No. 1.

Kaźmierska-Jóźwiak, B. (2015). Determinants of Dividend Policy: Evidence from Polish Listed Companies. Procedia Economics and Finance, 23, 473-477.

Khan, F.A., & Ahmad, N. (2017). Determinants of Dividend Payout: An Empirical Study of Pharmaceutical Companies of Pakistan Stock Exchange (PSX). *Journal of Financial Studies & Research*, 2017(2017), 16.

King'wara, R. (2015). Determinants of Dividend Payout Ratios in Kenya. *Research Journal of Finance and Accounting*, 6(1), 48-51.

Koerniadi, H., Krishnamurti, C., & Tourani-Rad, A. (2016). Natural Disasters-Blessings in Disguise?. *The Singapore Economic Review*, 61(01), 1640004.

Kovats, R. S., Bouma, M. J., Hajat, S., Worrall, E., & Haines, A. (2003). El Niño And Health. *The Lancet*, 362, 1481-1489.

Kurukulasuriya, P. & Rosenthal, S. (2003). Climate Change and Agriculture: A Review of Impacts and Adaptations. *Environment Department Papers*, 91.

Lintner, J. (1962). "Dividends Leverage, Stock Prices, and the Supply of Capital of Corporations. *Review of Economics and Statistics*, 243-269.

Luo, N. (2012). The Impact of Disasters on Global Stock Market: The Case of The Japanese 2011 Earthquake. (Master Research Project), Saint Mary's University.

Miller, M. H. & Modigliani, F. (1961). Dividend Policy, Growth, and the Valuation of Shares. *The Journal of Business*, 34(4), 411-433.

Miller, M., Rock, K. (1985). Dividend Policy under Asymmetric Information. *The Journal of Finance 40*, 1031–1051.

Mirza, H., & Azfa, T. (2010). Ownership Structure and Cash Flows as Determinants of Corporate Dividend Policy in Pakistan. *International Business Research*, 3(3), 210-221.

Mitnick, B. M. (1974). The Theory of Agency: The Concept of Fiduciary Rationality and Some Consequences. *Unpublished Ph.D. Dissertation, Department of Political Science, University of Pennsylvania.* Univ. Microfilms No. 74-22,881.

Morris, J., & Brewin, P. (2014). The Impact of Seasonal Flooding on Agriculture: The Spring 2012 Floods in Somerset, England. *Journal of Flood Risk Management*, 7(2), 128-140.

Mui, Y. T. & Mustapha, M. (2016). Determinants of Dividend Payout Ratio: Evidence from Malaysian Public Listed Firms. *Journal of Applied Environmental and Biological Sciences*, 6(1S) 48-54, 2016.

Murray, R. (2015). How Climate Change is Putting Your Investments at Risk.

Musiega, M., Alala, O. B., Douglas, M., Christopher, M. O. & Robert, E. (2013). Determinants of Dividend Payout Policy Among Non Financial Firms on Nairobi Securities Exchange, Kenya, *International Journal of Scientific & Technology Research*, 2(10), 253-266.

Naceur, S. B., Goaied, M., & Belanes, A. (2006). On the Determinants and Dynamics of Dividend Policy. *International review of Finance*, 6(1‐2), 1-23.

Naeem, S., & Nasr, M. (2007). Dividend Policy of Pakistani Firms: Trends and Determinants. *International Review of Business Research Papers*, III (3), 242-254.

New Climate Economy (2014). Better Growth Better Climate.

Papadopoulos, D.L. & Charalambidis, P.D. (2007). Focus on Present Status and Determinants of Dividend Payout Policy: Athens stock exchange in perspective. *Journal of Financial Management and Analysis*, 20 (2), 24–37.

Paterson, R. R. M., Sariah, M. & Lima, N. (2013). How Will Climate Change Affect Oil Palm Fungal Diseases? *Crop Prot*. 46, 113–120.

Paterson, R.R.M., Kumar, L., Taylor, S. and Lima, N. (2015). Future Climate Effects on Suitability for Growth of Oil Palms in Malaysia and Indonesia. *Scientific reports*, 5.

Patra, T., Poshakwale, S., & Ow-Yong, K. (2012). Determinants of Corporate Dividend Policy in Greece. *Applied Financial Economics*, 22(13), 1079-1087.

Periasamy, P. and Satish, R. (2016). The Impact of Elnino on Soft and Hard Commodities, Reference to Commodity Markets and Commodity Derivatives in India – A Study. *Indian Journal of Science and Technology*, 9(19), 1-4.

Piao, S., Ciais, P., Huang, Y., Shen, Z., Peng, S., Li, J., Zhou, L., Liu, H., Ma, Y., Ding, Y., Friedlingstein, P., Liu, C., Tan, K., Yu, Y., Zhang, T., & Fang, J. (2010). The impacts of climate change on water resources and agriculture in China. *Nature*, 467, 43-51.

Rafique, M. (2012). Factors Affecting Dividend Payout: Evidence from Listed Non-Financial Firms of Karachi Stock Exchange. *Business Management Dynamics*, 1 (11), 76-92.

Rahman, A. K. A., Abdullah, R., Balu, N. and Shariff, F. M. (2013). The Impact of La Niña and El Niño Events on Crude Palm Oil Prices: An Econometric Analysis. *Oil Palm Industry Economic Journal*, 13 (2), 38-51.

Rehman, A and Takumi, H. (2012). Determinants of Dividend Payout Ratio: Evidence from Karachi Stock Exchange (KSE). *Journal of Contemporary Issues in Business Research*, 1(1), 20-27.

Rosenzweig, C., Tubiello, F. N., Goldberg, R., Mills, E., & Bloomfield, J. (2002). Increased Crop Damage in the US from Excess Precipitation Under Climate Change. *Global Environmental Change*, 12(3), 197-202.

Ross, S. A. (1973). The Economic Theory of Agency: The Principal's Problem. *American Economic Review*, 62(2), 134-139.

Selvaraju, R. (2003). Impact of El Niño–southern Oscillation on Indian Foodgrain Production. *International Journal of Climatology*, 23(2), 187-206.

Shabani, F., Kumar, L., & Taylor, S. (2012) Climate Change Impacts on The Future Distribution of Date Palms: A Modeling Exercise Using CLIMEX. *PLoS One* 7, 1–12.

Smith, S. C., & Ubilava, D. (2017). The El Niño Southern Oscillation and Economic Growth in the Developing World. *Global Environmental Change*, 45, 151-164.

Stathers, R. (2015). El Nino's Economic Impact: What the Brokers Say. Schroders Talking Point, August.

Sustainable Stock Exchanges - United Nations (SSE). (2016). Sustainable Stock Exchanges Initiative 2016 Report on Progress.

Thanatawee, Y. (2011). Life-Cycle Theory and Free Cash Flow Hypothesis: Evidence From Dividend Policy in Thailand. *International Journal of Financial Research*, 2(2), 52-60.

United Nations Framework Convention on Climate Change (UNFCCC). (2014). 2014 Biennial Assessment and Overview of Climate Finance Flows Report.

Wang, L., & Kutan, A. (2013). The Impact of Natural Disasters on Stock Markets: Evidence from Japan and the US. *Comparative Economic Studies*, 55(4), 672-686.

Wilby, R. L., & Keenan, R. (2012). Adapting to Flood Risk Under Climate Change. *Progress in Physical Geography*, 36(3), 348-378.

Wooldridge, J. M. (2006). *Introductory econometrics: A modern approach.* Mason, Ohio:South-Western Cengage Learning.

Worthington, A.C. & Valadkhani, A. (2004). Measuring the Impact of Natural Disasters on Capital Markets: An Empirical Application Using Intervention Analysis. *Applied Economics*, 36, 2177-2186.

Worthington, A.C. (2008). The Impact of Natural Events and Disasters on the Australian Stock Market: A GARCH-M Analysis of Storms, Floods, Cyclones, Earthquakes and Bushfires. *Global Business and Economics Review*, 10, 1-10.

Zameer, H., Rasool, S., Iqbal, S., & Arshad, U. (2013). Determinants of Dividend Policy: A Case of Banking Sector in Pakistan. *Middle-East Journal of Scientific Research*, 18(3), 410-424.

Zhou, F. and Botzen, W.J.W. (2017). The Impact of Natural Disasters on Firm Growth in Vietnam: Interaction with Financial Constraints. *U.S.E Discussion Paper*, 17-20.

Appendices

Appendix A: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
DIV	462	26.38253	22.87616	0	99.81
PROF	462	5.357987	5.675711	-15.11	39.67
LEV	462	57.25747	78.81945	-175.82	446.88
LIQD	462	8.334757	19.13453	.026183	252.7381
LnSIZE	462	17.82684	6.075	3.178054	23.89482
GROP	462	.1868961	.665845	-.984512	7.222567
ELN	462	.2857143	.4522437	0	1
FLD	462	.3571429	.4796768	0	1

Appendix B: Correlation Matrix

	DIV	PROF	LEV	LIQD	LnSIZE	GROP	ELN
DIV	1.0000						
PROF	0.0143	1.0000					
LEV	0.2164	0.1059	1.0000				
LIQD	0.0857	0.0071	0.2526	1.0000			
LnSIZE	-0.1015	-0.2118	-0.2854	-0.1480	1.0000		
GROP	-0.0665	-0.0843	-0.0098	-0.0223	0.0822	1.0000	
ELN	0.1889	-0.1677	0.0273	0.0054	0.0289	0.0229	1.0000
FLD	0.0406	-0.1713	-0.0106	0.0039	0.0014	0.0077	0.1886

	FLD
FLD	1.0000

Appendix C: Pooled OLS Regression Result

Source	SS	df	MS	Number of obs	=	462
				F(7, 454)	=	6.25
Model	21199.7491	7	3028.53559	Prob > F	=	0.0000
Residual	220050.267	454	484.692219	R-squared	=	0.0879
				Adj R-squared	=	0.0738
Total	241250.017	461	523.318908	Root MSE	=	22.016

DIV	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
PROF	.052227	.190371	0.27	0.784	-.3218907	.4263446
LEV	.0553035	.0139606	3.96	0.000	.0278681	.0827389
LIQD	.0347087	.0556162	0.62	0.533	-.0745885	.1440059
LnSIZE	-.1514687	.1806056	-0.84	0.402	-.5063953	.2034578
GROP	-2.196576	1.549384	-1.42	0.157	-5.241429	.8482768
ELN	9.432804	2.334366	4.04	0.000	4.845301	14.02031
FLD	.4805392	2.201242	0.22	0.827	-3.845349	4.806427
_cons	22.89091	4.151086	5.51	0.000	14.73318	31.04863

Appendix D: Fixed Effects Regression Result

```
Fixed-effects (within) regression               Number of obs      =       462
Group variable: countrynum                      Number of groups   =        33

R-sq:                                           Obs per group:
     within  = 0.1043                                         min =        14
     between = 0.0342                                         avg =      14.0
     overall = 0.0061                                         max =        14

                                                F(7,422)           =      7.02
corr(u_i, Xb)  = -0.9466                        Prob > F           =    0.0000
```

DIV	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
PROF	-.2174888	.1863374	-1.17	0.244	-.5837538	.1487763
LEV	.0137997	.0213604	0.65	0.519	-.0281864	.0557857
LIQD	.1080757	.0598424	1.81	0.072	-.0095506	.225702
LnSIZE	7.045309	1.918736	3.67	0.000	3.27384	10.81678
GROP	-1.811563	1.297919	-1.40	0.164	-4.362755	.7396294
ELN	6.280438	2.02675	3.10	0.002	2.296656	10.26422
FLD	.2763489	1.798976	0.15	0.878	-3.259722	3.81242
_cons	-101.2932	34.34975	-2.95	0.003	-168.8111	-33.77528
sigma_u	47.612928					
sigma_e	17.834558					
rho	.87695792	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(32, 422) = 8.43                     Prob > F = 0.0000
```

Appendix E: Random Effects Regression Result

```
Random-effects GLS regression                   Number of obs     =       462
Group variable: countrynum                      Number of groups  =        33

R-sq:                                           Obs per group:
     within  = 0.0742                                         min =        14
     between = 0.0644                                         avg =      14.0
     overall = 0.0695                                         max =        14

                                                Wald chi2(7)      =     35.95
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

DIV	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
PROF	-.269175	.1819257	-1.48	0.139	-.6257428	.0873928
LEV	.0309765	.0187223	1.65	0.098	-.0057186	.0676716
LIQD	.0838425	.0573588	1.46	0.144	-.0285788	.1962637
LnSIZE	-.0077029	.4079719	-0.02	0.985	-.8073132	.7919074
GROP	-2.052933	1.310145	-1.57	0.117	-4.62077	.514904
ELN	8.923346	1.932767	4.62	0.000	5.135193	12.7115
FLD	-.1345573	1.81784	-0.07	0.941	-3.697458	3.428343
_cons	23.37186	8.183235	2.86	0.004	7.333012	39.4107
sigma_u	13.112872					
sigma_e	17.834558					
rho	.35089956	(fraction of variance due to u_i)				

Appendix F: Breusch and Pagan LM Test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        DIV[countrynum,t] = Xb + u[countrynum] + e[countrynum,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                     DIV |    523.3189       22.87616
                       e |    318.0715       17.83456
                       u |    171.9474       13.11287

        Test:   Var(u) = 0
                                 chibar2(01) =   282.49
                              Prob > chibar2 =   0.0000
```

Appendix G: Hausman Test

.

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
PROF	-.2174888	-.269175	.0516862	.0403072
LEV	.0137997	.0309765	-.0171769	.0102831
LIQD	.1080757	.0838425	.0242333	.0170609
LnSIZE	7.045309	-.0077029	7.053012	1.874861
GROP	-1.811563	-2.052933	.2413703	.
ELN	6.280438	8.923346	-2.642907	.6100229
FLD	.2763489	-.1345573	.4109062	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 23.23
Prob>chi2 = 0.0016
(V_b-V_B is not positive definite)

Appendix H: Variance Inflation Factor

Variable	VIF	1/VIF
LEV	1.15	0.868343
LnSIZE	1.14	0.873394
PROF	1.11	0.900581
LIQD	1.08	0.928381
FLD	1.06	0.943044
ELN	1.06	0.943370
GROP	1.01	0.987873
Mean VIF	1.09	

Appendix I: Wooldridge Test


```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
       F(  1,       32) =      2.638
            Prob > F =      0.1142
```

Appendix J: Modified Wald Test

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (33)  =     903.14
Prob>chi2 =      0.0000
```

Appendix K: Fixed Effect with Robust Standard Error

```
Fixed-effects (within) regression               Number of obs      =       462
Group variable: countrynum                      Number of groups   =        33

R-sq:                                           Obs per group:
     within  = 0.1043                                         min =        14
     between = 0.0342                                         avg =      14.0
     overall = 0.0061                                         max =        14

                                                F(7,32)            =      5.71
corr(u_i, Xb)  = -0.9466                        Prob > F           =    0.0002

                                (Std. Err. adjusted for 33 clusters in countrynum)
```

DIV	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ELN	6.280438	1.779454	3.53	0.001	2.655809	9.905068
FLD	.2763489	1.411701	0.20	0.846	-2.599192	3.151889
PROF	-.2174888	.1419681	-1.53	0.135	-.5066684	.0716908
LEV	.0137997	.0290379	0.48	0.638	-.0453486	.0729479
LIQD	.1080757	.1111978	0.97	0.338	-.1184269	.3345783
LnSIZE	7.045309	3.508912	2.01	0.053	-.1021113	14.19273
GROP	-1.811563	1.411216	-1.28	0.208	-4.686115	1.06299
_cons	-101.2932	63.12639	-1.60	0.118	-229.8774	27.29106
sigma_u	47.612928					
sigma_e	17.834558					
rho	.87695792	(fraction of variance due to u_i)				