THE IMPACT OF DIVIDEND POLICY ON STOCK PRICE VOLATILITY BASED ON “BIRD-IN-HAND” THEORY: EVIDENCE FROM MALAYSIA

RABIA QAMMAR

DOCTOR OF PHILOSOPHY
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By
RABIA QAMMAR

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Nama Pelajar (Name of Student)	:	**Rabia Qammar**
Tajuk Tesis / Disertasi *(Title of the Thesis / Dissertation)*	:	**The Impact of Dividend Policy on Stock Price Volatility based on "Bird-in-Hand" Theory: Evidence from Malaysia**
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Nama Penyelia/Penyelia-penyelia *(Name of Supervisor/Supervisors)*	:	**Prof. Dr. Yusnidah Ibrahim**

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ABSTRACT

There is an unending debate about the relationship between dividend policy and stock price volatility in the capital market literature. As the result is still inconclusive, there is a good scope to investigate the issue further, especially in the emerging and less efficient markets, as they are still highly volatile in nature. Bursa Malaysia, the exclusive capital market platform of Malaysia, is considered to be one of the highly volatile emerging markets. Over the past few years, Bursa Malaysia has been observed surviving from several financial crises and other economic issues. Therefore, the objective of this study is to examine the relationship between dividend policy and stock price volatility, with the moderating role of “Bird-in-Hand” theory based on Bursa Malaysia. This study utilized two measurements for stock price volatility, namely Parkinson formula and Generalized Autoregressive Conditional Heteroskedasticity (GARCH). The cost of capital and rate of return were adopted in measuring the moderating effects of “Bird-in-Hand” theory. This study utilized the panel data regression models for data analysis on the sample of 548 non-financial listed companies in Bursa Malaysia from the year 2009 to 2016. This study found significant effects of dividend payout ratio and dividend yield on stock price volatility, when volatility was measured by both GARCH and Parkinson formula methods. Moreover, this study found significant moderating effects of cost of capital on the relationship between dividend payout ratio and stock price volatility, when volatility was measured using the Parkinson formula. However, the results were insignificant using the GARCH method. The study concluded dividend policy as a strong predictor of stock price volatility. The implications of this research are expected to enable investors, policy makers, and researchers to reduce the stock price volatility in Bursa Malaysia.

Keywords: dividend policy, stock price volatility, “Bird-in-Hand” theory, panel data regression, Bursa Malaysia

ABSTRAK

Perdebatan mengenai hubungan di antara dasar dividen dan kemeruapan harga saham dari kajian lepas dalam pasaran modal masih diperdebatkan. Memandangkan kajian masih belum dapat menyimpulkan hubungan tersebut, masih terdapat ruang yang baik untuk mengkaji isu ini dengan lebih mendalam, terutamanya dalam pasaran yang baru dan kurang efisien kerana keadaannya yang masih tidak menentu. Bursa Malaysia, satu platform untuk pasaran modal Malaysia, dianggap sebagai pasaran baru yang tidak menentu. Sejak beberapa tahun yang lepas, Bursa Malaysia telah mengharungi beberapa krisis kewangan dan isu-isu ekonomi yang lain. Oleh itu, objektif kajian yang dijalankan ke atas Bursa Malaysia, adalah untuk mengkaji hubungan antara dasar dividen dan kemeruapan harga saham, dengan menggunakan teori "Bird-in-Hand" sebagai moderator. Kajian ini menggunakan dua ukuran kemeruapan harga saham, iaitu formula Parkinson dan Autoregresif Umum Heteroskedastisiti Bersyarat (GARCH). Kos modal serta kadar pulangan pula digunakan untuk mengukur kesan moderator teori "Bird-in-Hand". Kajian ini menggunakan model regresi data panel untuk menganalisis ke atas sampel sebanyak 548 buah syarikat bukan kewangan yang tersenarai di Bursa Malaysia daripada tahun 2009 hingga 2016. Penemuan daripada kajian ini mendapati terdapat kesan yang signifikan antara nisbah pembayaran dividen dan hasil dividen terhadap kemeruapan harga saham, apabila kemeruapan diukur dengan menggunakan kaedah GARCH dan formula Parkinson. Tambahan pula, kajian ini juga mendapati kos modal yang berfungsi sebagai moderator mempunyai kesan yang signifikan di antara hubungan nisbah pembayaran dividen dan kemeruapan harga saham, apabila kemeruapan diukur dengan menggunakan formula Parkinson. Walau bagaimanapun, dapatan kajian menjadi tidak signifikan apabila kaedah GARCH digunakan. Kajian ini menyimpulkan dasar dividen sebagai peramal utama kepada kemeruapan harga saham. Implikasi daripada kajian ini membolehkan pelabur, pembuat dasar, dan penyelidik mengurangkan kemeruapan harga saham di Bursa Malaysia.

Kata kunci: dasar dividen, kemeruapan harga saham, teori "Bird-in-Hand", regresi data panel, Bursa Malaysia

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With the name of Allah Almighty, the most beneficent, the most merciful,

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LIST OF ABBREVIATIONS

Stock PV	Stock Price Volatility
DPR	Dividend Payout Ratio
DY	Dividend Yield
SIZE	Firm Size
FINLEV	Financial Leverage
EPS	Earnings Per share
GROWTH	Growth in Assets
COC	Cost of Capital
ROR	Rate of Return
BIH	Bird-in-Hand
NYSE	New York Stock Exchange
NASDAQ	Nasdaq stock market
FTSE	Financial Times Stock Exchange
KLCI	Kuala Lumpur Composite Index
NPV	Net Present Value
VIF	Variance inflation Index
KLSE	Kuala Lumpur Stock Exchange
FEM	Fixed effect Model
REM	Random effect Model
LM	Lagrange multiplier
POLS	Pooled Ordinary Least Square

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

In this chapter, the background of this research study is presented, followed by the statement of problem, the research questions, the research objectives, scope of the study, significance of the research, and the organization of the thesis chapters.

1.2 Background of Study

For decades, prediction of the stock markets has been of great interest among traders, economists, businesses and consumers (Masry, 2015). In fact, the stock market reflects the country's economic development (Kokkonen & Suominen, 2015). Stock market indexes are considered as a barometer of the economic situation of any country (Hamrita & Trifi, 2011; Bilias, Georgarakos & Haliassos, 2016). Therefore, the importance of stock markets towards the growth of the country's economy should not be underestimated due to its significant contribution in creating wealth and the potential of its liquidity in steering economic growth (Lee et al., 2016).

Firms make efforts to enlist themselves in stock markets to improve their reputation and visibility (Masry, 2015). Stock markets provide the ability for firms to raise capital and expand their business (Chen et al., 2014). When a firm needs to raise money, it offers shares to the public. Listed companies issue the shares through the stock market which help to increase the firm value (Mittnik, Robinzonov & Spindler, 2015).

The first stock exchange market in the world is the Amsterdam stock exchange by Dutch East Company, established in 1602 (Arestis, Luintel & Demetriades, 2001). This market deals with stocks, bonds and also trade in securities. Currently, the NYSE (New York Stock Exchange) and NASDAQ (National Association of Securities Dealers Automated Quotation System) are the two largest financial stock markets in the world (Li & Giles, 2015). These stock markets have the market capitalization of USD19.63 trillion and USD 9.63 trillion respectively. Moreover, these two markets are considered as the most developed and less volatile markets (Li & Giles, 2015).

Stock markets in emerging economies are smaller in size, less efficient and have been considered as more risky and volatile compared to developed markets (Kumar & Tsetsekos, 1999; Bekaert & Harvey, 2017; Laopodis & Papastamou, 2016). While rapid globalization over the past 20 years has brought economies closer together, emerging markets have not yet been designated to be considered as fully integrated markets among global capital markets (Bekaert & Harvey, 2017). Some of the emerging markets such as South Korea's market, China's market (Shanghai stock market) and Malaysia's market (Bursa Malaysia) are considered as high return markets (Zainudin, Mahzdan & Yet, 2018). Emerging markets are more volatile and have less information efficiency (Kumar & Tsetsekos, 1999; Zainudin, Mahzdan & Yet, 2018). The emerging stock markets can progress toward developed stock markets by providing more security to local and international investors (Choudhry & Osoble, 2015).

The Malaysia's stock market is considered a young stock market, compared to other capital markets such as the NYSE (Lee et al., 2016). Malaysia's stock market is classified as an emerging market with unique characteristics (Hooi et al., 2015). This stock market is also known as a more mature market among the emerging markets (Lingaraja, Selvam & Vasanth, 2014). Referring to the history of Malaysia's stock market, it has been established since the year 1960, where the market share has been consistently enhanced in the past 50 years (Zakaria & Shamsuddin, 2012).

Currently, Bursa Malaysia has become one of the biggest stock markets in the South East Asia (Arshad & Yahya, 2016). At the end of March 2018, Bursa Malaysia capitalized approximately USD 441.24 billion (Yee & Salleh, 2018). The main market of Bursa Malaysia capitalizes the whole Malaysia's market known as the Kuala Lumpur Composite Index (KLCI). It also demonstrates Malaysia's stock market's performance (Chong & Puah, 2009). Past records have indicated that the Malaysia's economy can be severely influenced by external factors. This has been proven by the impact left by the Asian financial crisis during the year 1997 and 1998 and later the global financial crisis in 2008 (Athukorala, 2012). These financial crises caused terrible fluctuation in the KLCI, which was showing high performances before the crisis of 1997-1998 (Rahman, Sidek & Tafri, 2009).

KLCI index was at 1216 points at the end of January 1997 and declined to 594 points by December 1997 due to the financial crisis (Rahman, Sidek & Tafri, 2009). After Asian financial crisis 1997, again KLCI index fall down from 1393 points to 876 points in January 2008 (Khoon & Lim, 2010). At that time, the KLCI index dropped 45%, which was the most severe decline seen than the Asian financial crisis during 1997 (Angabini & Wasiuzzaman, 2011). Subsequently, the stock's share price also decreased approximately 20% during 2007 to 2009, which indicated a higher collapse magnitude during the 2008 crisis (Athukorala, 2012).

In Southeast Asia, Malaysia's stock market is considered a riskier market compared to other emerging markets (Arshad & Yahya, 2016; Zakariya, Muhammad & Zulkifli, 2012). Malaysia's stock market is considered a more volatile market in Asia due to profound changes in the country's economy (Zakaria & Shamsuddin, 2012). The country's economy is highly affected by the stock market volatility (Geetha et al., 2011). Furthermore, the below figure 1.1 reveals an elevated volatility trend of Malaysia's stock market from the year 2011-2018.

Figure 1.1
Malaysia's Stock Market Trend from 2011-2018
Source: Trading Economic (2018)

According to Table 1.1, the trend from 2008 to 2017 illustrates the prominent fluctuation of capital gain in non-financial sectors. As shown in Table 1.1 after the crisis of 2008, the capital return also decreases from the year 2008 to 2017, which indicates volatility in Bursa Malaysia.

Table 1.1
Year on Year Performance and Volatility on Capital Return of Bursa Malaysia

Index % MYR	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Bursa Malaysia	-39.3	45.2	19.3	0.8	10.3	10.5	-5.7	-3.9	-3.0	9.4

Source: FTSE Fact Sheet (2018)

The stock price variance is the symbol of risk or volatility in the stock market (Ross, 2008; Qin & Singal, 2015). Sahu and Mondal (2015) noted that markets with high risks have high returns, hence the volatility is high in emerging markets. The volatility of share price is the systemic risk faced by investors who possess ordinary shares' investment (Guo, 2002; Ross, 2008). Investors are by nature risk averse, and the volatility of their investments is important for them because it is a measure of the level of exposed risk (Hashemijoo, Ardekani & Younesi, 2012).

It is clear that the issue of the relationship between dividend policy and the share price volatility has generated intense debate for many years. Furthermore, decisions on whether to distribute earnings to shareholders or to plough the money back into the firm has left the opportunity for many finance scholars and professionals to examine its various effects. The dividend policy formulates a practical link between a firm and the market. Determining an appropriate dividend policy is a difficult task due to the need in balancing potentially conflicting forces (Baker & Weigand, 2015).

Several considerations are required to make a strong dividend policy, such as dividend payout in the form of cash or payable, the amount pays as cash dividend or repurchase shares, and the time limit of payments as short or long (Iqbal, Waseem & Asad, 2014). Dividends are part of a return on the investment in a firm, the normative relationship between risk and return requires firms to pay dividends with the change in systematic or unsystematic risks to the investors (Hooi et al., 2015). Investors expect higher returns on their investment by dividends and capital gains (Yegon, Cheruiyot & Sang, 2014). The aim of dividend payment is to provide the profit to investors on their investments (Al-Shawawreh, 2014). Dividend policy is important not only for investors, and regulatory bodies, but also for firms.

The payment behavior of dividends does not only varies from company to company, but it also varies from sector to sector in both developed and emerging markets (Duke, Ikenna & Nkamare, 2015). The requirement of dividend payment is increasing among investors in emerging markets similar to developed markets (Yegon, Cheruiyot & Sang, 2014). In terms of “Bird-in-Hand” theory, investors are risk averse, and they focus on the "Bird-in-hand" in the form of dividends instead of the "two in the bush" in the form of future capital gains (Al-Malkawi, Rafferty & Pillai, 2010). The “Bird-in-Hand” theory emphasis on maximization of shareholder wealth by paying a high amount of cash dividend which increase the share price of companies. Moreover, companies which do not consider dividend payment have higher risk (Lashgari & Ahmadi, 2014). Therefore, various studies try to examine the effect of dividend policy on stock price volatility, which is still a debatable topic in the financial industry.

1.3 Problem Statement

The stock price is considered as one of the main determinants of the market valuation of a company (Chandra, 2017; Koudijs, 2016). If the share price of a firm increases consistently over the time, it can be assumed that the firm is performing well and efficiently (Reilly & Brown, 2011; Kim & Zhang, 2016). On the other hand, if the price of the stock fluctuates widely and frequently, it is considered as a highly volatile stock. Moreover, if the price of the stock fluctuates more than the market, the stock is considered as more risky than the market (Chandra, 2017).

In the perfect capital market, Miller and Modigliani (1961) stated payment of dividends is not relevant to the market value of the firm. Whereas, Agency Theory by Jensen and Meckling (1976) argued that dividend payment improves the agency conflict between the firm and its investors, providing scrutiny in the capital market to investors (Benjamin & Zain, 2015). Moreover, 'Signaling Theory' by Miller and Rock (1985) stated that dividend payment is a signal in the capital market on the value of a firm which increases the confidence level of investors on the firm and attracts more investors for investment purpose. Additionally, "Bird-in-Hand" theory established by Gordon (1963) states that companies paying higher dividend and investing less, can reduce the risk perceived by investors, which influence the cost of capital and hence, the stock prices. Moreover, the effect of firm's rate of return and cost of capital with dividend payout policy influence the firm's share price.

In the finance theory, risk is directly related to return (Ross, 2008; Adam et al., 2016). If the risk increases, the return also needs to be increased (Ross, 2008; Ballings et al., 2015). Therefore, when the volatility of a stock increases, the market return for that stock also should be increased (Dewasiri & Banda, 2015). There are two types of return from market price gain and dividend gain (Zhao et al., 2018). Therefore, risk has become an important factor in explaining the effects of dividend payout policies (Baskin, 1989; Profilet & Bacon, 2013; Dewasiri & Banda, 2015; Herskovic, 2018).

However, Miller and Modigliani (1991) theory stated dividend is not related to the firm value, but acts as firms' protection for investors against the possible effects of long-run investment risks. Therefore, investors are always more conscious about the dividends return on their investment (Hussainey, Mgbame & Chijoke-Mgbame, 2011; Benjamin & Zain, 2015). Therefore, dividend policy is still a highly debated issue in financial theory.

Gordon (1963) purported in "Bird-in-Hand" theory that the stock price volatility is more affected by dividends rather than retained earnings. Companies that do not pay dividends have a higher risk in the capital market (Nazir, Ali & Sabir, 2014). Baskin (1989) explored the effects of dividend policy and stock price volatility. He considered that dividend policy is a determining factor of return volatility. Furthermore, Baskin (1989) analyzed that dividend policy directly affects the stock price volatility and helps an investor to predict the risk on investment. The findings of Baskin (1989) revealed that if the dividend yield increases by 1 percent, then the stock price volatility could be decreased by 2.5 percent.

Firms consider dividend policy as a determining factor of return volatility (Dewasiri & Banda, 2015). The effects of dividend policy and stock price volatility are defined through four dimensions: Duration Effect, the Rate of Return Effect, arbitrage realization effect and information effect (Shah & Noreen, 2016). The

‘Rate of Return Effect’ and ‘Duration Effect’ reflect the dividends as a proxy for underlying cash flows' timings of business (Hooi et al., 2015). Whereas, the ‘Arbitrage Realization’ and ‘Information Effect’ suggest that managers may dynamically affect the stock market risk (Hooi et al., 2015). This study also focuses on the moderating effect of “Bird-in-Hand” theory proxies i.e. cost of capital and rate of return among dividend policy and stock price volatility.

The Duration Effect purported companies that pay large dividends, as a result have high dividend yields, in return are expected to be associated with the stream of cash inflows in the near future. Also, companies with consistent dividend policy have a higher dividend yield with a shorter duration (Profilet & Bacon, 2013). This is similar to the concept of short-term liabilities which are always near to par value (Nazir, Ali & Sabir, 2014). Hence, stocks’ prices of companies with high dividend payouts are less likely to fluctuate by changes in discount rate (Baskin, 1989; Hashemijoo, Ardekani & Younesi, 2012; Profilet & Bacon, 2013). Moreover, a high dividend yield stock will be less sensitive to fluctuations in the discount rate, thus ought to display lower price volatility, while all other things remain the same (Noreen & Shah, 2016; Baskin, 1989). Duration Effect assumed a stable dividend yield as constant dividend growth and diversifiable risk as the sensitivity of the discount rate (Baskin, 1989; Dewasiri & Banda, 2015). According to Duration Effect, cost of capital can moderate the effects of dividend policy on stock price volatility.

The Rate of Return Effect prophesies that both dividend yield and dividend payout ratio vary inversely with projected future rates of return (Baskin, 1989; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014). A firm with more future investment opportunities have lower dividend yield and low dividend payout, thus its stock prices may be fluctuated by the estimated rate of return over a distant time period as argued by Gordon (1963). At the time of market imperfection, new equity issuance is costly and firms rely on retained earnings for equity funds (Herskovic, 2018). The market perceives lower dividend payout as a positive signal towards greater future cash flows from new investment projects and expects higher-than-present returns in the future. However, it is uncertain whether the company may or may not be able to achieve its desired objective of earning a higher rate of return. Hence fluctuations of stock prices depend upon the rate of return volatilities over a period of time (Gordon, 1963, Ballings et al., 2016). The rate of return can moderate the effects of dividend policy on the stock price volatility, which is ignored by prior studies.

Baskin's theory has been applied in previous studies in the context of developed markets (Allen & Rachim, 1996; Hussainey et al., 2011; Profilet & Bacon, 2013) as well as emerging markets (Dewasiri & Banda, 2015; Shah & Noreen, 2016). A plausible reason for the inconsistent findings is due to contextual differences of each study. It has been suggested in the literature that industry-specific analyses are vital to overcome industry variations of dividend payout in order to better understand the impact of dividend policies on stock market variations, particularly in the context of emerging economies. In view of the aforesaid, this study heeds the suggestions from the literature (Baskin, 1989; Rashid & Rahman, 2009; Hooi, Albaity & Ibrahimy, 2015) by investigating the effects of dividend policy and stock price volatility in an emerging market – Bursa Malaysia.

This study considers study on Bursa Malaysia, because in the current era, Bursa Malaysia (Malaysia's stock market) has become one of the biggest stock markets in South-East Asia with the capitalization of approximately USD 441.24 billion (Yee & Salleh, 2018). However, it is considered as one of the risky stock market among the emerging markets (FTSE, 2018; Lee et al., 2016; Arshad & Yahya, 2016; Zakariya, Muhammad & Zulkifli, 2012) due to profound changes in the economy of Malaysia (Zakaria & Shamsuddin, 2012). The Trading Economy (2018) shows that the condition of Malaysia's economy became harsher after the global financial crisis in 2008, where severe volatility in capital market return incurred from 2009 to 2017 (FTSE, 2018). The aftermath of the financial crisis of 2008 alone left the value of the market at 39.3% decline (Angabini & Wasiuzzaman, 2011; Athukorala, 2012; Zakaria, Muhammad & Zulkifli, 2012; Lee et al., 2016). Moreover, despite past records, there is a lack of study on the impact of dividend policy on stock price volatility in Bursa Malaysia. Very few studies examined the effects of dividend policy on stock price volatility in Bursa Malaysia, with limited observations and few sectors like construction, material and consumer product companies only. Moreover, the findings of these studies are not consistent with Hashemijoo et al. (2012) found that there is a positive significant effect of dividend payout on stock price volatility; whereas, Zakaria et al. (2012) stated that there is a negative effect of dividend yield on stock price volatility.

Therefore, there is an extreme need to examine the effects of dividend policy on stock price volatility in Bursa Malaysia based on a large sample size and different sectors.

1.4 Research Questions

The proposed questions are as mentioned below:

1. What are the dividend payment behaviors of firms' in Bursa Malaysia?
2. Is there any significant influence of dividend payout ratio on a volatility of stock price?
3. Is there any significant influence of dividend yield on a volatility of stock price?
4. Do the variables of "Bird-in-Hand" theory significantly moderate the relationship between dividend payout ratio and volatility of stock price?
5. Do the variables of "Bird-in-Hand" theory significantly moderate the relationship between dividend yield and volatility of stock price?

1.5 Research Objectives

The overall objective of this thesis is to examine the effects of dividend policy on stock price volatility in Bursa Malaysia, with consideration of "Bird-in-Hand" theory as moderator.

The followings are the specific objectives of the thesis:

1. To describe the dividend payment behaviors of the firms enlisted in Bursa Malaysia.
2. To identify the impact of dividend yield on the volatility of stock price among the firms enlisted in Bursa Malaysia.
3. To identify the impact of dividend payout ratio on the volatility of stock price among the firms enlisted in Bursa Malaysia.
4. To examine the moderating effect of the variables of "Bird-in-Hand" theory on the relationship between dividend payout ratio and volatility of stock price among the firms enlisted in Bursa Malaysia.
5. To examine the moderating effect of the variables of "Bird-in-Hand" theory on the relationship between dividend yield and volatility of stock price among the firms enlisted in Bursa Malaysia.

1.6 Significance of Research

There are studies available on the effects of dividend policy and stock price volatility, however the findings of the studies showed ambiguous results. This study will show a clear and deeper understanding on the dividend policy relationship with the volatility of stock price by using the moderating role of variables of the "Bird-in-Hand" theory (cost of capital and rate of return) for different sectors.

The impact of dividend policy on the volatility of stock price is important for researchers and investors who take an interest in the capital market. The investors prefer to invest in the stock market. From an investment perspective, this study increases the awareness for an investor and board of directors in making proper investment decisions and policies. Investors can make decisions by evaluating and expecting the future movement of stock prices. Although volatility is not eliminated entirely, it can be reduced with the efficient decision on dividend policies. Managers can use the research findings to make the right decision on the development of the firm's performance.

1.7 Scope of Study

This study test the "Bird-in-Hand" theory in Bursa Malaysia based on secondary data. This study encompasses 10 non-financial sectors, which include construction, consumer product, industrial product, hotels, plantation, properties, technology, trading or services, mining and infrastructure project (IPC), with a total of 548 companies that are listed on Bursa Malaysia during 2009-2016.

1.8 Organization of the Thesis Chapters

This study consists five chapters. The first chapter is an introduction towards the study. It comprises the study background, problem statement, research objectives, research questions, and the significance of the study (theoretical and practical) and scope of the study.

The second chapter includes the literature reviews. This chapter discusses the theoretical and empirical relationship between dependent, independent and moderating variable. Chapter three briefly describes the methodology of the research. This chapter consists the research framework, hypothesis development, sampling and units of analysis that would be employed to evaluate the results.

The fourth chapter incorporates all the analysis results and their findings on the panel data on the relationship between dividend policy and stock price volatility with the moderating role of "Bird-in-Hand" theory variables. This chapter highlights the analysis by two measurements of the dependent variable, stock price volatility by Parkinson formula and GARCH, post-estimation of panel data, and panel data regression analysis. This chapter also provides discussions on the findings. The fifth chapter contains the summary of this study, policy recommendations and implications, limitations and recommendations for future study.

1.9 Summary of the Chapter

This chapter demonstrates the background of the study and problem statement. In addition, this chapter describes the research objectives and research questions. This chapter also discusses on the theoretical and practical significances and scope of the study. Finally, the organization of study is discussed in this chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter contains literature reviews on the effect of dividend policy on the stock price volatility. Section 2.1 presents theories of the dividend policy that support the effect of dividend policy on stock price volatility. Section 2.2 shows the prior empirical studies which examine the effect of dividend policy on stock price volatility in developed and emerging markets. Lastly, Section 2.3 exhibits the literature gaps.

2.1 Underpinning Theories

There are many dividend theories which are discussed by previous researchers. In the perspective of this study, some related dividend policy theories are considered to underpin the arguments. These theories include Irrelevant Theory, "Bird-in-Hand" theory, Signaling Theory, and Clientele Effect. Dividend policy is a puzzle. Although there are few researchers suggesting that it is not relevant to a firm's value and shows no effect on the stock prices, however, some researchers proposed there is a relationship between dividend policy and investors' interest in the firm's value. Some key theories of dividend policy are mentioned below in Table 2.1:

Table 2.1
Theoretical Literatures on Stock Price Volatility and Dividend Policy

Theory	Researcher	Year	Statement
Dividend Irrelevance Theory	Miller and Modigliani	1961	Dividend policy is not relevant to investors. It is not possible to change shareholders' wealth during the fixed investment policy and increment in payout is only possible on the sale of priced stock
"Bird-in-Hand" Theory	Gordon	1963	Dividends as a "Bird-in-Hand" is more valuable than future capital gain as two in hand
Signaling Hypothesis	Lintner	1956	Dividend payment provides a great information about the firm, this is also proof of fluctuation in share prices.
Clientele Effects of Dividends Theories	Pettit	1977	It explains that how a company's stock price will move according to the demands and goals of investors in reaction to taxes, dividends or other policy changes. Because of this adjustment, the stock price will move up or down.

2.1.1 Irrelevance Theory

Miller and Modigliani (1961) proposed that dividend policy is not relevant to the wealth of shareholders. When all investment policy characteristics are unchanged and fixed, management can be increased and 100 percent payouts are still made during every period. However, there are several assumptions made such as; tax exclusion or no transaction cost; shareholder retains best agents in the form of managers; investors follow rational approach and they make valuation of securities on the basis of discount future cash flow value; and authentication and confirmation of the firm's investment policy with clear future cash flows (Velnampy, Nimalthasan & Kalaiarasi, 2014). This theory depends on the following assumptions of Miller and Modigliani (1961):

- Equality in tax rates of cash dividends and capital gains or zero taxes
- An investor can sell shares on commissions and other charges without any transaction cost rather than cash dividends
- Absolute rational decisions by investors
- No agency cost because managers are performing efficiently for shareholders high return on investment in the form of cash dividends
- The efficient market for companies, all information are made available and reachable at all times without paying any cost. Stock prices are effected based on this information and it is influenced by events
- All information is available for companies and investors, no information gap between managers and investors.
- Dividend policy shows effects only on the external financing level, for investments in future projects which consist of positive NPV (Net Present Value).

The supporters of this Irrelevance Theory (Black & Scholes, 1974; Miller & Scholes, 1978; Merton, 1982) debated that an investor can make amendments in dividend policy. This theory argued that there is an independent relationship between firm's capital budgeting policy and its dividend policy. This argument of irrelevance theory is also supported by Friend and Puckett (1964) and Black and Scholes (1974).

2.1.2 “Bird-in-Hand” Theory

Although the irrelevant approach shows no relationship between dividend policy and stock price volatility, the “Bird-in-Hand” theory reveals opposite results. “Bird-in-Hand” theory was introduced by Gordon (1963). Lintner (1962) and Gordon (1963) argued that the return on capital should be increased as a result of the decrease in dividend payouts due to low confirmation of investors on the capital gains. It also affects the earnings return and high stock prices which are obtained from these cash dividends. Lintner (1962) and Gordon (1963) also purported that investors are mostly interested in cash dividends rather than capital gains. Investors have risk-averse nature and there is more risk in capital gain.

It is acknowledged that investors estimate the risk through the discount rate on per share future cash flow. There is a positive relationship between risk and the discount rate, henceforth, the discount rate on share prices with future capital gains will be higher. Consequently, companies who are paying lower cash dividends and retaining the high amount of earnings for future investment and capital gains have lower share price as compared to companies who are paying high cash dividends (Baskin, 1989). Therefore, high retain earnings for future capital gains reduce a share price.

An initial study by Rozeff (1982) on the “Bird-in-Hand” theory illustrated that share prices show less risk when a company pays higher cash dividends. Investors prefer less risky shares that have higher prices. Rozeff (1982) suggested that companies are more conscious when they are profitable with uncertain risks, thus they pay lower amount of dividends with higher risk consideration. However, managers consider lower cash dividends a more favorable option because the need to invest free cash flows in positive NPV's which determine their compensation. Therefore, they prefer to pay less cash dividends so that there would be enough retained earnings to invest in profitable projects. Managers increase the firm's risk by investing in riskier projects. Rozeff (1984) finds that dividend yield with interest rate in short-term elucidates a significant division of fluctuations in annual stock returns.

"Bird-in-Hand" theory recommends that cash dividends are less uncertain than capital gains. Shareholders mostly invest in companies that pay more cash dividends as compared to companies that invest free cash flow for future capital gains. Because of this preference, investors are ready to pay higher prices for shares that meet the criterion rather than companies who have high profits in specific circumstances. On the other hand, this theory focuses on the maximization of shareholders' wealth by paying a high amount of cash dividend which increase the share price of companies (Baker, Powell & Veit, 2002). Oppositely, Miller & Modigliani (1961) did not accept the assumptions of this theory and mentioned it as "Bird-in-Hand" Fallacy. While, Bhattacharya (1979) described that risk can be determined by the future risk of cash flows for any projects, therefore, when cash dividend is increased, a share price will decrease in relation, which will decrease the company's overall value (Al-Malkawi, Rafferty & Pillai, 2010).

The Duration Effect by Baskin (1989) also relies on "Bird-in-Hand" theory. The Duration Effect purported that, assuming all other things being equal, when the dividend yield is higher, the discount rate will be less sensitive to fluctuations which would ultimately show low volatility in prices (Baskin, 1989; Hashemijoo, Ardekani & Younesi, 2012; Profilet & Bacon, 2013). Dividend yield denotes more close time duration cash flow (Profilet & Bacon, 2013). Higher stock dividends have shorter durations due to the stable dividend policy and it is treated as short-term debts which remain close to par value (Nazir, Ali & Sabir, 2014). In the same way, the stock prices of higher dividend yield shares may be less vulnerable to discount rate changes (Zakaria, Muhammad & Zulkifli, 2012; Sadiq et al., 2014). Firms expect less stock price volatility when it has a high dividend yield (Dewasiri & Banda, 2015). Duration Effect assumed stable dividend yield as constant dividend growth and diversifiable risk as the sensitivity of the discount rate (Baskin, 1989; Dewasiri & Banda, 2015). Duration effect focused on the dividend yield and explain the risk fluctuation.

Similarly, the Rate of Return Effect in Baskin (1989) study is also derived from Gordon (1963) theory. The Rate of Return Effect revealed that projected future rates of return will fluctuate inversely with both dividend yield and dividend payout ratio (Baskin, 1989; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014). The firms with more future investment opportunities have lower dividend yield and dividend payout. Furthermore, its stock prices may be fluctuated by the estimated rate of return over the distant time period (Gordon, 1963). During market imperfection period, new equity issuance is costly and firms rely on retain earnings for equity funds (Onsomu & Onchiri, 2014). In this situation, a firm anticipates large investments and pay smaller dividends.

The findings of "Bird-in-Hand" theory state that there is a higher risk of investment in firms offering lower cash dividends. When investors evaluate companies with higher investment risks, they discounted the future cash flow at a higher discount rate. Therefore, they spend less income on these types of shares. On the other hand, companies determine share prices by using discount rates. A share price depends on the level of risk, unless focusing on companies' dividend policy. Thus, the company's risk level can be changed by the effect of cash dividend policy.

2.1.3 Signaling Theory

According to Miller and Rock (1985), dividends have a signal effect. It helps management to forecast the future income or firm's long-term planning. On the other hand, investors can predict future changes in company profits based on changes in the dividend rate. However, companies must stabilize dividend payments and dividend payout ratio. Changes in the share prices may reflect the future incomes and opportunity costs for the respective companies. According to Modigliani and Miller (1961), investors and organizations receive irregular information. This occurred because firm's management tends to transmit information that are only favorable to investors. The company's value declination relates to higher cost in the transmission of information to investors. Lintner (1956) stated that increment of dividends provide clearer information to investors.

Zameer et al. (2013) discovered that dividends have a signaling effect. Dividends provide transmission in a market as well as in connection with future earnings prospects of the company. In other words, a dividend is a prominent tool for indicating a company's market value. Management uses retained earnings to generate surplus profit from investments when the market price of the firms' assets is greater than the expected value of the assets. However, when a company raises funds through external financing, it could imply that the company overvalues its assets. Thus, investors would expect the share price of firm to decrease (Baker & Weigand, 2015).

In the financial market, there is a presence of asymmetric information among shareholders and inner management (managers and directors). In this case, managers and directors have more information on the company in terms of current and future points of view, which is not available to externally (Al-Malkawi, Rafferty & Pillai, 2010). Asymmetric information leads to a true intrinsic value for the company which often portrays the inaccuracy of the market price of the shares reflecting the value of the company. The managers share knowledge, which transmits information to investors in estimating the real value of the company. In the perspective of investors, the cash flows are used as a tool of a firm's value. Therefore, payments of dividends are opted to portray future business profits.

The effect of arbitrage realization in a study done by Baskin (1989) suggested that firms with high dividend yields will be less prone to irrational mispricing. Similarly mispriced common stocks without dividend payments and less return on intrinsic values are not considered a better option as compared to undervalued common stocks with dividend payments (Hashemijoo, Ardekani & Younesi, 2012). This situation provides investors a complete arbitrage profit. The realization of profit from mispricing is uncommon because the stock will automatically be devalued in time.

The information effect by Baskin (1989) also reported that firm's management could control stock prices through presenting dividend payment as an information in the market. This effect follows the Signaling Theory of Miller and Rock (1985) which stated that dividends are considered as information signal in the capital market for investors. Investors have more focus on earning announcements, which are accompanied by ample dividends (Irandoost, Hassanzadeh & Salteh, 2013; Al-Shawawreh, 2014; Dewasiri & Banda, 2015).

Managers may influence stock market risk by increasing the target dividend payout ratio, which may reduce stock price volatility (Allen & Rachim, 1996; Nazir, Ali & Sabir, 2014). The main finding of this theory is that the market price and the share value respond positively when a company announce and pay dividends (Al-Malkawi, Rafferty & Pillai, 2010). This means that investors perceive dividend payment as an evaluating tool for a firm's value and prospective future performances.

2.1.4 Clientele Effects of Dividends Theory

Investors tend to prefer stocks of companies that satisfy a particular need. Investors face different tax treatments for dividends and capital gains. They also have to consider certain transaction costs when trading securities. Miller and Modigliani (1961) argued that for these costs to be minimized, investors turn to firms that could offer their desired benefits. Likewise, firms would attract different clientele based on their dividend policies. It is argued that even though Clientele Effect may change a firm's dividend policy, one clientele is as good as another, therefore dividend policy remains irrelevant.

Brennan (1970) and Litzenberger and Ramaswamy (1982) described that investors take less interest in dividends when it has higher tax rates. The expected rate of return or discounted rate based on the stock price volatility and dividend yield (Litzenberger & Ramaswamy, 1982). Al-Malkawi (2007) affirms that firms in their growth stage tend to pay lower dividends to attract clienteles that desire capital appreciation. As opposite to this, firms at their maturity stage pay higher dividends to attract clienteles that require immediate income in the form of dividends.

Al-Malkawi (2007) grouped the Clientele Effect into two groups that are driven by tax effects and transaction costs. He argued that investors in higher tax brackets would prefer firms that pay little or no dividends. The reward is gained in the form of share price appreciation. Transaction cost-induced clienteles, on the other hand, arises when small investors depend on dividend payments for their needs. This type of clientele prefers companies who satisfy this requirement because they cannot afford higher transaction costs of selling securities. Modigliani and Miller (1961) argued that investors prefer stocks in cases where a company fulfills a specific need. This is because investors do not only face different tax treatments, but also different transaction costs in different markets. Investors in higher tax brackets will tend to prefer stocks with lower to zero dividend payments.

Berk and DeMarzo (2014) state individual investors held 54% of market value, but only received 35% of the dividends in the market. These effects are different for every investor, depending on the size of portfolios, what type of investors, and where the securities are traded (Hussainey et al., 2011). The Tax-Preference Theory states that lowering payout ratios will increase the value of the stock. This is because the required rate of return gets lower since high payout stocks have a negative tax implication against capital gain (Al-Malkawi, 2007).

2.1.5 The Efficient Markets Hypothesis

According to the efficient market hypothesis which is introduced by Fama (1970), the active market demonstrates the securities with fair prices that are based on available information. Moreover, information related to asset prices is categorized into three forms; weak, semi-strong and strong (Fama, 1970; Ross, 2002).

Weak form information refers to information about prices based on past information of assets. On the other hand, semi-strong form information asserts that asset prices incorporate the publicly available information (Malkiel, 2005).

Moreover, the public information includes returns and past prices of securities, financial statements of a company, dividend announcements, earnings and financial situations of competitors and accounting practices. Strong form of information are current stock prices that reflect all the existing available public and private information (Malkiel, 2005).

When a company announces its dividends, it is mandatory to pay the dividends on a specific day (Ross, 2002). The expectation of dividend payments (higher or lower) relies on the market information, which is necessary for potential investors and current shareholders to benchmark (Bhattacharya, 1979). Hence, dividend announcement shows an effect on stock price volatility. The efficient market hypothesis affirms that prices of assets relies on the availability of market information (Smith & Watts, 1992).

2.2 Empirical Studies on Dividend Policy and Stock Price Volatility

Several researchers (Friend & Puckett, 1964; Baskin, 1989; Allen & Rachim, 1996; Asghar et al., 2011; Nazir, Abdullah & Nawaz, 2012; Iqbal, Waseem & Asad, 2014; Dewasiri & Banda, 2015; Noreen & Shah, 2016) investigated the impact of dividend policy on stock price volatility. Some researchers (Gordon & Shapiro, 1956; Miller & Merton, 1961; Angabini et al., 2011; Lashgari & Ahmadi, 2014; Dewasiri & Banda, 2015) conduct studies on the relationship between dividend policy and volatility of stock price which resulted positively. Other researchers (Allen & Rachim, 1996; Baskin, 1989; Fama & French, 2001; Asghar et al., 2011; Nazir et al., 2012; Zakaria et al., 2012; Profilet & Bacon, 2013; Ramdan, 2013; Al-

Shawawreh, 2014; Sadiq et al., 2014; Shah & Noreen, 2016) found negative effect of dividend policy on stock price volatility. Few researchers (Onsomu & Onchiri, 2014; Abrar-ul-haq, Akram & Imdad Ullah, 2015) conducted empirical tests and found no effect of dividend policy on stock price volatility.

2.2.1 Negative Effect of Dividend Policy on Stock Price Volatility

Noreen and Shah (2016) conducted a study on dividend policy and stock price volatility from 2005 to 2012 by considering 50 non-financial companies listed on Karachi Stock Exchange (KSE). This study utilizes regression analysis to check the relationship between dividend policy and stock price volatility, by controlling firm size, financial leverage, earnings per share, earning volatility and growth in assets. The findings of their study revealed that there is a negative correlation between dividend yield and stock price volatility, and dividend payout ratio is negatively related to stock price volatility.

Another study by Nazir, Ali, and Sabir (2014) examined the effect of dividend policy on stock price volatility by focusing on Pakistani chemical companies during 2007-2012. They selected 17 companies as a sample for analysis. The findings of this study revealed that the dividend payout ratio has a significant negative relationship with stock price volatility, after controlling some variables such as leverage, firm size and growth in assets.

Furthermore, Hunjra et al. (2014) explored the effects of dividend policies on stock prices in Pakistan. They took samples from 63 companies during 2006-2011 and used the proxies of dividend policy (dividend yield and dividend payout ratio). In addition, return on equity, profit after tax and earnings per share were also applied to measure changes in stock prices. This study concluded that dividend yield is negatively significant in affecting stock prices while the dividend payout ratio has a positive significant influence on stock prices.

Similarly, some researchers conduct studies on the relationship of dividend policy and volatility of stock price in developed countries. Profilet and Bacon (2013) examined the effects of dividend policy on stock price volatility in the United States of America. The study collected data from value line investment survey database of 500 companies. The results illustrated that stock price volatility is low when the dividend yield is high. They further elaborated that firms' sizes and stock price volatility have a negative relationship between each other, which reveals that the market capitalization of companies increase when stock price volatility decreases. Hence, stocks with higher dividends are less risky and more desired by investors.

Another study of Ramadan (2013) studied the dividend policy and volatility of the stock price relationship in Jordan by considering data from 77 firms during 2000-2011. He accomplished his study by analyzing correlation and cross-sectional multiple least square regression methods. His results showed that dividend yield and dividend payout have a negative impact on stock price volatility. This means that an increase in dividend yield and dividend payout reduces the volatility of stock price.

Sadiq et al. (2014) tested the effect of dividend policy on stock price volatility in non-financial firms listed on Karachi Stock Exchange of Pakistan. This study uses partial regression models where firm sizes, growth in assets and earnings per share as controlling variables in the relationship studied. They added 35 firms' data from 2001-2011 for the analysis. Their study determined that dividend policy (dividend yield and dividend payout) have negative impact on stock price volatility by using growth in the assets as a control variable.

Furthermore, another study by Zakaria, Muhammad, and Zulkifli (2012) on Bursa Malaysia was conducted to determine the impact of dividend policy on a volatility of stock price in consumer product companies from year 2005 to 2010. They used leased square regression to analyze dividend policy and volatility of stock price correlation. Their findings indicated that dividend yield has a significant negative relationship with the volatility of stock price and dividend payout ratio has a positive correlation.

An additional study done by Khan et al. (2011) examined the effect of dividend policy on stock price volatility in Pakistan’s pharmaceutical and chemical industry. He examined the relationship between dividend policy and stock price volatility by using control variables including: return on equity, profit after tax and earnings per share. His findings show that there is significant negative relationship between dividend policy and stock price volatility. This proved that the pharmaceutical and chemical industry of Pakistan consistently pays dividends and can manage the volatility of share prices for better performance. His study also showed that profit after tax and earnings per share have positive significant results between each other, while return on equity is insignificant in effecting both.

Hussainey et al. (2011) conducted a study on stock price volatility and main determinants of dividend payouts in the UK stock market which is a developed exchange market. They considered firms which are listed on the London Exchange Market during 1998-2007. They explored the relationship by using regression analysis; the findings proposed that the impact of dividend payout ratio on the volatility of stock price is negative with the existence of control variables such as firm's earning, the size of the firm, debt level, and growth. Size and debt level have strong correlations with the volatility of stock prices, whereas size is negatively significant with price volatility, suggesting that when a firm's size is large, volatility chances are less. However, debt level is found to be positively significant with stock price volatility, which indicates that when a firm is highly leveraged, the stock price will increase.

Additionally, another study by Asghar et al. (2011) explored the impact of dividend policy on stock price volatility in five sectors in Pakistan during 2005-2009. The experiential estimation of this study follows the regression and correlation model for analysis and found that there is a positive and significant relationship between dividend yield and stock price volatility, whereas the correlation between growth in asset and stock price volatility is negatively related. They also proposed that price volatility is not only dependent on those variables, but also differentiates by different structures of different stock markets. However, efficient and stable markets are easy to forecast rather than markets that have high fluctuations in stock prices.

Another study on the Pakistan Karachi Stock Exchange by Nazir et al. (2010) examined the effect of dividend policy on volatilities of stock prices by sampling on 73 listed firms on Karachi Stock Exchange during 2003-2008. This study proposed that there is an effect of dividend policy on volatilities of stock prices, whereby it assists the evidence of Duration Effect and price arbitrage effect in Pakistan.

The study of Pandey (2003) examined the behavior of listed firm's dividend policy on Kuala Lumpur Stock Exchange (KLSE). The findings of this study confirm that payout ratios in a given industry vary significantly across time and dividend actions are sensitive to changes in earnings. Following the Signaling Theory of Lintner (1956), he concluded that retain earnings have lesser impact on stock prices as compared to dividend policy.

2.2.2 Positive Effect of Dividend Policy on Stock Price Volatility

Khan et al. (2017) examined the relationship between stock price volatility and dividend policy in Pakistani economy. The samples are taken from three sectors, which are textile, sugar and chemical sector. The data of 42 companies were extracted from joint stock balance sheet analysis for the period of 2006-2007. Their study found positive significant results between dividend policy and stock price volatility. The study also discovered a positive significant coefficient for price volatility and size.

Similarly, the study of Dewasiri and Banda (2015) examined the effect of dividend policy on stock price volatility in Colombo stock exchange by using Granger causality test and cross-sectional random effect model. They employed growth assets and firm size as control variables in this study. A data from 40 companies which are listed on the Colombo Stock Exchange during 2003-2012 were taken for the study. This study relies on Gordon (1963) relevance theory and revealed that dividend payout has a negative impact on stock price volatility. Therefore, they followed the Information Effect and Rate of Return Effect. The study identified that companies paying small amount of dividends have more growth potential as compared to companies reinvesting in their assets.

Another study on Karachi Stock Exchange of Pakistan was conducted by Habib, Kiani, and Khan (2012) to determine the influence of dividend policy on a volatility of the share price by taking data of 29 companies during 2001-2010. The expressional valuation relies on cross-sectional regression analysis among dividend policy and price volatility along with two controlled variables; size of firm and leverage. The finding of this study revealed that the dividend payout ratio is positively significant and size and debt is negatively significant to stock price volatility. This study suggested that dividend yield is an effective determinant of the volatility of stock price in emerging markets like Karachi Stock Exchange 100 Indexes.

Consistent with previous studies highlighted, Nazir, Abdullah and Nawaz (2012) also tested the relationship between dividend policy and volatility of stock price, with a sample size consisting 75 financial firms in Pakistan that are listed in Karachi Stock Exchange during 2006-2010. They considered asset growth, earnings volatility, leverage, and firm size as controlling variables. They determined this relationship by using fixed effect regression analysis, which showed the negative influence of dividend policy on a volatility of stock price. Dividend yield revealed a negative impact on the volatility of stock price, but earning volatility showed a positive significant effect on stock price volatility.

Hashemijoo, Ardekani, and Younesi (2012) explored the impact of dividend policy on the volatility of stock price for 142 construction and material companies in Malaysia during 2005-2010. This relationship was studied by adapting regression analysis after considering earning volatility, investment growth, size and leverage as controlling variables. According to this study, the dividend yield is insignificant while the dividend payout ratio is significant with changes in stock prices. Earnings per share and investment growth are also found to insignificantly affect stock prices. However, a firm's size is found to be significantly related to changes in stock prices. Oppositely, leverage and dividend yields have negative impacts on the volatility of stock prices. Concluding their findings, dividend policy may affect changes in stock prices and firms can reduce their firm risk (volatility) by paying higher dividends.

Allen and Rachim (1996) examined similar relationship by taking samples of 173 firms listed on the Australian Stock Exchange, and found that in affecting stock price vitality, the dividend yield has a positive effect while the dividend payout ratio has a negative effect. Therefore, this study could not firmly conclude the impact of dividend policy on stock price volatility in Australia.

Baskin (1989) investigated the same relationship in the USA by taking a sample of 2344 US common stocks during 1967 to 1986. The findings of this study are opposite to the Allen and Rachim (1996) findings. He concluded that there is a negative impact of dividend yield on the volatility of stock prices and a positive impact of dividend payout ratio on the volatility of stock prices. Differing from Allen and Rachim study in 1996, this study provides statistical proof of arbitrage effect, Duration Effect, rate of return effect and information effect.

2.2.3 No Significant Effect of Dividend Policy on Stock Price Volatility

Pandey and Narayani (2018) examined the impact of dividend policy on the share price volatility of the Oil and Gas industries in India that are listed on the National Stock Exchange (NSE). Nine firms have been included as samples for their study. The period of the study is from the year 2012–2016. Their study used regression analysis to find targeted results. The empirical estimations found that the dividend policy is not correlated to the share price volatility of the firm. Furthermore, dividend policy also has negative correlation with a firm's size.

The study of Abrar-ul-haq, Akram and Imdad Ullah (2015) examined the relationship between dividend policy and volatility of stock price along with control variables like sizes of firms, per-share earnings, growths, and debts by taking samples from 11 firms listed in the Karachi Stock Exchange during 2001-2014. They analyzed data gained by regression method and found no relationship between dividend policy, size, earning, growth and leverage because of small sample size and missing data of specific companies.

Another study by Onsomu and Onchiri (2014) determine the relationship between dividend policy and share price volatility for firms listed on the Nairobi Securities Exchange, Kenya. The study covered samples from 2008-2012. A sample of 30 companies was selected. Their study employed correlation cross-sectional descriptive research design and used regression model. They found that there was no evidence of any significant relationship between dividend policy and share price volatility.

2.3 Gap in Literature

Even though there are many literature available on the relationship between dividend policy and stock price volatility, the findings are often not conclusive. Based on different theories and assumptions, several studies empirically tested the impact of dividend policy on the stock price volatility. Several researchers conduct studies on the relationship of dividend policy and volatility of stock price by controlling firm financial factors including leverage, firm size and growth. Prior studies found different results, positive significant, negative significant and insignificant results on the relationship between dividend policy and stock price volatility. Therefore, the results are inconsistent and not conclusive. Table 2.2 exhibits the summary of empirical literature about the effect of dividend policy on stock price volatility in different stock markets.

Table 2.2
Summary of Empirical Literature on Stock Price Volatility and Dividend Policy

Author	**Samples and Time Period**	**Method**	**Variables**			**Findings**
			Depen -dent	Independent	Control	
Shah & Noreen (2016)	2005-2012 50 Non-financial companies Karachi Stock Exchange	Multiple Regression Analysis	SPV	DPR DY	Earning Vol. Fin. leverage Firm size Asset growth	Negative relationship between dividend yield and stock price volatility
Dewasiri & Banda (2015)	2003-2012 40 companies Colombo Stock Exchange	Cross-section random effect model and Granger Causality test	SPV	DPR DY	Firm Size Growth In assets	Dividend yield highly significant with volatility of stock price Dividend Payout less significant

Table 2.2 (Continued)

Author	Samples and Time Period	Method	Variables			Findings
Abrar-ul-haq et al. (2015)	2001-2014 11 firms Karachi Stock Exchange	Regression method	SPV	DPR DY	Fin. leverage Earning vol. Growth Firm size	No significant relationship between dividend payout ratio and stock price volatility No relation between dividend yield and stock price volatility
Nazir et al. (2014)	2007-2012 17 banks listed on KSE	Cross sectional regression analysis Fixed Effect Regression Random Effect, Fixed Effect OLS model Pooled Regression	SPV	DPR DPS	EPS Fin. Leverage Administr-ation Expense ratio Advance to deposit ratio	All are significant except administration expense ratio
Hussainey et al. (2011)	1998-2007 UK firms listed on London Stock Exchange	Multiple Regression (Clientele effect, “Bird-in-Hand”, information effect, Rate of return effect)	SPV	DY DPR	Size Earning volatility Long term debt Growth in assets	Payout ratio Negative, significant with share price volatility Negative between dividend yield and share price volatility Size

Table 2.2 (continued)

Author	Samples and Time Period	Method	Variables			Findings
Nazir et al. (2010)	73 firms listed on KSE 2003-2008	Fixed effect and random effect model	SPV	DY DPR	Size Earning volatility Long term debt Growth in assets	Dividend yield Significant Payout ratio Significant lower level of significance Size Negative and non-significant Debt Negative and non-significant
Zakariya et al. (2012)	All consumer Product Companies listed on KLSE 2005-2010	Least square regression	SPV	DPR DY	Earning Volatility Size Long term debt Growth in assets	DY negative insignificant DPR positively significant Growth insignificant Debt negative insignificance
Hashemijoo et al. (2012)	84 Construct-ion and Material Companies 2005-2010	Multiple Regression	SPV	DPR DY	Size Earning volatility Long term debt Growth in assets	DPR positive significant Size significant
Pardhan (2003)	110 Companies listed on Nepalese Stock Exchange 1991-1999	Cross sectional pooled OLS regression	SPV	Dividend & Retain Earnings		DY negative significant DPR positive Size and leverage negative sign

Table 2.2 (Continued)

Author	Samples and Time Period	Method	Variables			Findings
Jonathan Baskin (1989)	2344 commons stock USA stock exchange 1967-1986	Multiple regression	SPV	Dividend Yield Dividend payout ratio	Size Earning volatility Long term debt Growth in assets	Dividend highly significant and retain earning less significant
Allen and Rachim (1996)	173 Australian listed companies 1972-1985	Cross sectional OLS regression	SPV	Dividend Yield Dividend payout ratio	Size Earning volatility Long term debt Growth in assets Dummy Variable (Board Industry Pattern	DPR Negative sing DY has positive sign

According to Sadiq et al. (2014), dividend policy shows a positive effect on the stock price volatility, higher dividend payout ratio leads to more volatile stock prices. Dividend announcement is taken as a positive signal that increases the prices of a stock. On the other hand, some studies stated that there is a significant negative impact of dividend policy on a volatility of stock price (Hashemijoo, Ardekani & Younesi, 2012; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014; Dewasiri & Banda, 2015). This reaffirms that larger firms are at their maturity stage, more diversified and are in a better position to generate debt finance at a favorable cost. Hence, when firms pay higher dividends, their stock prices remain stable compared to smaller or growing firms (Hussainey, Mgbame & Chijoke-Mgbame, 2011). Similarly, some researchers indicated that dividend policy has no effect on stock price volatility (Abrar-ul-haq, Akram & Imdad Ullah, 2015). The reason for nonexistence of any relationships are because they utilized a different methodology and limited sample size as compared to previous studies. Moreover, this study proposed a moderating effect of "Bird-in-Hand" theory among dividend policy and stock price volatility which was missing in prior literatures.

The 'Duration Effect' purported companies that pay larger dividends, have a higher dividend yield, thus are expected to be associated with the stream of cash inflows in the near future. Also, companies with consistent dividend policies have high dividend yields in a shorter duration (Profilet & Bacon, 2013). Hence, stocks of companies with higher dividends are less likely to fluctuate by discount rate changes (Baskin, 1989; Hashemijoo, Ardekani & Younesi, 2012; Profilet & Bacon, 2013). Moreover, high dividend yield stocks will be less sensitive to fluctuations in the discount rates, thus ought to display lower price volatility, while all other things remain the same (Noreen & Shah, 2016; Baskin, 1989). Duration Effect assumed a stable dividend yield as constant dividend growth and diversifiable risk as the sensitivity of the discount rate (Baskin, 1989; Dewasiri & Banda, 2015). According to Duration Effect, cost of capital can moderate among dividend policy and stock price volatility.

Furthermore, the Rate of Return Effect prophesies that both dividend yield and dividend payout ratio vary inversely with projected future rates of return (Baskin, 1989; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014). The firm with more future investment opportunities have a lower dividend yield. Lower dividend payout leads to fluctuation of stock prices by estimated rates of return over a distant time period as argued by Gordon (1963). However, it is uncertain and a company may or may not be able to achieve its desired objectives of earning a higher rate of return. Hence fluctuations of stock prices depend upon the rate of returns' fluctuations over a period of time (Gordon, 1963; Lashgari & Ahmadi, 2014). The rate of return can moderate the relationship between dividend policy and stock price volatility, which is ignored by prior studies.

Previous studies show that there are inconclusive results of the relationships between dividend policy and stock price volatility. Therefore, there is a wide gap in the literature in terms of the relationship between dividend policy and stock price volatility, and the moderating effect of the cost of capital and rate of return in their relationship, especially in case of Bursa Malaysia. Consequently, this study is an attempt to reduce this gap in the literature.

2.4 Summary of the Chapter

Chapter two discusses the prior researchers' reviews on the effects of dividend policies on stock price volatilities. This chapter is structured by considering relevant literatures. It starts from the underpinning theories that support the impact of dividend policy on volatility of stock prices. Furthermore, this chapter includes empirical literatures that pertain the impact of dividend policies on stock price volatilities in different countries and different sample size with different time periods. This study also incorporates the positive and negative findings separately. Lastly, this chapter described the gap in previous literatures and it's significant in filling the gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter consists of the research methodology used for this study. Section 3.1 presents the research framework. Section 3.2 shows the hypothesis development. Sections 3.3 provide the operational definitions and the measurements of variables. Section 3.4 consists of research population, sample and data collection. Moreover, section 3.5 denotes statistical test. Diagnostic tests are presented in Section 3.6 followed by a descriptive analysis and panel data analysis in the section 3.7 and section 3.8 respectively. Section 3.9 mentions the regression analysis techniques for panel data. Finally, section 3.10 displays the operational models of this study.

3.1 Research Framework

There are two basic schools of thoughts regarding the effect of dividend policy on stock price. According to the 'Irrelevant Theory' of Miller and Modigliani (1961) on dividend policy, dividends pertain no effects on the stock price volatility, which insisted that there is no need to pay dividends to increase stock prices. While a relevant theory of dividends by Gordon (1963) "Bird-in-Hand" theory states that investor give preferences to gain something from profits, companies should offer dividends to them for the attraction and instilling confidences. Additionally, another relevant theory by Lintner (1956), Signaling Theory describes that dividends are used as a signal in a stock market for investors and it effects the stock price volatility.

This study includes dividend policy as an independent variable and stock price volatility as a dependent variable with some controlling variables such as the size of a firm, financial leverage, earning per share, and growth in assets. Some studies (Hussainey, Mgbame & Chijoke-Mgbame, 2011; Profliet & Banda, 2013) showed that there are significant positive impacts of dividend policies on stock price volatilities and other studies (Dewasiri & Banda, 2015; Hashemijoo, Ardekani & Younesi, 2012) revealed there are significant negative impacts of dividend policies on stock price volatilities. While the rest of the studies (Abrar-ul-hq, Akram & Imdad Ullah, 2015; Rashid & Rahman, 2009) justified that there are no correlations between dividend policies and stock price volatilities.

This study checks the impact of dividend policy on stock price volatility based on the moderating effect of proxies of "Bird-in-Hand" theory (cost of capital and rate of return) in Malaysia. Below figure (3.1) demonstrates the relationship between dividend policy and stock price volatility by considering the moderating effect of proxies of "Bird-in-Hand" theory.

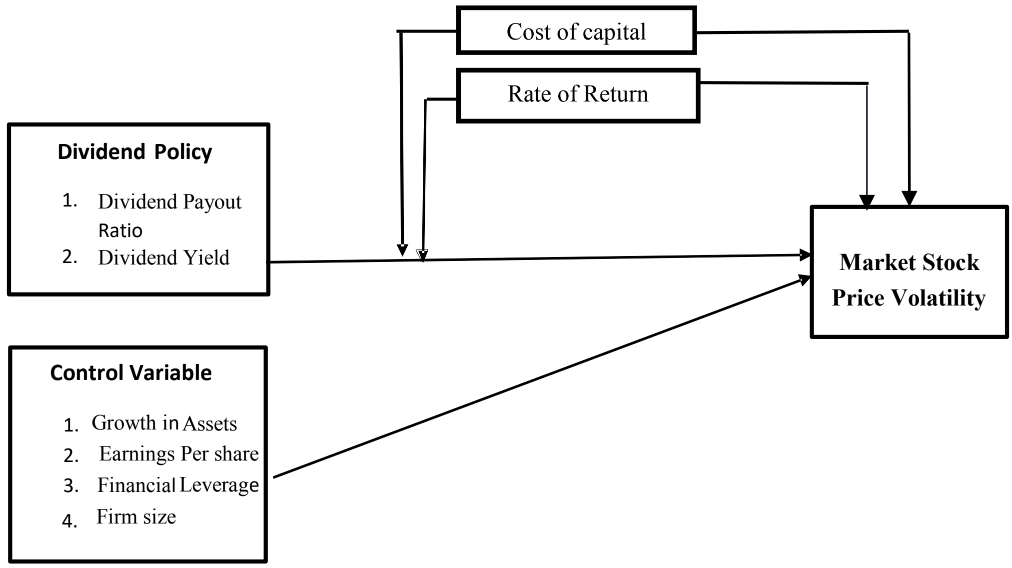

Figure 3.1
Conceptual framework of the study

3.2 Hypothesis Development

3.2.1 The Pattern of Dividend Policy among Malaysian Companies

Dividends are important for both investors and firms. Investors consider dividends as a return on their investment and firms use it to enhance their investment by attracting more and more investors (Benjamin & Mat Zain, 2015). The aim of a dividend payment is to facilitate investors who provide basic equity. If firms would not pay dividends, ultimately the shares' value reduces, thus they pay dividends to maintain their market values (Al-Shawawreh, 2014). In 1961 Miller and Modigliani proposed that dividends are not relevant to firms' market values in the perfect capital market. While, Agency Theory by Jensen and Meckling (1976) argued that dividend payment alleviates the agency conflict between the managers and investors. Dividends provide scrutiny in the capital market to investors (Benjamin & Zain, 2015).

Moreover, there are few researchers that conduct their research in dividend policy in the non-financial sector of Malaysia (Pandey, 2003). Based on MIDA (2014), Malaysia's non-financial sector remained a net importer instead of net exporter even though the performances of this sector have better compared to the past ten years. The export values are more than RM 18 billion currently, which is equivalent to two-thirds of the total food exports (RM28 billion). Based on FTSE (2014), the performances of Malaysia's non-financial sector is at 12.22% annually and -2.80% monthly. Nevertheless, the dividend yield for this sector is 2.69%. In line with Appannan and Lee (2011), Malaysia's plantation sector has been paying high dividends to their shareholders due to their fewer growth opportunities and higher cash on hand.

There is no proper procedure and standard policy for dividend payment in Malaysia (Pandey, 2003; Ling et al., 2008; Subramaniam, Devi & Marimuthu, 2011). Companies are free to decide on their dividend payment for a specific financial year as long as they comply with Companies Act, 1965. According to Section 365 of the Companies Act, "No dividend shall be payable to shareholders of any company apart from profit or pursuant to Section 60." Section 60 concerns to the share premium account of assessment application. Since Section 60 does not include cash dividend payment, a company may provide it only for its profits, but not from another source. It means that a company can only distribute dividends from its profit except in compliance with Section 60 of the Act. It is also useful to notice that 86% of companies that are listed on Bursa Malaysia do not have any records regarding dividend policy in their annual reports (Ameer & Rahman, 2009).

The payment behaviors of dividends do not only vary from countries to countries, but also from sectors to sectors in both developed and emerging markets (Duke, Ikenna & Nkamare, 2015). Therefore, different companies have different dividend policies in Malaysia (Ling et al., 2008; Yusof & Ismail, 2016). This study hypothesized (alternative hypothesis) that:

H1: There is a statistically significant difference in the practices of dividend policy among the firms listed on Bursa Malaysia.

3.2.2 Impact of Dividend policy on Stock Price Volatility

Investors are particularly interested in the dividend payout ratio because this indicates how generous a company is in paying out net income to investors (Shah & Noreen, 2016). Investors pay close attention to dividend yields, whereby the riskiness of their investments may affect the evaluation of a firm's shares in the long run (Baskin, 1989; Allen & Rachim, 1996; Hussainey et al., 2011; Hashemijoo et al., 2012; Zakaria et al., 2012; Hussainey, Mgbame & Chijoke-Mgbame, 2011). Gordon (1963) "Bird-in-Hand" Theory states that companies paying higher dividends and investing lesser can reduce the risk, which influences the cost of capital and hence stock prices. Moreover, the relationship between a firm's rate of return (r) and the cost of capital (k) with dividend payout policy of the firm influences the firm's market per share price.

Gordon (1963) purported that the stock price volatility is more affected by dividends rather than retained earnings. Investors are risk averse therefore they focus on the "Bird in the Hand" in the form of dividends instead of the "Two in the Bush" in the form of future capital gains (Al-Malkawi, Rafferty & Pillai, 2010). Since investors value capital gains as riskier than the dividends, firms with higher dividend payout ratios maximize the share prices. In other words, higher dividend payout upsurges the stock price (Dewasiri & Banda, 2014). Likewise, the companies that pay no dividend have to face a higher risk in the capital market (Nazir, Ali & Sabir, 2014).

Consistently, Zakaria et al. (2012) stated that there is a significant positive relationship between the dividend policy of a firm and share price volatility. This study investigated the impact of dividend policy on the share price volatility of the Malaysian listed companies on Bursa Malaysia from 2005 to 2010. They found out that the share prices will become more volatile when there are higher dividend payouts. However, this study indicates that dividend policy explained 43.43 percent of the changes in the share prices.

Baskin (1989), Hussainey et al. (2011), Hashmijoo et al. (2012) and Noreen and Shah (2016) explored the relationship between dividend policy and stock price volatility. These studies considered that dividend policy is a determining factor of return volatility. Noreen and Shah (2016) analyzed that dividend policy directly affects the stock price volatility and it helps an investor to predict risk on investment. The findings revealed that when the dividend yield increases by 1 percent, then the stock price volatility could be decreased by 2.5 percent (Allen & Rachim, 1996; Dewasiri & Banda, 2015). On the other hand, Allen and Rachim (1996) and Dewasiri and Banda (2015) described that dividend yield has a significant positive relationship with stock price volatility and dividend payout has a significant negative correlation with stock price volatility. Accordingly, this study hypothesized (alternative hypothesis) the followings:

H2: There is a statistically significant impact of dividend payout ratio on the volatility of stock price of the firms listed on Bursa Malaysia.

H3: There is a statistically significant impact of dividend yield on the volatility of stock price of the firms listed on Bursa Malaysia.

3.2.3 Moderating Effect of "Bird-in-Hand" Variables

Gordon (1963) discussed that higher dividend payouts reduce equity costs or the equity's required rate of return. Investors prefer the "Bird in the Hand" in the form of cash dividends instead of the "Two in the Bush" in the form of future capital gains (Al-Malkawi, Rafferty & Pillai, 2010). Likewise, the companies that pay no dividend have to face a higher risk in the capital market through variances in their stock prices (Nazir, Ali & Sabir, 2014). Dividend yields indicate more near-term cash flows (Profilet & Bacon, 2013). High dividend stocks have shorter duration when dividend policy is stable, thus they are treated as short-term debts which remains close to par values (Nazir, Ali & Sabir, 2014). In the same way, the stock price of a high dividend yield stock may be less vulnerable to discount rates' changes (Zakariya, Muhammad, & Zulkifli, 2012; Sadiq et al., 2013). A firm that has a high dividend yield expects less fluctuations in its stock price (Sadiq et al., 2013; Dewasiri & Banda, 2015).

The cost of capital is a function of a market's risk-free rate plus a premium for the risk associated with the investment (Pratt & Grabowski, 2014). Risks are a major concern of investors. The risk-free rate compensates investors for renting out their money. This component of the cost of capital is readily observable in the marketplace and generally differs from one investment to another only to the extent of the time horizon (maturity) selected for measurement of the risk-free rate (Bruno & Shin, 2015). If investors are risk neutral, the appropriate discount rate for estimating the present value of the expected net cash flows would be the risk-free rate. But investors are generally assumed to be risk-averse.

As investors are risk-averse, the market requires an increasing rate of return as risks of negative outcomes increase. As the cost of capital increases, the present value decreases and risk increases (Konchitchki et al., 2016). Similarly, the fundamental principle of investing is that higher risk investments should lead to higher returns, but there are no guarantees. Investments with high returns also come with a greater possibility of failure in meeting expectations or fall in value (Jensen & Shore, 2015).

“Bird-in-Hand” theory of Gordon (1963) suggested that a lower cost of capital increases the dividend payout which controls the stock price fluctuations. Firms with higher costs of capitals are less competitive compared to competitors that are issuing dividends as return on capital to investors. Companies that pay larger dividends, as a result have higher dividend yields, are expected to be associated with a stream of cash inflows in the near future (Shah & Noreen, 2016). Also, companies which have consistent dividend policies of delivering high dividend yields have shorter durations. This is similar to the concept of short-term liabilities which are always near to par value. Hence, stocks of companies with higher dividend yields are less likely to fluctuate in the face of discount rate changes (Baskin, 1989; Shah & Noreen, 2016).

Firms that have low dividend payout and low dividend yield have more chances of future investment opportunities. The stock prices may change by the estimated rates of return over the distant time period as discussed by Gordon (1963). At the time of market imperfection, new equity issuance is costly and firms rely upon retain earnings for equity funds and use rational approaches (Onsomu & Onchiri, 2014). In this situation, a firm anticipates large investment and pay smaller dividends. Moreover, investment opportunities with high net present values increase the stock prices and reduce the dividend yields (Lashgari & Ahmadi, 2014).

Companies at growth stage have considerable investment opportunities available to them; they are therefore likely to retain a much larger portion of their earnings and pay very low dividends. Retention of earnings for reinvestment purposes is deemed to be cheaper than new issuances of shares or debt financing (Myers and Majluf, 1984). However, a low dividend payout resulting in low dividend yield, can command value only if there is an availability of future positive net present value (NPV) projects. The market perceives low dividend payout as a positive signal regarding greater future cash flow from new investment projects and starts expecting higher than present returns in the future. The future is uncertain and the company may or may not be able to achieve its desired objectives of earning a higher rate of return (Lee et al., 2016). Hence, stock prices' movement depends upon rate of return fluctuations over a period of time.

According to Gordon (1963) firms paying high dividends are accompanied by a decrease in risk which ultimately affects the cost of capital and influence the stock prices of the firm. Gordon's theory on dividend policy also states that the company's dividend payout policy and the relationship between its rate of return (ROR) and the cost of capital (COC) influences the market price per share of the company. Therefore, this study hypothesized (alternative hypothesis) the following:

H4: There is a statistically significant moderating effect of the cost of capital on the relationship between dividend payout ratio and volatility of stock price of the firms listed in Bursa Malaysia.

H5: There is a statistically significant moderating effect of the cost of capital on the relationship between dividend yield and volatility of stock price of the firms listed in Bursa Malaysia.

H6: There is a statistically significant moderating effect of rate of return on the relationship between dividend payout ratio and volatility of stock price of the firms listed in Bursa Malaysia

H7: There is a statistically significant moderating effect of rate of return on the relationship between dividend yield and volatility of stock price of the firms listed in Bursa Malaysia

3.3 Definitions of Variables

The working definition of different variables that are used in this study are given below:

3.3.1 Study Variables

This study utilized the following variables to measure the impact of dividend policy on stock price volatility based on moderating effect of "Bird-in-Hand" theory.

Stock Price Volatility (Stock PV)

Stock price volatility is a dependent variable in the study and is measured by Parkinson (1980). This method was selected because it is far superior to take annual closing and opening prices. Accordingly, the yearly highest price of a stock minus lowest stock price, i.e. range is divided by the average of lowest and highest share prices and then raising a second power to it. Finally, the square root is applied to transform the variance to standard deviation comparable. This method is applied by many researchers in obtaining data of stock price volatility (Zakariya, Muhammad & Zulkifli, 2012; Hussainey, Mgbame & Chijoke-Mgbame, 2011; Nazir et al., 2010; Baskin, 1989). Parkinson's formula is mentioned below:

$$\mathrm{HL} - \mathrm{HV} = \frac{\sqrt{\sum_{t=1}^{n} \left(\frac{1}{4 * Ln2} (X_t^{HL})^2\right)}}{n}$$

Here,

HL= high stock price,

HV is low stock price

$X_t^{HL} = e^{HL/HV}$ (calculated as the natural logarithm of the ratio of a high stock's price to low stock's price).

For the sake of this study, daily stock prices collected from the Thomson Reuter's data stream with code low price volatility WC05003 and high price WC05002. Stock price volatility is used to define the risk of a common stock, whereby, the greater the volatility of a common stock, the greater its risk. Volatility is defined as the variation or deviation of an asset's return from its mean (Kotzé, 2005; Nazir et al., 2014). According to Markowitz (1952), investors are rational and risk-averse, they want to avoid risk unless they are compensated for taking such risk. Investors generally choose less risky investments (Profilet & Bacon, 2013).

However, the volatility of a common stock is considered as a benchmark for quantifying risk, which demonstrates the different changing pace over a specific period in the stock price. Hence, it is difficult to predict the future price of a specific stock, as it indicates the possibilities of gain or loss. Ramdan (2013) revealed that price volatility may differ from firm to firm, different nature or different sizes of firms either smaller or larger firms, may have dissimilarity in volatility of stock prices.

The other measurement of stock price volatility is by GARCH. GARCH is commonly used to forecast volatility (Hansen & Lunde, 2005). The generalized autoregressive conditional heteroskedasticity (GARCH) models proposed by Engle (1982) and Bollerslev (1986). In GARCH model, the volatility process is time varying and is modeled to be dependent upon both the past volatility and past innovations (Goyal, 2000). This model has been used in many applications of stock return data, interest rate data, and foreign exchange data. GARCH models are unable to capture the entire variation in volatility. However, on a positive note, the GARCH predictions of volatility usually (approximately 50% of the time on monthly frequency) lie within the confidence intervals of our proxy of actual volatility implying that GARCH models are not wholly inadequate measures of actual volatility (Wang & Wu, 2012). GARCH models with non-normal distributions are more robust in what comes to volatility forecasting than other historical models (Liu & Morley, 2009).

The GARCH model is an extension of the ARCH model that recognizes the difference between conditional and unconditional variance allowing for the conditional variance to change over time as a function of past errors (Anderson & Bollerslev, 1998). The GARCH model also allows both for a longer memory and a more flexible lag structure. These models are non-linear models. This study measures GARCH.

Dividend Payout Ratio

Dividend payout ratio (DPR) is measured by dividing common dividends by net income minus preferred dividend requirements. This study collects data for the dividend payout ratio from Thomson Reuter's data stream with code WC08256. The dividend payment is important for both management and investors, as both have a common interest in a positive stock performance. The effect of dividend payout on the balance sheet demonstrates the perception of investors regarding payout and non-payout of dividend, hence investors can predict on future changes in stock prices (Alli, Khan & Ramirez, 1993; Habib, Kiani & Khan, 2012). The formula for dividend payout is

Dividend payout ratio= (Common dividend/net income bottom line - preferred dividend requirements) * 100

Dividend Yield

Dividend yield relies on stock price as the market denominated measurement. In the pursuance of calculation of dividend yield, this study follows Thomson Reuter's data stream with code WC09402. The data stream calculates dividend yield by using the formula as given below:

Dividend Yield = (Dividends per Share for the last 12 months/ Current Market Price) * 100

Dividend yield refers to a firm's sum dividend payment divided by the company's market capitalization (Bragg, 2007).

3.3.2 Control Variables

Based on the literature, the following variables are considered as potential determinants of the stock price volatility, thus, are used as control variables in this study.

Growth in Asset (GROWTH)

Growth in assets was calculated by current year assets value divided by last year assets value minus one. This study utilizes total asset values from Thomson Reuter's data stream with code WC02999. The data stream measures the total assets which represent the sum of the total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net properties such as plant and equipment and other assets. The formula is given below:

Growth in Assets = (Current year Asset value/Last year asset value)-1

Firm Size (SIZE)

This study uses the size of the firm as a firm's characteristic, which is formulated by a natural logarithm of a total asset. This method was also used by Nazir, Ali, and Sabir (2014) in their study. The data for total assets are taken from the data stream and uses excel in calculating the total assets through a logarithm.

Financial Leverage (FIN LEV)

As proposed by prior researchers (e.g. Asghar et al., 2011), this study calculates financial leverage as debt to equity ratio. The data for financial leverage is collected from Thomson Reuter's data stream with code WC08231. Data stream utilizes following formula for measurement:

Debt to equity ratio= {(long term debt + short term debt & current portion of long-term debt)/total equity}*100

Earnings per Share (EPS)

Earnings per Share (EPS) is another firm's characteristic chosen for the study. It is measured by earnings divided by numbers of outstanding shares. The data for EPS is taken from Thomson Reuter's data stream under code WC05201. The formula is given below:

EPS= Earnings /number of outstanding shares

3.3.3 Moderating Variables

This study utilized "Bird-in-Hand" theory variables including cost of capital and rate of return as moderating variables among the relationship between dividend policy and stock price volatility.

Cost of Capital (COC)

The two main sources of company to raise capital are equity and debt. Company need capital for future projects. Companies calculate the cost of debt and cost of equity by many ways. Most commonly companies use WACC method to provide a discount rate for a financed project due to capital cost calculates at fair price. WACC is used to determine the discount rate used in a discounted cash flow valuation model (Frank & Shen, 2016). This study follows Thomson Reuters Eikon for the measurement of cost of capital. The formula for cost of capital as utilized by Eikon is given below:

$$\text{Weighted Average Cost of Capital (WACC)} = KD\ (TD/V)\ (1\text{-}t) + KP\ (P/V)] + KE*(E/V)$$

Here, KD=cost of debt; TD=total debt; V=total capital; KP= cost of preferred; P=preferred equity; KE=cost of equity; E=equity capital and t=tax rate.

Furthermore, total capital also includes total debt, preferred equity, and equity capital.

WACC measures the weight of debt and the true cost of borrowing money or raising funds through equity to finance new capital purchases and expansions based on the company's current level of debt and equity structure (Ondraczek et al., 2015). Management typically uses this ratio to decide whether the company should use debt or equity to finance new purchases. This ratio is very comprehensive because it averages all sources of capital; including long-term debt, common stock, preferred stock, and bonds; to measure an average cost of borrowing funds (Lorenz et al., 2016). It is also extremely complex. Bonds and long-term debt are issued with stated interest rates that can be used to compute their overall cost. Equity, like common and preferred shares, does not have a readily available stated price on it.

Investors and creditors, on the other hand, use WACC to evaluate whether the company is worth investing in or lending money. Since the WACC represents the average cost of borrowing money across all financing structures, higher WACC mean the company's overall cost of financing is high and the company will have less free cash to distribute to its shareholders or pay off additional debt (Frank & Shen, 2016). As the weighted average cost of capital increases, the company is less likely to create value and investors and creditors tend to look for other opportunities (Lorenz et al., 2016).

Rate of Return (ROR)

This study utilizes rate of return as a moderator among the relationship between dividend policy and stock price volatility. A rate of return represents a return on investment and data on the variable is collected from Thomson Reuter's data stream under code WC08367. Data stream calculates return on investment through the given formula;

Return on Investment = (Net income bottom line + (interest expense on debt - interest capitalized) * (1- tax rate) / average of last year & current year's total capital & short term debt & current portion of long term debt) * 100

3.3.4 Summary of Variables

Table 3.1 shows the list of variables, their specific measurements and the authors who utilize these measurements in their previous studies.

Table 3.1
Measurement of Study Variable, Control Variable and Moderating Variables

Variable	Measurement	Employed by
Stock Price Volatility	$HL - HV = \frac{\sqrt{\sum_{t=1}^{n}\left(\frac{1}{4 * Ln2}\left(X_t^{HL}\right)^2\right)}}{n}$	(Zakariya, Muhammad & Zulkifli, 2012; Hussainey, Mgbame & Chijoke-Mgbame, 2011; Nazir, Nawaz, Anwar & Ahmed , 2010; Baskin, 1989)
	GARCH Model	(Hansen & Lunde, 2005; Liu & Morely, 2009; Wang & Wu, 2012)

Table 3.1 (Continued)

Variable	Measurement	Employed by
Dividend Payout Ratio	(Common dividend/net income bottom line - preferred dividend requirements)*100	(Sadiq et al., 2013; Dewasiri & Banda, 2015; Nazir , Abdullah & Nawaz, 2012)
Dividend Yield	(Dividend Per share for Last 12 months/Market per share-Current) * 100	(Sadiq et al., 2013; Dewasiri & Banda, 2015)
Firm Size	A logarithm of Total assets	(Nazir, Ali & Sabir, 2014; Baskin, 1989)
Financial Leverage	Debt to equity ratio= (long term debt + short-term debt + current portion of long term debt /total equity) * 100	(Asghar et al., 2011; Baskin, 1989)
Growth in Assets	(Current year Asset value/Last year asset value) – 1	(Baskin, 1989; Hussainey, Mgbame & Chijoke-Mgbame, 2011)
Earnings per Share	Earnings / number of outstanding shares	(Hussainey, Mgbame & Chijoke-Mgbame, 2011; Zakariya, Muhammad & Zulkifli, 2012)
Cost of Capital	WACC (weighted average cost of capital)= KD (TD/V) (1-t) + KP (P/V)] + KE*(E/V)	(Huang et al., 2016, Frank & Shen, 2016)
Rate of Return	Return on investment= (Net income bottom line + (interest expense on debt - interest capitalized)*(1-tax rate) / average of last year & current year's total capital+ short term debt + current portion of long term debt) *100	(Easton, 2004; Easton & Sommers, 2007)

3.4 Data and Sampling

This study considers all ten non-financial sectors listed on Bursa Malaysia. Bursa Malaysia has a clear classification of sectors. However, these classifications of sectors are not the same as Thomson Reuters' classification. These non-financial sectors, namely construction, consumer product, industrial product, hotels, plantation, properties, technology, trading or services, mining and infrastructure project (IPC), included total 548 companies which listed on Bursa Malaysia. Due to the small number of the sample, this study has taken mining, hotel and IPC sectors collectively and named as ‘others’.

Table 3.2
Number of Companies in Each Sector

Sectors	**Number of companies**
Construction	89
Consumer product	101
Industrial Product	142
Plantation	40
Properties	68
Technology	34
Trading/Services	65
Others (hotels, Mining & IPC)	9
Total	548

This study took the data during 2009 to 2016. During this period, Malaysia’s stock market is sensitive towards internal and external factors such as economic and financial crises (Tuyon & Ahmad, 2016). Data before 2009 for most of the companies are not available due to the global financial crisis in 2008 (Lee et al., 2016). This study considered only the stable time period after crisis from 2009-2016. This study does not include the financial companies included trusts, and closed-end funds because these companies are generally governed by different rules and practices with regard to earnings’ management.

Data Source

This study collected data for all variables except cost of capital from Thomson Reuter's Data Stream. The data for cost of capital (WACC) is collected from Thomson Reuter's Eikon.

3.5 Statistical Tests and Tools

3.5.1 Descriptive Analysis

The descriptive analysis is used for comparison of different sectors, which includes measurement of mean, coefficient of variation and standard deviation, etc. Furthermore, this study tested the difference of dividend payment behavior among non-financial sectors by t-test. The t-test is a type of parametric inferential statistics. It is used to determine whether there is a significant difference between the means of the groups, which was developed by William Sealy Gosset in 1908.

This study utilized Tukey’s t-test. Tukey's test compares the means of every treatment to the means of every other treatment; it applies simultaneously to the set of all pairwise comparisons $\mu_i - \mu_j$ and identifies any difference between two means that is greater than the expected standard error. The confidence coefficient for the set, when all sample sizes are equal, is exactly $1-\alpha$ for any $0 \leq \alpha \leq 1$. For unequal sample sizes, the confidence coefficient is greater than $1 - \alpha$. In other words, the Tukey’s method is conservative when there are unequal sample sizes. This study used Tukey’s t-test to find statistical significances of dividend policy among non-financial sectors of Bursa Malaysia.

3.5.2 Econometric Model Analysis (Operational Models)

According measurements of dependent variable (stock price volatility) by Parkinson formula and GARCH, this study designed two main equations for analysis of data at individual sector and all non-financial sectors, which are illustrated below:

$$Y_{1\ it} = \beta_0 + \beta_1 DY_{it} + \beta_2 DPR_{it} + \beta_3 SIZE_{it} + \beta_4 EPS_{it} + \beta_5 FINLEV_{it} + \beta_6 GROWTH_{it} + \beta_7 COC_{it} + \beta_8 ROR_{it} + \beta_9 COC_{it}*DY_{it} + \beta_{10} COC_{it}*DPR_{it} + \beta_{11} ROR_{it}*DY_{it} + \beta_{12} ROR_{it}*DPR_{it} + \xi_{it} \quad (1)$$

$$Y_{2\ it} = \beta_0 + \beta_1 DY_{it} + \beta_2 DPR_{it} + \beta_3 SIZE_{it} + \beta_4 EPS_{it} + \beta_5 FINLEV_{it} + \beta_6 GROWTH_{it} + \beta_7 COC_{it} + \beta_8 ROR_{it} + \beta_9 COC_{it}*DY_{it} + \beta_{10} COC_{it}*DPR_{it} + \beta_{11} ROR_{it}*DY_{it} + \beta_{12} ROR_{it}*DPR_{it} + \xi_{it} \quad (2)$$

Here,

Y1 = Stock price volatility measured by Parkinson (1980) formula

Y2 = Stock price volatility measured by GARCH

DPR_{it} = Dividend payout ratio

DY_{it} = Dividend yield

$SIZE_{it}$ = Firms size

$FINLEV_{it}$ = Financial leverage

EPS_{it} = Earnings per share

$GROWTH_{it}$ = Growth in assets

COC_{it} = Cost of capital

ROR_{it} = Rate of return

β_0 = Intercept value

β_1 = Coefficient

ξ_{it} = Error term in time

i = Company

t = time

3.5.3 Diagnostic Test

Identification of Multicollinearity

In statistics, multicollinearity (also Collinearity) is a phenomenon in which a predictor variable in multiple regression models can be linearly predicted from the others with a substantial degree of accuracy. This study utilizes acceptance value and variance inflation factor (VIF) to identify the existence of Multi-Collinearity issue/s among the predictor variables. According to Hair et al. (2006), the tolerance value is a variation in a variable that is not accounted for other variables. In addition, the VIF indicator is a proxy and consistent with the tolerance value. Tolerance value should be more than 0.1 and VIF should be less than 10 to indicate that there is no multicollinearity issues among independent variables. This indicates that they are not extremely correlated with one another.

Normality

One of the expectations of regression analysis is to guarantee normality for the fitness of the data. Statisticians have proposed many ways to test the normality of the data. This study employs Jarque-Bera test to check the normality of the data. Jarque-Bera test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. Jarque-Bera test was proposed by Jarque-Bera in 1987 and is based on the sample skewness and sample kurtosis. The test uses the Lagrange multiplier procedure on the Pearson family of distributions to obtain tests for normality.

Testing the Heteroscedasticity

Heteroscedasticity is another assumption required for the regression inferences' validity where error term is considered to have constant variance. Variances that fall short of satisfying this property are described to be heteroscedasticity (Mendenhall & Sinchich, 2003). Moreover, heteroscedasticity is described as a distortion existing in the regression analysis where the error term shows no variance similarity. An issue concerning heteroscedasticity often arises in a cross section data more than in a time series data because, in the former, the research is impacted with the population data at a specific time while the latter's research data is in the same group of the same period. The detection of heteroscedasticity is possible through many ways, i.e. graphics methods, Park methods, Glesjer methods and Spearman's Rank Correlation.

Additionally, heteroscedasticity can also be detected by using the Cook (1997) test where the test examines if the squared standardized residuals are related in a linear manner to the dependent variables (Hamilton, 2003). In a null hypothesis where homogeneous residuals are tested; a p-value higher than 0.05 indicates the failure to reject the hypothesis and thus the residual variance is considered homogenous. After the detection of heteroscedasticity, it can be resolved through the use of White's heteroscedasticity consistent variance and standard error technique, weighted least square method or by data transformation (Hair et al., 2006; Gujarati, 2003).

The presence of heteroscedasticity arises when an error variance reveals a non-constant variance in which case, the disturbances of every observation drawn from various distributions have different variances. In other words, the observed variance's value of the dependent variable surrounding the regression line is dynamic. Each observed value of the dependent variable can be observed as being obtained from various conditional probability distributions with various conditional variances. The issue of heteroscedasticity can be determined through the use of White General Heteroscedasticity Test, Breuch-Pagan Godfrey Test, Park Test or Glejser Test (Gujarati, 2003; Green, 2003).

3.5.4 Statistical Tools

This study employs statistical software's to analyze the results, including Microsoft Excel, STATA and Econometric Views (EVIEWS). These statistical packages are accessible and can perform basic functions easily.

3.5.5 Panel Data Analysis

A combination of time series and cross-sectional data sets is referred to as longitudinal or panel data sets. These sets are more inclined toward cross-section analysis. The units' heterogeneities are the core issue of panel data analysis.

The Constant Coefficients Model (Pooled OLS Estimation)

The constant coefficients model is a kind of panel model having constant coefficients and refers to intercepts as well as slopes. If there are no significant spatial or significant temporal effects, the entire data is run through an ordinary least squares regression model. More often than not, there are either spatial or temporal effects, but sometimes neither of the two is found to be statistically significant. The constant coefficients model is sometimes referred to as the pooled OLS estimation regression model (Stock & Watson, 2007). The statistical equation for pooled OLS estimation is:

$$Y_{it} = \beta X_{it} + \alpha_{it} + \varepsilon_{it} \qquad (3)$$

For pooled OLS estimation, it is practical to do the estimation using OLS rather than recognizing panel structure of data. Moreover, standard OLS would assume homoscedasticity and no correlation between unit i's observations in different periods (or between different units in the same period).

The Fixed Effects Model

When using fixed effects model, it is assumed that something within the individual may impact or bias the predictors or outcome variables, thus there is a need for control. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Majority of empirical studies in economics aim to explain the relationship between a dependent variable "Y" and one or more explanatory variables (X_1, X_2, X_n). The aim is to determine if Xi affects Y and if it does, then what is the size and direction of this effect. For the solution to this query, data sample has to be obtained through an unbiased source towards the impact of X upon Y. For unbiased estimation, it is crucial to carry out confounding variables (observable and non-observable). In order to control the observable variables, multiple classical linear regression models can be used. While the unobservable ones vary throughout units but constant over time, fixed effects regression model can be utilized. This model is an extension of the multiple classical linear regression model. For the fixed regression model, panel data are required.

Fixed effect model removes the effect of those times-invariant characteristics, thus the study can assess the net effect of the predictors on the outcome variable. Another important assumption of the fixed effect model is that those time-invariant characteristics are unique to the individual and should not correlate with other individual characteristics. Each entity is different, therefore the entity's error term and the constant (which captures individual characteristics) should not be correlated with the other. If the error terms are correlated, then fixed effect is not suitable since inferences may be incorrect and there is a need to remodel existing relationship (probably using random-effects). The equation for the fixed effects model is illustrated below:

$$Y_{it} = \beta X_{it} + \alpha_{it} + u_{it} \tag{4}$$

Where, αi (i=1…. n) is the unknown intercept for each entity (an entity-specific intercepts). Y_{it} is the dependent variable with 'i' entity and 't' time. X_{it} represents an independent variable. β_1 is the coefficient for that independent variable, – u_{it} is the error term.

To decide between fixed or random effects, Hausman Test is applied where the null hypothesis highlights that the preferred model is random effects and the alternative hypothesis implies on the fixed effects. It basically tests whether the unique errors (ui) are correlated with the regressors, the null hypothesis implies that they are not.

The Random Effects Model

The random effects model significantly minimizes the parameters that would need estimation. The rationale behind the random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables that are included in the model. The previous model enables the unobserved individual effects to be associated with the variables. The units' differences are then structured as shifts in a constant term. If, however, the individual effects are not associated with the regressors, then it is appropriate to use the model.

The random effects model assumes that the entity's error term is not correlated with the predictors which allow for time-invariant variables to play a role as explanatory variables. In random-effects there is a need to specify those individual characteristics that may or may not influence the predictor variables. The problem with this is that some variables may not be available therefore leading to omitted variable bias in the model. Random effect allows for generalization of inferences beyond the sample used in the model.

The random effects model is:

$$Y_{it} = \beta X_{it} + \alpha_{it} + u_{it} + \varepsilon_{it} \qquad (5)$$

Where, u_{it} shows between entity error and ε_{it} is within entity error. The Breusch-Pagan Lagrange multiplier (LM) test helps to decide between a random effects regression and a simple OLS regression.

Difference between Pooled OLS, Fixed and Random Effect Estimations

There are some differences between fixed and random effect models which are mentioned below:

1. Fixed effects are constant across individuals, and random effects vary.
2. The effects are fixed if they are interesting in themselves or random if there is interest in the underlying population.
3. If an effect is assumed to be a realized value of a random variable, it is called a random effect.
4. When a sample exhausts the population, the corresponding variable is fixed; when the sample is a small (i.e., negligible) part of the population the corresponding variable is random.

First, Pooled OLS estimation is simply an OLS technique run on Panel Data. Second, in checking whether such data are able to be pooled OLS estimation or not, Breusch-Pagan Lagrange multiplier test is used, where the null hypothesis H_0 is that the variance of the unobserved fixed effects is zero, pooled OLS might be an appropriate model. Third, in a fixed effect specification, individual specific parameters do not vanish and can be added back in (identical coefficients but standard errors which need to be adjusted).

Best Fit Model Selection

Two statistical tests are used in order to identify which methodology is appropriate. The Lagrangian Multiplier Test and Hausman Test are used to select the best fit model from pooled, fixed and random effect.

The Lagrangian Multiplier

First, to compare pooled OLS estimation and random effect estimation, the Lagrangian Multiplier Test is performed. With a lower chi-square test value, indicative of a high p-value, the alternative hypothesis was rejected and concluded that the not pooled OLS estimation is appropriate. The null hypothesis in the Lagrangian Multiplier Test is that variances across entities are zero. This indicates that there no significant difference across units (i.e. no panel effect).

Hill et al. (2008) showed that the two errors are correlated over time for a given individual but are otherwise uncorrelated. They explained further that the correlation is caused by the component of e_i that is common to all time periods and it is constant over time and does not decline as the observations get further apart in time. This correlation is $\rho = \sigma^2_e / (\sigma^2_u + \sigma^2_e)$, it provides the proportion of the variance in the total error term V_{it} that is attributable to the variance of the individual component e_t. Hill et al. (2008) stated that the magnitude of the correlation ρ is a very important aspect of the random effects, if $\sigma^2_e = 0$ it means $\rho = 0$ and there is no random individual heterogeneity presented in the data. The presence of individual heterogeneity can be tested by testing the null hypothesis.

H_0: σ^2_e Vs H_1: $\sigma^2_e > 0$. If the null hypothesis is rejected, then it is concluded that there is an individual heterogeneity, thus means the random effects model is appropriate. The Lagrange Multiplier principle is most convenient and appropriate for testing individual heterogeneity. The test statistic developed by Breusch and Pagan and is as illustrated below;

$$LM = N_T/2(T-1) \; \{[\textstyle\sum^N_{i=1} (\sum^T_{t=1} \hat{e}_{it})^2 / (\sum^N_{i=1} \sum^T_{t=1} \hat{e}^2_{it})] - 1\} \quad (6)$$

Where N is the total observations and T is the total time period, $LM \sim X^2_{(1)}$ if the hypothesis is true. The null hypothesis is rejected and the alternative is accepted if $LM \geq X^2_{(1-\alpha, 1)}$ and the conclusion is that there is a presence of random effects.

The Hausman Test

To select between fixed or random effects, the Hausman Test is applied. The Hausman Test detects endogenous regressors (predictor variables) in a regression model. Endogenous variables have values that are determined by other variables in the system. The endogenous regressors in a model will cause ordinary least squares estimators to fail, as one of the assumptions of OLS is that there is no correlation between a predictor variable and the error term. Instrumental variables estimators can be used as an alternative in this case. However, before a decision on the best regression method is made, there is a need to figure out if the predictor variables are endogenous. The Hausman Test is sometimes described as a test for model misspecification. In panel data analysis, the Hausman Test can assist in choosing between fixed effects model and a random effects model.

The null hypothesis proposed that the preferred model has random effects; the alternate hypothesis proposed that the model has fixed effects. Essentially, the tests look to see if there is a correlation between the unique errors with the regressors in the model. The null hypothesis is that there is no correlation between the two. The result from a Hausman Test is fairly straightforward: if the p-value is small (less than 0.05), the null hypothesis is rejected. The statistical equation for Hausman Test is:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \mu_{it} + e_{it} \quad (7)$$

In a panel model, the individual effect terms can be modelled as either random or fixed effects. If the individual effects are correlated with other regressors in the model, the fixed effect model is consistent and the random effects model is inconsistent. On the other hand, if the individual effects are not correlated with the other regressors in the model, both random and fixed effects are consistent and random effects are efficient. Since the fixed effects model is efficient in both situations, the random and fixed effects estimation ought to be close when both are consistent and distant when random effects are not efficient.

Fixed effects are statistically the more reasonable model to apply when dealing with panel data as they always provide consistent results. On the other hand, fixed effects model is not the most efficient model to use. Random effects offer superior P-values and they estimate more accurately and thus, random effects should be run in justifiable cases. The Hausman Test confirms the efficiency of a model against a less efficient one to ensure that the former provides consistent results. Its null hypothesis states that coefficients estimated by the efficient random effects estimator are identical to the ones estimated by the consistent fixed effects estimator and if they present an insignificant P-value, Prob >chi square higher than 0.05, the random effects should be utilized if not then, fixed effects are more suitable.

The panel regression is a variant of the basic multiple regression processes that allows the research to test the impact of certain predictors independent of the impact of other variables or to specify a secure order entry for variables in order to control for the effect of covariates. Before undertaking panel regression, this study examined the Pearson correlation to fulfil the rudimentary process. Panel regression examines the moderating role of proxies of "Bird-in-Hand" theory between dividend policy and stock price volatility. This study runs panel regression for each individual non-financial sector and overall non-financial sectors.

3.6 Summary of the Chapter

Chapter three proposes the methodology used to conduct the study. This chapter includes research framework and the justification of variables. Furthermore, this chapter develops the relevant hypothesis in relation to the study purpose. In addition, descriptions of the measurements of the variables and its definitions are also included in the chapter. This study considers the whole population consisting of 548 listed non-financial companies on Bursa Malaysia. Lastly, this chapter exhibits the analytical tools and techniques along with the operational models.

CHAPTER FOUR

ANALYSIS AND DISCUSSIONS

4.0 Introduction

This chapter consists research analysis and discussions on the effect of dividend policy on stock price volatility based on the “Bird-in-Hand” theory. Section 4.1 discusses the descriptive analysis and section 4.2 shows the results of Pearson correlation. Further, sections 4.3 and 4.4 contain model selection tests, and results of panel data models estimation. Lastly, section 4.5 contains the discussion on the findings of the study.

4.1 Descriptive Statistics

The descriptive analysis includes the mean, minimum and maximum values, standard deviation, and variation in the coefficients. Stock price volatility is considered as dependent variable, and dividend policy (dividend payout ratio and dividend yield) as independent variables. Financial leverage, earnings per share, growth in assets, and firm size are considered as controlling variables, and the rate of return and cost of capital are considered as moderating variables.

Table 4.1 presents the descriptive statistics of the variables utilized in panel data. Price volatility (Parkinson) of the stock market during the period 2009 to 2016 was 0.029. The dependent variable (Stock PV) has a maximum value of 0.127 and the minimum value of 0.001 with a standard deviation of 0.019 or 1.9%. The standard deviation figures depict stock price fluctuations during the year.

Additionally, Stock PV measured by GARCH has -0.556 to 0.994 maximum and minimum value respectively. The mean value of Stock PV (GARCH) is 0.357 and standard deviation is 0.142.

The mean value of independent variables, including dividend yield and dividend payout ratio is 0.036 and 0.368 respectively. Moreover, the standard deviations of the dividend yield and dividend payout ratio are 0.036 and 0.251 respectively.

Among the controlling variables, the average value of firm size is 12.651, earnings per share 0.029, financial leverage 0.302 and growth (growth in assets) 0.028. Moreover, the standard deviation of controlling variables is; size 1.334, earnings per share (EPS) 0.106, financial leverage 0.225 and growth in assets 0.361.

Table 4.1
Descriptive Statistics of the Variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Stock PV	4384	0.001	0.127	0.029	0.019
Stock PV (GARCH)	4384	-0.556	0.994	0.357	0.142
DY	4384	0.000	0.948	0.036	0.035
DPR	4384	0.000	0.999	0.368	0.251
Size	4384	5.793	18.579	12.651	1.334
Growth	4384	-1.000	1.991	0.028	0.361
Fin Lev	4384	-1.792	0.989	0.302	0.225
ROR	4384	-0.378	1.308	0.081	0.113
EPS	4384	-0.520	1.180	0.029	0.106
COC	4384	-0.093	0.265	0.084	0.034
Valid N (list-wise)	4384				

Note: Stock PV: Stock Price Volatility; DY: Dividend Yield; DPR: Dividend Payout Ratio; Size: firm size; Growth: Growth in the asset; Fin Lev: Financial Leverage; ROR: Rate of Return; EPS: Earnings per Share; COC: Cost of Capital

Table 4.2 depicts a summary of the descriptive statistic for the dividend payout ratio of non-financial sector listed on Bursa Malaysia. This sample consists of 10 enlisted non-financial sectors in Bursa Malaysia for the year 2009 to 2016. The construction sector includes 89 companies and the mean value of dividend payment of the construction sector is 0.348 and the standard deviation is 0.254. Moreover, the consumer product sector contains 101 companies and the mean value of dividend payout for the consumer product sector is 0.569 and standard deviation is 0.249. Furthermore, the industrial product sector pertains 142 companies which show a mean value of dividend payment of 0.389 and standard deviation of 0.203. Plantation companies have a mean value of dividend payout of 0.464 and standard deviation of 0.289. Additionally, properties sector encompasses 68 companies, dividend payment mean value of this sector is 0.387 and standard deviation is 0.139. Technology sector comprises 25 companies; dividend payout mean value for this sector is 0.277 while the standard deviation is 0.280. As well, others (hotel, mining and IPC) sectors have 9 companies along the mean value of 0.361, and standard deviation of 0.233.

Table 4.2
Descriptive Statistics and T-test for Dividend Policy among the Non-Financial Sectors of Bursa Malaysia

Sectors	N	Min	Max	Mean	S. D.	T-test value	P-value
Construction	89	0.000	0.998	0.348	0.254	36.799	0.000
Consumer product	101	0.165	0.85	0.569	0.249	43.361	0.000
Industrial Product	142	0.048	0.966	0.389	0.203	40.999	0.000
Plantation	40	0.158	0.919	0.464	0.289	23.371	0.000
Properties	68	0.000	0.827	0.387	0.139	33.303	0.000
Technology	34	0.000	0.989	0.277	0.28	22.929	0.000
Trading/Services	65	0.000	0.803	0.38	0.185	29.215	0.000
Others (hotels, Mining & IPC)	9	0.000	0.986	0.361	0.233	6.032	0.000

Table 4.3 shows the results of the ANOVA test for the dividend payment behavior of different sectors. The p-value is 0.00, it means the null hypothesis cannot be accepted. Therefore, there is statistically significant difference of dividend payment behaviors among non-financial sectors of Bursa Malaysia.

Table 4.3
ANOVA for Differences between Dividend Payment Behaviors of Bursa Malaysia's Non-Financial Sectors

Source of Variation	Sum of Square	df	Mean of Square	F	P-value
Between Groups	0.307	7	0.0439	13.007	0.000
Within Groups	0.189	56	0.003		
Total	0.497	63			

4.2 Determining the Best Fit Model for Panel Data Analysis

4.2.1 Normality

Table 4.4 and figure 4.1 shows that the data for overall non-financial sectors is not normal. Among the sectors normality results show different results. The figure for sector wise results is mentioned in Appendix A.

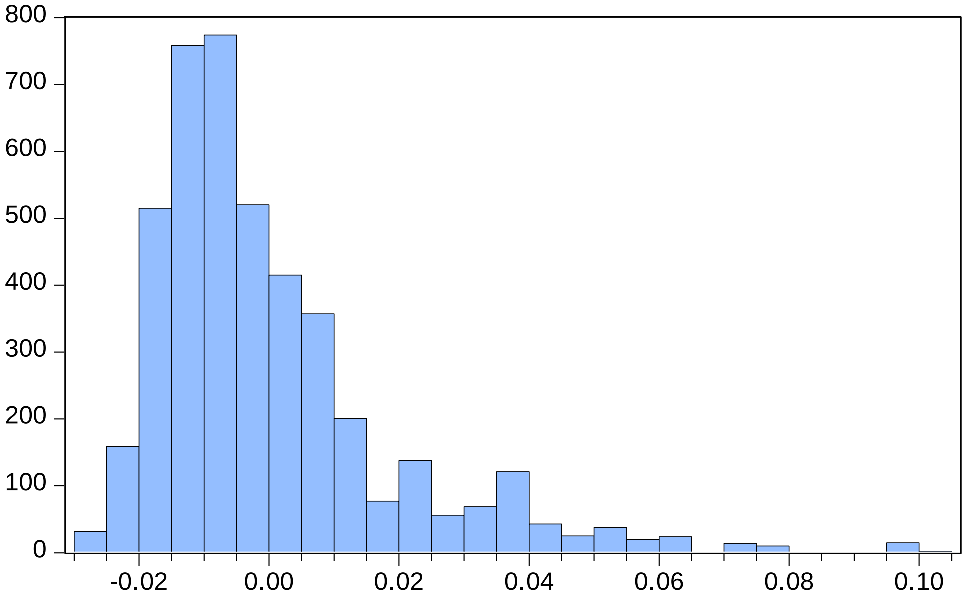

Figure 4.1
Q-Plot in Panel data (Stock PV by Parkinson)

Figure 4.2 and Table 4.4 also depicts that data for stock price volatility measured by GARCH is normal.

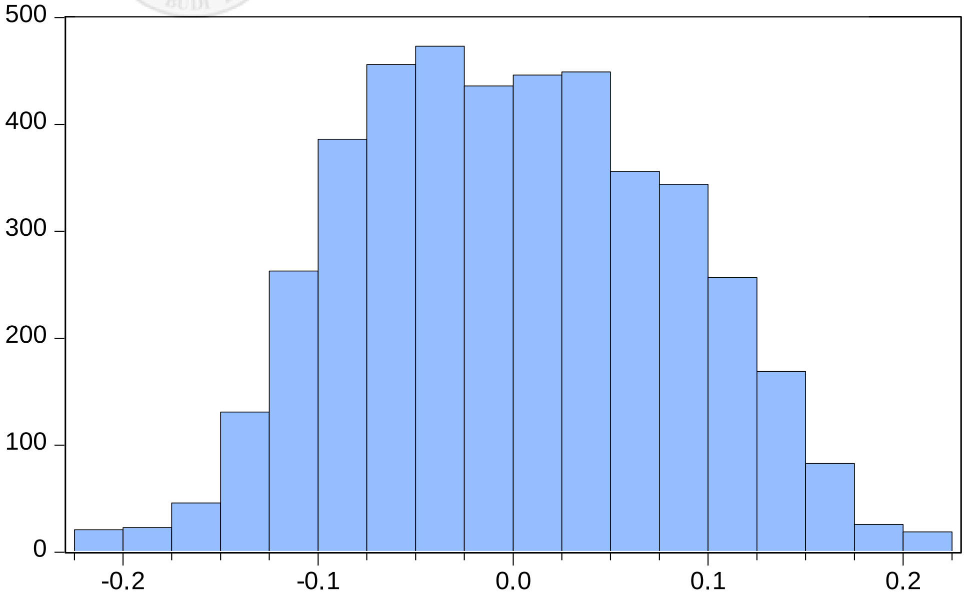

Figure 4.2
Q-Plot in panel data (Stock PV by GARCH)

GLS estimation is considered to be the appropriate remedial procedure to be used in the regressions analysis. To overcome this normality problem, the panel EGLS method is applied in this study.

Sector wise, normality test figures are mentioned in Appendix A. Table 4.4 shows sectorial results of the Jarque Bera test for normality. Table 4.4 and Appendix A indicate that the sectors' data is not normal when volatility is measured through Parkinson formula and GARCH. The results are similar to all non-financial sector as reported in Table 4.4.

Table 4.4
Jarque Bera Normality Test for Individual and Overall Non-Financial Sectors (Volatility Measured by Parkinson Formula and GARCH)

Sectors	Stock PV (Parkinson)				Stock PV (GARCH)			
	Skewness	**Kurtosis**	**Jarque Bera**	**Prob.**	**Skewness**	**Kurtosis**	**Jarque Bera**	**Prob.**
Construction	1.815	7.045	876.607	0.000	0.289	2.421	19.930	0.000
Consumer Product	1.755	6.969	945.287	0.000	0.006	4.234	51.302	0.000
Industrial product	1.772	6.944	1246.454	0.000	0.428	2.739	35.622	0.000
Plantation	1.552	5.778	231.4489	0.000	0.354	4.603	40.972	0.000
Properties	2.119	9.745	1438.576	0.000	0.334	2.816	10.869	0.004
Technology	2.131	8.963	447.816	0.000	0.551	2.490	12.271	0.002
Trading and Services	1.828	7.211	673.964	0.000	0.274	4.787	75.692	0.000
Others (hotel, mining, IPC)	1.345	5.093	34.892	0.000	0.918	3.756	11.829	0.003
Overall non-financial Sectors	1.808	7.265	5712.620	0.000	0.077	2.431	63.629	0.000

4.2.2 Tests of Multicollinearity and Correlation

The correlation between stock price volatility (Parkinson) and dividend yield (DY) is -0.12, and the correlation between stock price volatility (Parkinson) to dividend payout (DPR) is 0.13 (Table 4.5). The correlations between DY and Stock PV (Parkinson) were found to be statistically negatively significant. The negative correlation provides a basis to support the hypothesis in this research; where dividend yield is proposed to have a negative relationship with stock price volatility individually.

The correlations between Stock PV (GARCH) with the dividend policy for both dividend yield and dividend payout ratio are -0.027 and -0.04, respectively. It shows that dividend policy has negative significant correlation with stock price volatility. As none of the correlation value is greater than 0.8, it can say that there is no multicollinearity among the variables.

Table 4.5

Pearson Correlation of Stock Price Volatility and Dividend Policy for Overall Non-Financial Sectors

	SPV-Parkin-son	**SPV-GARCH**	**DY**	**DPR**	**Size**	**Growth**	**Fin. Lev.**	**EPS**	**ROR**	**COC**
Stock PV (Parkinson)	1									
Stock PV (GARCH)	1									
DY	-0.012**	-0.027*	1							
	(0.009)	(0.036)								
DPR	0.013**	-0.004*	0.031*	1						
	(0.018)	(0.087)	(0.021)							
Size	-0.027*	-0.054**	-0.050**	0.067**	1					
	(0.038)	(0.000)	(0.001)	(0.000)						
Growth	0.017	0.009	-0.018	-0.014	-0.159**	1				
	(0.128)	(0.267)	(0.112)	(0.172)	(0.000)					
Fin Lev	0.024	-0.016	0.025*	-0.001	0.172**	-0.025*	1			
	(0.056)	(0.137)	(0.046)	(0.464)	(0.000)	(0.049)				
EPS	-0.004	0.030*	-0.005	0.039**	0.150**	-0.043**	-0.007	1		
	(0.389)	(0.023)	(0.376)	(0.005)	(0.000)	(0.002)	(0.313)			
ROR	0.041**	0.056**	0.015	0.059**	0.012	0.028*	-0.081**	0.034*	1	
	(0.004)	(0.000)	(0.158)	(0.000)	(0.215)	(0.032)	(0.000)	(0.012)		
COC	0.037**	-0.002	0.027*	-0.004	-0.038**	-0.020	-0.056**	-0.001	-0.026*	1
	(0.007)	(0.441)	(0.038)	(0.385)	(0.006)	(0.093)	(0.000)	(0.473)	(0.042)	

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

N= 4384; P-Value in parentheses

Stock PV (Parkinson): Stock Price Volatility measured by Parkinson; Stock PV (GARCH): Stock Price Volatility measured by GARCH; DY: Dividend Yield; DPR: Dividend Payout Ratio; Size: firm size; Growth: Growth in assets; Fin Lev: Financial Leverage; EPS: Earnings per Share; ROR: Rate of Return; COC: Cost of Capital

Moreover, VIF for all the variables are lower than the 10 and the tolerance indicators of the factors are higher than 0.10 for both Parkinson and GARCH based models (Table 4.6). That also indicates, there is no multicollinearity available.

Table 4.6
VIF for Stock Price Volatility – Parkinson & GARCH

Model	Stock Price Volatility-Parkinson		Stock Price Volatility-GARCH	
	Tolerance	**VIF**	**Tolerance**	**VIF**
(Constant)				
DY	0.993	1.007	0.993	1.007
DPR	0.990	1.010	0.990	1.010
Size	0.917	1.090	0.972	1.029
Growth	0.972	1.029	0.917	1.090
Fin Lev	0.958	1.043	0.974	1.026
ROR	0.987	1.014	0.958	1.043
EPS	0.975	1.026	0.987	1.014
COC	0.994	1.006	0.994	1.006

Dependent: Stock PV: Stock Price Volatility; DY: Dividend Yield; DPR= Dividend Payout Ratio; Growth: Growth in an asset; Size: firm size; Fin Lev: Financial Leverage; ROR: Rate of Return; EPS: Earnings per Share; COC: Cost of Capital

The multicollinearity test for each sector is mentioned in Appendix B. The sectorial correlation also shows similar results to the overall non-financial sector results.

4.2.3 Lagrangian Multiplier Test (LM)

Table 4.7 presents the Lagrangian Multiplier Test application in selecting between random and pooled OLS estimation. If the LM test generates a significant chi-square value and indicates a low p-value that is less than 0.05, the null hypothesis is rejected, thus pooled OLS estimation cannot be accepted. Hence, the not to pool method is preferred over the pooled OLS estimation. If the LM test shows that the probability value is not significantly different from zero, the pooled OLS estimation is the appropriate model to be applied.

Table 4.7 presents the Lagrangian Multiplier Test for random and pooled OLS estimation selection for individual non-financial sectors of Bursa Malaysia. The P-values are less than 0.05 for all sectors except others (hotel, mining and IPC) when volatility is measured by Parkinson formula. This shows that it is appropriate to select not to pooled OLS estimation method. The results for others (hotel, mining and IPC) indicate that pooled OLS estimation is better. On the other side of Table 4.7 shows the results of the Lagrangian Multiplier Test according to the volatility measured by GARCH. The results for all sectors present p-values lesser than 0.05, thus all sectors apply not to pooled OLS estimation.

Table 4.7
Breusch and Pagan Lagrangian Multiplier Test for random effects (Stock PV (Parkinson) and GARCH) of Individual and Overall Non-Financial Sectors

Sectors	**Stock PV-Parkinson**			**Stock PV-GARCH**		
	F-Statistics	**Pooled OLS/Random**	**Prob.**	**F-Statistics**	**Pooled OLS/Random**	**Prob.**
Construction	219.484	Random	0.000	597.043	Random	0.000
Consumer Product	124.331	Random	0.000	91.084	Random	0.000
Industrial product	221.178	Random	0.000	105.980	Random	0.000
Plantation	102.579	Random	0.000	92.427	Random	0.000
Properties	58.815	Random	0.000	304.154	Random	0.000
Technology	23.354	Random	0.000	179.238	Random	0.000
Trading and Services	78.184	Random	0.000	71.102	Random	0.000
Others (hotel, mining, IPC)	2.434	Pooled OLS	0.069	27.721	Random	0.000
Overall non-financial Sector	724.734	Random	0.000	1912.220	Random	0.000

4.2.4 Hausman Test

Hausman Test was used to determine the appropriate model to apply between fixed effect models (FEM) and random effect model (REM) in case of not to pool model. The null hypothesis of Hausman Test is that estimators in FEM and REM do not differ substantially. It is based on asymptotic chi-square distribution. If the null hypothesis is rejected, it means FEM estimates results better than REM.

Table 4.8 shows that the overall non-financial sectors p-value is 0.1067 which is higher than 0.05 for Stock PV (Parkinson). Therefore, H_0 is confirmed, it means that there is no relationship between the estimated regression error and the independent variables and random effect model gives better estimation results. Furthermore, results for Stock PV (GARCH) in Table 4.8 indicated that p-value is less than 0.05, referring rejection of H_0, consequently proves that the fixed effect model is more suitable to apply.

The sectorial results of Hausman Test are reported in Table 4.8 by both ways of volatility measurement (Parkinson and GARCH). Table 4.8 exhibited the results of stock price volatility measured by Parkinson formula which shows that p-values for construction, industrial product, plantation, and trading or services sectors are less than 0.05, meaning that fixed effect model given better results for these sectors. Whereas, consumer product, properties, technology, mining, hotels and IPC sectors, all with p-values higher than 0.05, thus H_0 cannot be accepted and random effect is selected for analysis.

Moreover, Table 4.8revealed the results of stock price volatility measured by GARCH. The results indicate that the fixed effect model is more suitable for consumer product, technology, mining, hotels and IPC sectors due to p-values lesser than 0.05. However, for other sectors, H_0 cannot be accepted due to p-values higher than 0.05, therefore random effect is selected for analysis of construction, industrial, plantation, properties and trading or services sectors.

Table 4.8
Hausman Test for Individual and Overall Non-Financial Sectors Panel Data Stock PV (Parkinson & GARCH)

Sectors	**Stock PV-Parkinson**			**Stock PV-GARCH**		
	Chi-Sq. Statistics	**Fixed or random**	**Prob.**	**Chi-Sq. Statistics**	**Fixed or random**	**Prob.**
Construction	24.342	fixed	0.018	11.770	random	0.464
Consumer Production	9.416	random	0.667	20.631	fixed	0.056
Industrial Production	22.757	fixed	0.029	13.649	random	0.324
Plantation	32.251	fixed	0.001	12.951	random	0.372
Properties	8.343	random	0.757	13.071	random	0.364
Technology	3.300	random	0.993	7.181	fixed	0.005
Trading/Services	10.348	Fixed	0.000	9.451	random	0.664
Others (Hotels, Mining, & IPC)	6.923	random	0.545	7.472	fixed	0.032

4.2.5 Heteroscedasticity

This study conducted Heteroscedasticity Test based on White Test. Table 4.9 presents the results of White's Heteroscedasticity-corrected standard errors for panel data of Stock PV (Parkinson) and Stock PV (GARCH). The p-value is less than 0.05, which indicates that the null hypothesis of constant variances is rejected.

The Heteroscedasticity for each sector is stated in Table 4.9. The p-value is less than 0.05 for all sectors. In addition, p-values were discovered to be less than 0.05 for construction, consumer product, industrial product, plantation, properties, and trading and services sectors, when volatility is measured by GARCH. It indicates that there is a Heteroscedasticity issue. Oppositely, technology and others (hotel, mining, IPC) sectors have p-values higher than 0.05, which means that these sectors are exempted from any Heteroscedasticity issue.

The first step in selecting the best model is to choose between fixed or random effects and pooled estimation. After considering the results of Hausman Test and Breusch and Pagan Lagrangian Multiplier Test, it is concluded that the most appropriate technique is to estimate parameters and hypothesis test for stock price volatility model by applying the Parkinson method. The study discovered that the pooled estimation application is suitable for overall non-financial sectors.

The white test indicates that there is a problem of Heteroscedasticity, hence Generalized Least Square is the best model to test the impact of dividend policy on stock price volatility (Hamilton, 2003). The Generalized Least Square (GLS) is one of the most applied methods in dealing with data that is not normally distributed.

Table 4.9
White Heteroscedasticity for Individual and Overall Non-Financial Sectors' Panel Data Stock PV (Parkinson and GARCH)

Sector	Stock PV-Parkinson		Stock PV-GARCH	
	F-Statistics	**Prob.**	**F-Statistics**	**Prob.**
Construction	0.581	0.000	2.605	0.005
Consumer Product	0.901	0.000	1.367	0.000
Industrial product	0.789	0.000	2.404	0.000
Plantation	0.679	0.006	2.107	0.000
Properties	0.818	0.000	1.829	0.016
Technology	0.416	0.002	1.737	0.434
Trading and Services	2.165	0.000	1.192	0.000
Others (hotel, mining, IPC)	1.001	0.007	2.301	0.055
Overall non-financial Sectors	3.109	0.000	2.362	0.000

4.3 Estimation of Panel Data Model

4.3.1. Stock Price Volatility Measured by Parkinson Formula

Table 4.10 displays the regression results of the relationship between dividend policy and stock price volatility for all non-financial sectors. Table 4.10 presented the results for stock price volatility measured by Parkinson formula. F-statistics of all non-financial sectors listed on Bursa Malaysia demonstrate that the models are statistically significant.

But the overall sectors show that dividend yield has negatively significant effect on stock price volatility. The results show that dividend yield (DY) is negatively significant in construction, consumer product, industrial product, technology, trading or services, plantation and property sectors. Whereas, mining, hotels and IPC sector do not have a significant effect of dividend yield on stock price volatility.

Furthermore, dividend payout ratio has positively significant effect on stock price volatility for consumer product and properties sector. All non-financial sectors models have similar results. While, construction, industrial product, technology, and trading or services, plantation sectors show negative significant effect of dividend payout ratio on stock price volatility.

The cost of capital shows positive significant results for consumer product, industrial product, trading or services, plantation and properties sectors. The model for all non-financial sectors also show that there is a positive significant relationship between cost of capital and stock price volatility. On the other hand, the technology sector, mining, hotels and IPC sectors showed a significant negative effect. Interestingly, the construction sector indicates that there is no relationship between stock price volatility and cost of capital.

All non-financial sector results also show positive significant relationship between rate of return and stock price volatility. The rates of returns have significant positive results for constructions and properties sectors. However, the results for other sectors shows insignificant relationship of rate of return and stock price volatility.

Furthermore, the interaction between dividend yield and cost of capital is negative insignificant for over all non-financial sectors. Dividend yield and cost of capital interaction is also negative significant for construction, consumer product, and technology sector. It is positive significant for industrial product, plantation and properties sectors, and trading or services sectors. However, the relationship is found to be insignificant for hotels, mining and IPC sectors.

The interaction between the dividend payout ratio and the cost of capital is negative significant for plantation sector and positive significant for properties and technology sectors.

The other sectors have insignificant results. But all non-financial sector model reveals that there is a positive significant effect of interaction between the dividend payout ratio and the cost of capital on stock price volatility.

Moreover, the interaction between dividend yield and rate of return is negative significant for consumer product and properties sector. It has insignificant results for construction, industrial product, technology, trading or services, hotels, mining and IPC sectors. The interaction between dividend yield and the rate of return results are insignificant for overall non-financial sectors.

The interaction between the dividend payout ratio and the rate of return shows negative significant effect in construction and trading or services sectors. The properties sector shows positive significant results. The rest of sectors including consumer product, industrial product, plantation, technology and other (hotel, mining and IPC) show insignificant results. The overall non-financial sector model shows a significant result for effect of interaction between the dividend payout ratio and the rate of return on stock price volatility.

The controlling variable, firm size shows negative significant results for construction, industrial product, plantation, technology, and others (mining, hotels, and IPC) sector. The results are similar for all non-financial sector model. However, it is insignificant for consumer product, properties and trading or services sectors.

Moreover, the results for earnings per share show positive significant effect in construction, consumer product, industrial product and other (mining, hotel and IPC) sectors. Regardless, earnings per share shows negative significant results for all non-financial sectors. The results for technology, trading or services, plantation, and properties sectors are insignificant.

Financial leverage shows positive significant results for all non-financial sectors.

The results are similar for only consumer product and properties sectors. However, for construction, industrial product, plantation, technology, trading or services and others (mining, hotel and IPC), negative significant results were observed.

The last controlling variable, asset growths have positive significant results for consumer product, plantation, trading or services and other (mining, hotel and IPC) sectors. Whereas construction, industrial product, properties and technology sectors showed insignificant results. The model for all non-financial sectors also have insignificant results.

Table 4.10

Output of Panel data Model for Different Non-Financial Sectors Listed on Bursa Malaysia (Volatility Measured by Parkinson Formula)

Variables	**Construction**	**Consumer Product**	**Industrial Product**	**Plantation**	**Properties**	**Technology**	**Trading/ Services**	**Other Sector~**	**Total Non-Fin. sector**
Constant	0.0394	0.0161	0.0543	0.0567	0.0217	0.0676	0.0298	0.1072	0.0258
	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)	(0.000)*
DY	-0.1011	-0.0310	-0.0065	-0.0081	-0.0109	0.0696	-0.0235	-0.0193	-0.0034
	(0.000)***	(0.009)*	(0.091)**	(0.000)**	(0.000)*	(0.006)*	(0.003)*	(0.764)	(0.044)**
DPR	-0.0029	0.0040	-0.0015	-0.0007	0.0047	-0.0061	-0.0011	-0.0165	0.0017
	(0.007)**	(0.007)**	(0.077)**	(0.004)***	(0.000)**	(0.027)**	(0.006)**	(0.081)*	(0.001)**
COC	0.0072	0.0222	0.0339	0.0391	0.0375	-0.0719	0.0441	-0.1144	0.0198
	(0.715)	(0.036)*	(0.028)*	(0.013)*	(0.008)**	(0.029)*	(0.004)**	(0.085)*	(0.001)*
ROR	0.0084	0.0029	0.0084	-0.0006	0.0117	0.0095	0.0001	-0.0088	0.0039
	(0.040)**	(0.492)	(0.112)	(0.894)	(0.017)*	(0.152)	(0.971)	(0.710)	(0.010)**
COC*DY	-2.014	-1.6302	0.8122	1.0653	1.0528	-3.5432	2.8730	1.4159	-0.1946
	(0.003)**	(0.000)***	(0.089)*	(0.020)*	(0.015)*	(0.019)*	(0.000)***	(0.533)	(0.133)
COC*DPR	-0.0334	-0.0412	-0.0001	-0.0879	0.0592	0.2677	-0.0354	0.1072	-0.0258
	(0.683)	(0.368)	(0.998)	(0.043)*	(0.063)*	(0.035)*	(0.368)	(0.743)	(0.016)*
ROR*DY	0.0244	-0.4470	-0.0872	0.1226	-0.3880	-0.7136	-0.2680	-0.2953	0.0198
	(0.893)	(0.002)**	(0.498)	(0.303)	(0.007)**	(0.392)	(0.258)	(0.722)	(0.654)
ROR*DPR	-0.0502	-0.0092	-0.0139	0.0223	0.0541	0.0099	-0.0142	0.0398	-0.0107
	(0.041)*	(0.655)	(0.376)	(0.226)	(0.000)***	(0.791)	(0.099)*	(0.109)	(0.325)
SIZE	-0.0011	0.0002	-0.0019	-0.0018	-0.0004	-0.0025	-0.0002	-0.0054	-0.0003
	(0.049)*	(0.387)	(0.014)*	(0.002)**	(0.242)	(0.000)***	(0.589)	(0.000)***	(0.008)***

Table 4.10 (Continued)

Variables	Construction	Consumer Product	Industrial Product	Plantation	Properties	Technology	Trading/ Services	Other Sector~	Total Non-Fin. sector
EPS	0.0112	-0.0113	0.0174	0.0086	-0.0011	0.0153	0.0017	0.0763	-0.0030
	(0.048)*	(0.039)*	(0.017)*	(0.148)	(0.683)	(0.239)	(0.603)	(0.091)*	(0.041)**
FIN LEV	-0.0051	0.0089	-0.0136	-0.0254	0.0085	-0.0019	-0.0050	-0.0032	0.0042
	(0.014)*	(0.000)***	(0.002)**	(0.000)***	(0.000)***	(0.719)	(0.053)*	(0.776)	(0.000)**
GROWTH	0.0008	0.0019	0.0030	0.0022	-0.0004	-0.0037	0.0025	0.0131	-0.0002
	(0.638)	(0.043)*	(0.202)	(0.077)*	(0.631)	(0.208)	(0.000)***	(0.050)*	(0.959)
N	712	808	1064	320	544	200	520	72	4384
F-Statistics	4.5635	6.1586	7.7202	20.8924	4.0780	1.8271	21.8360	2.3627	6.2377
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Stock PV (GARCH): Stock Price Volatility measured by GARCH; DY: Dividend Yield; DPR: Dividend Payout Ratio; Size: firm size; Growth: Growth in the asset; Fin Lev: Financial Leverage; ROR: Rate of Return; COC: Cost of Capital; EPS: Earnings per Share
Standard error in Parentheses
*,**,*** shows significance level at 1%, 5%, 10%, respectively
~ Other sector consists of Mining, Hotels & IPC

4.3.2 Stock Price Volatility Measured by GARCH Method

Table 4.11 displays the regression results of the relationship between dividend policy and stock price volatility for all non-financial sectors. Table 4.11 shows results according to stock price volatility measured by GARCH. F-statistics of all non-financial sectors listed on Bursa Malaysia demonstrate that the models are statistically significant.

The all non-financial sector model also showed significant negative results on the relationship between dividend yield and stock price volatility. Table 4.11 presents that dividend yield has negative significant results for construction, consumer product, and plantation sectors. On the other hand, there is positive significant results for properties, trading or services, and other sectors.

In addition, there is also significant negative results for all non-financial sector model. Furthermore, dividend payout ratio has a positive significant impact on stock price volatility in industrial product, plantation and properties sectors. However, it shows significant negative results for construction, consumer product, technology, trading or services and other (mining, hotel and IPC sectors).

Moreover, the cost of capital shows positive significant results for consumer product, industrial product, trading or services, plantation, technology sector, and properties sectors. On the other hand, construction sector, and other sectors show negative significant effects. Oppositely, the results for all non-financial sector model indicated that there is an insignificant relationship between stock price volatility and cost of capital.

On the other hand, all non-financial sectors model results showed positive significant relationship between rate of return and stock price volatility. The rate of return has negative significant results for constructions, properties, and technology sectors. Though, the other sector shows insignificant results.

The results of interaction between dividend yield and cost of capital are negative significant for construction, consumer product, and trading or services sectors. The results are positive significant for industrial product, and properties sectors. Whereas it is found insignificant for plantation, technology, other sectors. The results for all non-financial sectors are also found insignificant.

Similarly, the interaction between cost of capital and dividend payout ratio is positive significant for construction, plantation and properties sectors. It is negative significant for industrial product sector, and rest of the sectors have insignificant results. Furthermore, all non-financial sectors also showed insignificant results.

Moreover, the interaction between dividend yield and the rate of return shows negative significant impacts on stock price volatility in industrial product and trading or services sectors. While, the remaining sectors showed insignificant results. However, all non-financial sector model showed significant negative results for interaction between dividend yield and rate of return.

Table 4.11 reveals that construction and trading or services sector have negative and positive significant effect of interaction between the dividend payout ratio and the rate of return on stock price volatility, respectively. Oppositely, it shows insignificant results for all non-financial sectors. The results for the remaining sectors are also similar to all non-financial sectors result.

Furthermore, firm size has negative significant results for construction, industrial product, plantation, properties, and trading or services sectors. The results are similar for all non-financial sector model. However, it is found to be insignificant for consumer product, technology, and other sectors.

The results for earnings per share showed positive significant effects in trading or services, and plantation sectors. However, earnings per share showed negative significant results for all non-financial sectors. The results for construction, consumer product, industrial product, technology, properties, and other sectors are insignificant.

In contrast, the results for all non-financial sector model are found to be negatively significant. Financial leverage shows negative significant results for construction, consumer product, industrial product, plantation, and trading or services sectors. However, properties, technology and others (mining, hotel and IPC) have insignificant results.

Whereas, the model for all non-financial sectors have significant negative result. Asset growth showed a positive significant result for industrial product sector only. The remaining sectors, which are consumer product, construction, plantation, trading or services, technology, properties and other (mining, hotel and IPC) sectors, have insignificant results.

Table 4.11

Output of Panel Data for All Non-Financial Sectors Listed On Bursa Malaysia Sectors (Volatility Measured By GARCH)

Variables	Construction	Consumer Product	Industrial Product	Plantation	Properties	Technology	Trading/ Services	Other Sectors~	Total Non-Fin. sector
Constant	0.0081	0.3715	0.3359	0.5156	0.4314	0.1612	0.1026	0.1026	0.4080
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
DY	-0.475	-0.2365	0.0215	-0.1917	-0.0756	0.0429	-0.1202	-0.1202	-0.0701
	(0.000)***	(0.012)*	(0.707)	(0.078)*	(0.047)*	(0.751)	(0.000)***	(0.000)***	(0.000)***
DPR	-0.0081	-0.0106	0.0161	0.0617	0.0264	-0.0321	-0.0229	-0.0229	-0.0063
	(0.032)*	(0.083)**	(0.028)*	(0.000)***	(0.003)**	(0.004)**	(0.014)*	(0.014)*	(0.000)**
COC	-0.331	0.3907	0.1983	0.4392	0.1619	0.4055	0.5360	-0.1144	0.1009
	(0.000)***	(0.000)***	(0.000)***	(0.001)**	(0.001)**	(0.000)***	(0.000)***	(0.085)*	(0.000)
ROR	-0.0055	0.0054	-0.0007	0.0375	-0.0735	-0.0306	0.0214	-0.0088	0.0072
	(0.018)*	(0.843)	(0.961)	(0.304)	(0.005)**	(0.016)*	(0.645)	(0.710)	(0.120)**
COC*DY	-16.502	-6.0202	11.001	-1.2613	10.5366	-0.2992	-6.5656	1.4159	-0.3773
	(0.000)**	(0.057)*	(0.000)***	(0.733)	(0.000)***	(0.944)	(0.044)*	(0.533)	(0.413)
COC*DPR	0.8321	0.1155	-0.8373	1.1168	0.7943	-0.2279	0.8673	0.1072	0.0287
	(0.007)**	(0.640)	(0.000)***	(0.035)*	(0.000)***	(0.156)	(0.221)	(0.743)	(0.652)
ROR*DY	-0.1068	-1.6277	-1.3584	-0.2473	-1.2259	-0.5621	-2.5578	-0.2953	-0.2772
	(0.895)	(0.102)	(0.006)**	(0.851)	(0.132)	(0.164)	(0.007)**	(0.722)	(0.007)**

Table 4.11 (Continued)

Variables	Construction	Consumer Product	Industrial Product	Plantation	Properties	Technology	Trading/ Services	Other Sectors~	Total Non-Fin. sector
ROR*DPR	-0.1492	0.0802	0.0495	-0.0779	0.0674	-0.0577	0.3482	0.0398	-0.0119
	(0.065)*	(0.672)	(0.443)	(0.635)	(0.496)	(0.274)	(0.008)**	(0.109)	(0.471)
SIZE	-0.0169	0.0053	-0.0046	-0.0152	-0.0096	0.0085	0.0216	-0.0054	-0.0043
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)**
EPS	-0.0257	-0.0626	-0.0284	-0.0572	0.0261	-0.0110	0.0652	0.0763	-0.0176
	(0.385)	(0.232)	(0.266)	(0.051)*	(0.406)	(0.531)	(0.000)***	(0.091)*	(0.000)*
FIN LEV	-0.0346	-0.0347	-0.0342	0.0493	0.0127	0.0210	-0.0161	-0.0032	-0.0042
	(0.009)**	(0.008)**	(0.000)***	(0.001)**	(0.279)	(0.351)	(0.283)*	(0.776)	(0.076)**
GROWTH	-0.0002	-0.0021	0.0271	-0.0029	-0.0036	0.0077	0.0276	0.0131	-0.0018
	(0.721)	(0.723)	(0.000)***	(0.706)	(0.528)	(0.313)	(0.152)	(0.050)*	(0.0039)**
N	712	808	1064	320	544	200	520	72	4384
F-Statistics	19.3489	27.4955	14.9035	6.0507	7.9304	43.2098	9.4150	2.3627	18.654
P-value	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000	0.0000

Stock PV (GARCH): Stock Price Volatility measured by GARCH; DY: Dividend Yield; DPR: Dividend Payout Ratio; COC: Cost of Capital; ROR: Rate of Return; Size: firm size; EPS: Earnings per Share; Fin Lev: Financial Leverage; Growth: Growth in the asset
Standard error in Parentheses
*,**,*** shows significance level at 1%, 5%, 10% respectively
~ Other sector consists of Mining, Hotels & IPC

4.4 Discussion

Based on the findings of the study, the discussion related to the objectives of the study and supporting evidences is given below:

4.4.1 Dividend Payment Behavior of Malaysian Companies

Table 4.2 shows the sector wise results of dividend payout. The industrial product and consumer product sectors have highest dividend payment behavior. The dividend payment behavior of individual sectors is statistically different.

Some firms prefer to pay dividend while others do not prefer to pay dividend. There might be many reasons to pay or not to pay (Chandra, 2017). For instance, a mature company with stable earnings that does not need to reinvest then they issue dividends. Many investors prefer the steady income associated with dividends, so they will be more expected to buy that particular company's stock (Abdulkadir et al., 2015). Investors also perceive a dividend payment as a sign of a company's strength and a sign that management has positive expectations for future earnings, which again makes the stock more attractive (Zainudin et al., 2017). A greater demand for a company's stock will increase its price.

Similarly, a company that is still growing rapidly usually would not pay dividends, because it wants to invest as much as possible into further growth (He et al., 2017). Even a mature firm that believes it will do a better contract of increasing its value (and therefore a better decision of increasing its share price) by reinvesting its earnings will choose not to pay dividends. Companies that don't pay dividends might use the money to start a new project, acquire new assets, repurchase some of their shares or even buy out another company (Baker & Weigand, 2015). The choice to not pay dividends may be more beneficial to investors from a tax perspective. Firms that choose to reinvest all of their earnings, instead of issuing dividends, may also be thinking about the high potential expense of issuing new stock (He et al., 2017).

Firms pay dividends to attract investors and increase their market values (Al-Shawawreh, 2014). The payment behaviors of dividends do not only vary from country to country, but it also varies from sector to sector in both developed and emerging markets (Duke, Ikenna & Nkamare, 2015). Different companies have different dividend policies in Malaysia. The findings of this study indicate that dividend payment is on the rise, supporting earlier findings of DeAngelo et al. (2004) in the U.S., Ferris et al. (2009) in the U.K., and Khan and Shamim (2017) in Pakistan.

The increasing number of dividends and number of dividend-paying companies signifies that dividend payment behavior of Malaysia's non-financial sectors are improving. Results show that past dividends are positively significant in explaining the current decision to pay the dividend. This finding also supports results obtained by Abdulkadir, Abdullah, and Woei-Chyuan (2015). The increase of dividend payment is similar to findings of DeAngelo et al. (2004) in the U.S. market and He et al. (2017).

Table 4.2 and 4.3 showed the dividend payment behavior of non-financial listed companies on Bursa Malaysia. The result of t-test indicated that there is a statistical difference in dividend payment behavior among non-financial sector in Bursa Malaysia. The results are consistent with the relevant dividend paradigm which is important for both investors and firms. Investors consider dividends as returns on their investments (Benjamin & Mat Zain, 2015). The decision of dividend payment is considered as one of financial management's decisions (Brealey, Mayers, & Allen, 2012). Moreover, dividend payment policy is usually exerted by companies that observe significant variations in their level of earnings (Fama & French, 2001; Pandey, 2003).

Profilet and Bacon (2013) findings are also the same, they suggested that companies with high growth rely on dividend payments. These companies are considered to be in a high growth stage that requires frequently innovation, development and to manage their costs (Profliet & Bacon, 2013). Malaysia is an emerging economy and an increasing trend in industries provides sustainable future growth. An increase in general industries is the continuous need of industrial metals for manufacturing support of the country. Increasing demand of technology and cable facility during the last decade was quite remarkable, which boosted this sector, and as a result, the investment amount increased and the payment of the dividend has also increased. Expend of economic services has boasted the non-financial sector of Malaysia, as compared with the past several years. Increasing the number of non-financial sectors are the root cause of the increase in investment in this sector, which increased dividend payment (Hashmijoo et al., 2012). Increase in equity instrument shows the investor behavior of individuals and firms toward the maximization of their long term wealth. This would bring it closer to the investors for making investment decisions.

4.4.2 Impact of Dividend Yield on Stock Price Volatility

The second objective is to study the relationship between dividend yield and stock price volatility for the non-financial sectors in Malaysia. Table 4.10 and Table 4.11 presents the results of panel data regression where volatility is measured by Parkinson formula and GARCH respectively. The results encompass individual sector and overall sectors.

In the overall non-financial sector, based on both Parkinson and GARCH method, a negative and statistically significant relationship is found between stock price volatility and dividend yield. Similarly, the results of construction, consumer product, industrial product, plantation, properties and trading or services sectors indicated negative significant effect of dividend yield on stock price volatility (measured by Parkinson method). There is positive significant effect of dividend yield on stock price volatility (measured by Parkinson method) for the technology sector. Moreover, the construction, consumer product, plantation, properties, trading or services and others sectors indicated negative significant effect of dividend yield on stock price volatility (measured by GARCH method).

The finding is consistent with another two studies done locally that focused on certain industries with a different time period. Research by Zakaria et al. (2012)

indicates a negative significant relationship between dividend yield and stock price volatility. On the other hand, Hashemijoo et al. (2012) also presented negative significant results for dividend yield. These findings aligned with results of Hooi, Albaity, and Ibrahimy (2015), where they found a significant negative relationship between dividend policy and stock price volatility.

The findings are consistent with Allen and Rachim (1996) in the Australian market, Baskin (1989) for the US market, Hussainey et al. (2011) for UK market, Nishat and Irfan (2001) for Pakistani market, Dewasiri and Banda (2015) for Sri Lanka market, Noreen and Shah (2016) for Pakistan market.

According to Baskin (1989) and Noreen and Shah (2016), dividend policy can be used as a tool for controlling the stock price volatility and reported that if the dividend yield increases by 1 %, the annual standard deviation of stock price decreases by 2.5 %. Sadiq et al. (2014) reported that dividend yield shows the positive effect on the stock price volatility, dividend announcement is taken as the positive signal that increases the prices of stock.

This study considers the price volatility as a normal distribution that was measured by Parkinson (1980), the study found a negative relationship between dividend yield and stock price volatility. Moreover, the results for volatility measured by GARCH method also show a significant negative relationship between dividend yield and stock price volatility.

The findings indicate that the expected return of a stock is the sum of dividend plus the stock price appreciation. Investors certainly evaluate the dividend policy of a firm before any transaction is decided. The corporate dividend policy is considered a key driver of stock price volatility (Hussainey, Mgbame, & Chijoke-Mgbame, 2011).

Furthermore, the findings imply that higher dividend yield reduces the stock price volatility, which is in line with the duration effect theory as high dividend yield could be regarded as near cash that lessen uncertainty on firms' cash flows, resulting in a reduction in the discount rate fluctuation and higher price stability (Noreen & Shah, 2016). Moreover, the negative relationship between high dividend yield is in line with the Signaling Theory as higher dividends are a sign of firms' stability (Dewasiri & Banda, 2015). It is revealed that higher dividend yield leads to a more volatile stock price in the short run (Sadiq et al., 2014). Firms that pay out high dividends are usually more matured, profitable, stable and less risky. For investors, the findings provide a clearer picture of the relationship between dividend yield and stock price volatility in non-financial firms (Hussainey et al., 2011). The research findings can facilitate investors in identifying the best combination of stocks to be selected during their portfolio construction process.

Malik, Qureshi, and Azeem (2012) mentioned that firms in Pakistan are reluctant to pay dividends as disbursements of their profits. Under such situation, using dividend policy to gauge share price volatility may not provide a concrete outcome. It is reasonable that firm size has a negative relationship with share price volatility.

Large firms normally have a better access to the capital market to raise funds, hence dependency on retained earnings as the source of income will reduce.

Another research conducted in the United States also recommended that size contributes slightly to variations in stock returns (Shubita & Alsawalhah, 2012). Earnings per share and financial leverage are found to be statistically significant to share price volatility in Malaysia's market as discussed in the hypothesis testing. These findings were in line with most of the studies conducted in the past (Hashmijoo et al., 2012; Hooi et al., 2015, Khan et al., 2017).

4.4.3 Impact of Dividend Payout Ratio on Stock Price Volatility

The third objective of the study is to check the effect of dividend payout ratio on stock price volatility for the non-financial sectors in Malaysia. The Table 4.10 and 4.11 show the findings for individual sectors and overall non-financial sectors. In case of overall non-financial sectors, according to stock price volatility (measured by Parkinson method) shows a significant positive relationship between dividend payout ratio and stock price volatility. Whereas, stock price volatility (measured by GARCH method) shows that there is a significant negative relationship between dividend payout and stock price volatility.

The various sectors have different results. The construction sector, industrial sector, plantation, technology, trading or services and others sectors show significant negative effect of dividend payout ratio on stock price volatility (measured by Parkinson). Similarly, the construction sector, consumer product, plantation, technology, trading or services and others sectors show significant negative effect of dividend payout ratio on stock price volatility (measured by GARCH method). There is a significant positive effect of dividend payout ratio on stock price volatility (measured by Parkinson) for consumer product and properties sector. Moreover, industrial product, plantation and properties sector show significant positive effect of dividend payout ratio on stock price volatility (measured by GARCH method).

These findings are consistent to research conducted in Malaysia by Hashemijoo et al. (2012) which found that there is a positive relationship between dividend yield and stock price volatility. However, Hashemijoo et al. (2012) found that the consumer products firms in Malaysia were more generous toward their shareholders. The dividend payout reported by Hooi et al. (2015) also indicates 30% dividend payout by firms across all sectors. In general, the dividend payout ratio for Malaysian stocks are lower than those of developed markets such as the UK, the USA and Australia (Profliet & Banda, 2013; Hussainey et al., 2011; Allen & Rachim, 1996).

The significant negative relationship between stock price volatility and dividend payout is supported by findings of Baskin (1989), Nazir et al (2014) and Shah and Noreen (2016). This result indicates that non-financial firms pay a higher portion of net income to investors as also reported by Zakaria et al. (2012) for construction and material companies.

The generalized autoregressive conditional heteroskedasticity (GARCH) model is inaccurate and inefficient, because they are based on the closing prices, of the reference period. The path of the price inside the reference period is totally ignored when volatility is estimated by GARCH models (Chou et al., 2010). Especially in turbulent days with the drops and recoveries of the markets, the traditional close-to-close volatility indicates a low level while the daily price range shows correctly that the volatility is high. The information contained in the opening, highest, lowest, and closing prices of an asset is widely used in Japanese candlestick charting techniques and other technical indicators. Several researchers, back to Parkinson (1980), developed from it several volatility measures far more efficient than the classical return-based volatility estimators.

A dividend cut signals that things are not moving as planned for a firm and the expected financial results were not achieved (Dewasiri & Banda, 2015). This reflects on the share price, presumably making it decrease in value. Companies should always aim to maintain a steady dividend growth pattern, or at least keep the dividend unchanged (Hooi et al., 2015). By doing this, companies gain trust from existing investors and also appears much more desirable in the eyes of prospective investors.

Furthermore, these results analyzed that dividend policy directly affects the stock price volatility and it helps investors to predict the risk on their investments (Profilet & Bacon, 2014). Finally, results revealed that when dividend payout increases by 1 percent, the stock price volatility could be decreased by 2.5 percent

(Allen & Rachim, 1996; Dewasiri & Banda, 2015). Based on the findings, it is noticeable that there is a strong evidence to not reject hypothesis three.

4.4.4 Moderating Effect of Cost of Capital on Relationship between Dividend Policy and Stock Price Volatility

The objective 5 of the study is to check the moderating effect of cost of capital on the relationship between dividend policy and stock price volatility. According to Table 4.10, cost of capital shows a significant moderating effect on the relationship between dividend policy and stock price volatility for individual sectors and overall non-financial sectors.

Table 4.10 exhibits values which regressed with the stock price volatility measurement by Parkinson (1980). The interaction between dividend payout ratio and cost of capital shows significant effect for plantation properties and technology sectors. The results for construction, consumer product, industrial product, trading and service, and other sectors are insignificant. Moreover, the overall non-financial sector shows that there is a negative significant moderating effect of cost of capital on the relationship between dividend payout ratio and stock price volatility (measured by Parkinson). These findings shows this study is complementing classical "Bird-in-hand" theory.

According to Gordon (1963), the moderating role of cost of capital, high dividend payouts reduce the cost of equity or required rate of return of the equity. Investors prefer the "Bird-in-Hand" in the form of cash dividends instead of the "two in the bush" as future capital gains (Al-Malkawi, Rafferty, & Pillai, 2010). Likewise, companies that pay no dividends have to face a higher risk in the capital market by having more variances in their stock prices (Nazir, Ali, & Sabir, 2014). The interaction of cost of capital and dividend yield is not significantly related to stock price volatility as measured by Parkinson in Table 4.10 and GARCH in Table 4.11. Moreover, the interaction of cost of capital and dividend payout ratio is significant when related to stock price volatility by Parkinson in Table 4.10.

The moderation of cost of capital between the relationship of dividend yield and stock price volatility (measured by Parkinson) is negatively significant for construction, consumer, and technology sector. Similarly, industrial, plantation, properties, trading and services sectors show the significant positive moderating effect of cost of capital on the relationship between dividend yield and stock price volatility. Moreover, the overall non-financial sectors findings show insignificant effect of cost of capital moderation on dividend yield and stock price volatility when measured by Parkinson formula in Table 4.10.

On the other hand, there is a significant negative moderating effect of cost of capital on the relationship between dividend yield and stock price volatility (measured by GARCH) for construction, consumer product, plantation, technology, trading and services sectors. The industrial product and properties sectors shows significant positive effect of cost of capital on the relationship between dividend yield and stock price volatility (measured by GARCH). The other sectors and overall non-financial sectors show insignificant effect of cost of capital on dividend yield and stock price volatility measured by GARCH in Table 4.11.

There is statistically positive significant effect of cost of capital on the relationship between dividend payout and stock price volatility (measured by GARCH) for construction, plantation and properties sectors. The results are negatively significant for industrial product sector. But the findings for consumer product, technology, trading and services, and other sectors show insignificant effect of cost of capital on dividend payout ratio and stock price volatility. Moreover, the overall non-financial sectors findings also exhibits insignificant effect of cost of capital on dividend payout ratio and stock price volatility when measured by GARCH.

From Table 4.11, the results represented that cost of capital is insignificant among the relationship between dividend policy and stock price volatility, where volatility is measured by GARCH model. Cost of capital did not show any significant impact on dividend yield and stock price volatility relationship, also among dividend payout ratio and stock price volatility. The results are aligned with Fama and French (2001) and Chen et al. (2009), who claimed the cost of capital has no relationship with stock price volatility.

Hypothesis 4 and hypothesis 5 are both not accepted when stock price volatility is measured by GARCH. However, only hypothesis 4 is not rejected, while hypothesis 5 is not accepted in measurements of volatility by Parkinson. It depicts that the relationship between dividend payout ratio and stock price volatility is negatively significant with the moderating effect of the cost of capital.

4.4.5 Moderating Effect of Rate of Return on Relationship between Dividend Policy and Stock Price Volatility

The moderating effect of rate of return is not significant as observed in Table 4.10. In addition, the interaction of rate of return and dividend yield and interaction of rate of return and dividend payout ratio are both found to be insignificant by using Parkinson (1980) formula for volatility measurement for the overall non-financial sectors. Thus, hypothesis 6 and 7 are not accepted. While, hypothesis 7 is not rejected when stock price volatility is measured by GARCH and hypothesis 6 is not accepted for over all non-financial sectors as shown in Table 4.11.

Table 4.10 exhibits values which regressed with the stock price volatility measurement by Parkinson (1980). The results based on overall non-financial sector results show that there is insignificant moderation effect of rate of return on relationship between dividend payout ratio and stock price volatility (measured by Parkinson). The findings of construction sector, trading and services sectors shows negative significant effect of rate of return on dividend payout ratio and stock price volatility. Only the properties sector shows positive significant moderation effect of rate of return on dividend payout and stock price volatility. The remaining sectors including consumer product, industrial product, plantation, technology and others show insignificant moderating effect of rate of return.

Moreover, the moderating effect of rate of return on relationship between dividend payout ratio and stock price volatility (measured by GARCH) show insignificant results for overall non-financial sectors as shown in Table 4.11. The findings of construction, trading and services sectors show negative and positive significant moderating effect of rate of return on dividend payout ratio and stock price volatility respectively. There is insignificant moderating effect of rate of return on dividend payout ratio and stock price volatility for consumer product, industrial product, plantation, technology, properties and other sectors.

The moderating effect of rate of return on relationship between dividend yield and stock price volatility (measured by Parkinson) is negatively significant for consumer product, and properties sector in Table 4.10. Moreover, the construction, industrial product, plantation, technology, trading and services and other sectors show insignificant moderation effect of rate of return on dividend yield and stock price volatility (measured by Parkinson) in Table 4.10. The findings of overall non-financial sectors reveal that there is no moderation effect of rate of return on dividend yield and stock price volatility as shown in Table 4.10.

Moreover, there is a significant negative moderating effect of rate of return on relationship between dividend yield and stock price volatility (measured by GARCH) for industrial product and trading and services sectors. There is insignificant effect of rate of return on relationship between dividend yield and stock price volatility (measured by GARCH) for remaining sectors in Table 4.11. The results are statistically significantly positive for trading and services sector.

The results for overall non-financial sectors show negative significant moderating effect of rate of return on dividend yield and stock price volatility as mentioned in Table 4.11.

Moreover, Baskin (1989) and Gordon (1963) revealed that firm with low dividend yield have more scopes of future investment since the stock prices may change by estimated rates of return over the distant time period. It is rational approach that new equity issuances are costly and therefore, firms rely upon retain earnings for equity funds (Onsomu & Onchiri, 2014). In this situation, firms anticipate large investments and pay smaller dividends. Hence, investment opportunities with high net present values increase the stock prices and reduce the dividend yields (Lashgari & Ahmadi, 2014). Noting stock price volatility measurement by GARCH model, Table 4.11 has shown that there is a significant impact of the rate of return on the relationship between dividend yield and stock price volatility. Thus, hypothesis 6 is not accepted and hypothesis 7 is not rejected.

4.4.6 Summary of Hypothesis testing

Table 4.12 presents the cruxes of hypothesis findings along the research objectives. It shows that hypothesis 1, 2, 3 and 4 are accepted in the measurement of stock price volatility by Parkinson formula (1980), while hypothesis 5, 6 and 7 are rejected. On the other hand, hypothesis 1, 2, 3, 7 are accepted and hypothesis 4, 5, 6 were rejected in the measurement of stock price volatility by GARCH. So, data assumptions play a significant role in determining the results.

Table 4.12

Summary of the Findings of the Hypothesis Testing

Objectives	Hypotheses (Alternative)	Findings	
		Stock PV (Parkinson)	**Stock PV (GARCH)**
Objective 1 To describe dividend payment behavior of listed firms in different sectors of Malaysia.	H1: There is statistically significant differences in dividend policy between the non-financial sectors of Malaysia	H1 is not rejected (Alternative Hypothesis)	
Objective 2 To identify the significant relationship between dividend payout ratio and stock price volatility	H2: There is a statistically significant impact of dividend payout ratio on the volatility of stock price among the nonfinancial sectors of Malaysia	H2 is not rejected (Alternative Hypothesis)	H2 is not rejected (Alternative Hypothesis)
Objective 3 To analyze the significant relationship between dividend yield and stock price volatility	H3: There is a statistically significant impact of dividend yield on stock price volatility among the non-financial sectors of Malaysia	H3 is not rejected (Alternative Hypothesis)	H3 is not rejected (Alternative Hypothesis)
Objective 4 To examine the moderating effects of proxies of "Bird-in-Hand" Theory on the relationship between dividend payout ratio and volatility of stock price.	H4: The moderating effect of the cost of capital on the relationship between dividend payout ratio and volatility of stock price	H4 is not rejected (Alternative Hypothesis)	H4 is not accepted (Alternative Hypothesis)
	H6: The moderating effect of rate of return on the relationship between dividend payout ratio and volatility of stock price	H6 is not accepted (Alternative Hypothesis)	H6 is not accepted (Alternative Hypothesis)
Objective 5 To examine the moderating effects of proxies of "Bird-in-Hand" Theory on the relationship between dividend yield and volatility of stock price.	H5: The moderating effect of the cost of capital on the relationship between dividend yield and volatility of stock price	H5 is not accepted (Alternative Hypothesis)	H5 is not accepted (Alternative Hypothesis)
	H7: The moderating effect of rate of return on the relationship between dividend yield and volatility of stock price	H7 is not accepted (Alternative Hypothesis)	H7 is not rejected (Alternative Hypothesis)

4.5 Summary of Chapter

Chapter four exhibits the analysis of the proposed hypothesis for this study. Moreover, it consists a descriptive analysis for all particular variables of this study, and correlation matrix for all variables. The study contains panel data with 548 cross sections and 4384 observations within 8 years during 2009 to 2016. For the purpose of data validity, this study testified the estimation for panel data. After that, this chapter explains the method in determining the fixed effect suitability for regression analysis through Hausman Post-Estimation Test and Lagrange multiplier test for stock price volatility measured by GARCH, and pooled effect adequacy for stock price volatility by Parkinson. Moreover, heteroskedasticity issues were discovered in the data. This chapter presents results for the studied sectors and all non-financial sectors, analyzing the relationship between dividend policy and stock price volatility based on moderating effects of cost of capital and rate of return. In the last section, the discussions on the findings are mentioned together with the summary of findings.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter consists the conclusion and future recommendations for further studies. Section 5.1 summarizes this study, Section 5.2 denotes the major theoretical and empirical contributions of the study, and Section 5.3 presents the implication of the study and policy recommendations. Section 5.4 highlights the limitations of this study. Lastly, Section 5.5 mentions the scope for future studies.

5.1 Summary of the Study

The Bursa Malaysia (Malaysia's stock market) is known as a young stock market compared to other capital markets such as the NYSE. Malaysia's stock market is also recognized as one of the leading market among the emerging markets in terms of growth. Referring to the history of the Malaysian stock market, it was established in 1960 and has consistently enhanced its market share within the next 50 years. However, Bursa Malaysia is considered a risky and volatile stock market among the emerging markets in South-East Asia due to profound changes in the economy of Malaysia and the financial crisis.

To reduce the market volatility and improve the efficiency level, several studies were conducted on different issues. Among them, one of the debatable issue is the effect of dividend policy on stock price volatility, but the findings are still inconclusive (Hussainey, Mgbame & Chijoke-Mgbame, 2011; Zakaria, Muhammad & Zulkifli, 2012; Irandoost, Hassanzadeh & Salteh, 2013; Sadiq et al., 2014; Dewasiri & Banda, 2015; Abrar-ul-haq, Akram & Imdad Ullah, 2015; Shah & Noreen, 2016). According to Sadiq et al. (2014), dividend policy shows positive effects on the stock price volatility, higher dividend payout ratio leads to more volatile stock prices, where the dividend announcement is taken as a positive signal that increases the prices of stock.

Other studies stated that there is a significant negative impact of dividend policy on the volatility of stock price (Hashemijoo, Ardekani & Younesi, 2012; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014; Dewasiri & Banda, 2015). This reaffirms that larger firms that are at their maturity stage are more diversified and are in a better position to generate debt finance at a favorable cost. Hence, such firms pay high dividends and consequently their stock prices remain stable compared to smaller or growing firms (Hussainey, Mgbame & Chijoke-Mgbame, 2011). Similarly, some researchers indicated that dividend policy has no effect on stock price volatility (Abrar-ul-haq, Akram & Imdad Ullah, 2015).

Moreover, "Bird-in-Hand" Theory (i.e. cost of capital and rate of return) is assumed to have a moderating effect on the relationship between dividend policy and stock price volatility. According to Duration Effect, cost of capital moderates the interaction between dividend policy and stock price volatility (Baskin, 1989; Hashemijoo, Ardekani & Younesi, 2012; Profilet & Bacon, 2013; Dewasiri & Banda, 2015). Similarly, the rate of return moderates the interaction between dividend policy and stock price volatility, which is ignored by prior studies (Gordon, 1963; Baskin, 1989; Kenyoru, Kundu & Kibiwott, 2013; Al-Shawawreh, 2014).

Furthermore, there is a lack of literatures on the dividend policy and stock price volatility effects in Bursa Malaysia, and the findings of these studies showed inconsistent results. For example, Hashemijoo et al. (2012) found that there is a positive significant effect of dividend payout on stock price volatility, but, Zakaria et al. (2012) found a negative effect of dividend yield on stock price volatility. Therefore, there is a strong need to examine the effects of dividend policy on stock price volatility with the moderating effects of cost of capital and rate of return in the case of Bursa Malaysia.

To fulfill this gap in the literature, this study considers five objectives, the first objective is to understand the dividend payment behavior of non-financial sector listed on Bursa Malaysia; the second objective is to determine dividend yield impact on stock price volatility of non-financial companies listed on Bursa Malaysia; the third objective is to examine the influence of dividend payout ratio on stock price volatility of non-financial companies listed on Bursa Malaysia; the fourth objective is to check the moderating effect of cost of capital as a proxy of "Bird-in-Hand" Theory on relationship between dividend payout ratio and stock price volatility, and the fifth objective is to examine the moderating effect of rate of return as proxy of "Bird-in-Hand" Theory on relationship between dividend yield and stock price volatility.

To analyze the data gathered, this study utilizes panel regression models. This study considers two measurements of stock price volatility, which are Parkinson formula and GARCH. This study contains stock price volatility as dependent variable, dividend payout ratio and dividend yield as independent variable, rate of return and cost of capital as moderating variables, and earnings per share, growth, financial leverage, size as controlling variables. The dataset consists of the yearly data on dividend yield, dividend payout ratio, earnings per share, firm size, asset growth, financial leverage and cost of capital, and the rate of return from 2009 to 2016. This study uses a sample of 548 non-financial companies listed on Bursa Malaysia.

The results of the analysis show that there are mixed results for measurement of stock price volatility by GARCH and Parkinson. This study found that different non-financial sectors of Malaysia shows different dividend payment behaviors. These sectors have statistically significant dividend policy. Furthermore, there are significant effects of dividend yield and dividend payout ratio on the stock price volatility, measured by both GARCH and Parkinson. The moderating effect of cost of capital on dividend payout and stock price volatility is significant, when stock price volatility was measured by using the Parkinson formula but it is the opposite in case of GARCH measurement. Similarly, the moderating effect of cost of capital on the relationship between dividend yield and stock price volatility is insignificant when volatility is measured by the Parkinson formula and GARCH.

Moreover, the moderating effect of rate of return on the relationship between dividend payout ratio and stock price volatility is insignificant for both measurements of stock price volatility (Parkinson and GARCH). Similarly, the moderating effect of rate of return on the relationship between dividend yield and stock price volatility is insignificant for volatility measured by Parkinson formula. The findings of this study concluded that dividend policy is a strong predictor of stock price volatility. These findings shows this study is complementing classical "Bird-in-hand" theory.

This study also analyzed the data sector wise. The findings of construction sector, trading and services sectors shows negative significant effect of rate of return on dividend payout ratio and stock price volatility (measured by Parkinson). Only the properties sector shows positive significant moderation effect of rate of return on dividend payout and stock price volatility (measured by Parkinson). The remaining sectors including consumer product, industrial product, plantation, technology and others show insignificant moderating effect of rate of return when volatility measured by Parkinson.

Moreover, the moderating effect of rate of return on relationship between dividend payout ratio and stock price volatility (measured by GARCH) show insignificant results for overall non-financial sectors. The findings of construction, trading and services sectors show negative and positive significant moderating effect of rate of return on dividend payout ratio and stock price volatility respectively. There is insignificant moderating effect of rate of return on dividend payout ratio and stock price volatility for consumer product, industrial product, plantation, technology, properties and other sectors.

The interaction between dividend payout ratio and cost of capital shows significant effect for plantation properties and technology sectors when stock price volatility measured by Parkinson. The results for construction, consumer product, industrial product, trading and service, and other sectors are insignificant when volatility measured by Parkinson.

The moderation of cost of capital between the relationship of dividend yield and stock price volatility (measured by Parkinson) is negatively significant for construction, consumer, and technology sector. Similarly, industrial, plantation, properties, trading and services sectors show the significant positive moderating effect of cost of capital on the relationship between dividend yield and stock price volatility.

On the other hand, there is a significant negative moderating effect of cost of capital on the relationship between dividend yield and stock price volatility (measured by GARCH) for construction, consumer product, plantation, technology, trading and services sectors. The industrial product and properties sectors shows significant positive effect of cost of capital on the relationship between dividend yield and stock price volatility (measured by GARCH).

There is statistically positive significant effect of cost of capital on the relationship between dividend payout and stock price volatility (measured by GARCH) for construction, plantation and properties sectors. The results are negatively significant for industrial product sector. But the findings for consumer product, technology, trading and services, and other sectors show insignificant effect of cost of capital on dividend payout ratio and stock price volatility (measured by GARCH).

The moderating effect of cost of capital is insignificant among the relationship between dividend policy and stock price volatility, where volatility is measured by GARCH model. Cost of capital did not show any significant impact on dividend yield and stock price volatility relationship, also among dividend payout ratio and stock price volatility. The summary of findings for all sectors individually and collectively for all variables are given below in Table 5.1.

Table 5.1
The Main Findings of the Impact of Dividend Policy on Stock Price Volatility Based On 'Bird-In-Hand' Theory for the Body of Knowledge

Variables	**Stock Price volatility Measurement**	**Construction**	**Consumer Product**	**Industrial Product**	**Plantation**	**Properties**	**Technology**	**Trading/ services**	**Other**	**Overall non-financial sector**
Dividend yield	Parkinson	-	-	-	-	-	+	-	+	-
	GARCH	-	-		-	-		-	-	-
Dividend payout ratio	Parkinson	-	+	-	-	+	-	-	-	+
	GARCH	-	-	+	+	+	-	-	-	-
Cost of Capital	Parkinson		+	+	+	+	-	+	-	+
	GARCH	-	+	+	+	+	+	+	-	
Rate of return	Parkinson	+				+				+
	GARCH	-				-	-			+
COC*DY	Parkinson	-	-	+	+	+	-	+		
	GARCH	-	-	+		+		-		
COC*DPR	Parkinson				-	+	+			-
	GARCH	+		-	+	+				
ROR*DY	Parkinson		-			-				
	GARCH			-				-		-
ROR*DPR	Parkinson	-				+		-		
	GARCH	-						+		
Size	Parkinson	-		-	-		-		-	-
	GARCH	-	+	-	-	-	+	+	-	-
Financial leverage	Parkinson	-	+	-	-	+		-		+
	GARCH	-	-	-	+			-		-
Growth in assets	Parkinson		+		+			+	+	
	GARCH			+					+	-
Earnings per share	Parkinson	+	-	+					+	-
	GARCH				-			+	+	-

Note: + indicates positive significant; - indicates negative significant; Blank indicates insignificant results.

5.2 The Contributions of the Study

This study highlights the effect of dividend policy on stock price volatility based on "Bird-in-Hand" Theory. In general, the study contributes theoretically and empirically. On the basis of the research objectives and its fulfilment, the contributions can be detailed as follows:

5.2.1 Theoretical Contribution

This study provides the empirical analysis in the financial literature. It was questionable whether or not dividend policy affects stock price volatility based on "Bird-in-Hand" theory in Bursa Malaysia. The present study contributes to the literature by examining the effect of dividend policy on stock price volatility based on "Bird-in-Hand" theory in Bursa Malaysia. In sum, the study managed to extend the body of knowledge in light of the following;

1. Examination of the impact of dividend policy on stock price volatility in Bursa Malaysia.
2. Provide the distinction in the study's findings in the context of the non-financial sectors of emerging markets.
3. A pioneer study that tests the moderating effects of "Bird-in-Hand" theory factors (including the cost of capital as WACC and rate of return) on the relationship between dividend policy (dividend yield) and stock price volatility by using Parkinson formula.

4. Extends the “Bird-in-Hand” theory by including the moderating effects of cost of capital and rate of return.

The other contribution is that this study extensively covers all non-financial sectors which are listed on Bursa Malaysia. This study develops a conceptual framework which shows effect of dividend policy on stock price volatility based on “Bird-in-Hand” theory. The analyses of study involve panel data estimation method.

5.2.3 Practical Contribution

The empirical findings of the study have importance for financial managers, investors, policy makers and market analysts. The impact of dividend policy on the stock price volatility is not only important for policymakers, it is also crucial for portfolio managers, researchers, and investors who take an interest in the capital market. From the investment perspective, this study will increase the awareness for an investor, government, board of directors and stock exchange authorities, in making proper investment decisions and policies.

The findings of the study are valuable for investors to be used as a guide to understand stock market viability and take better decisions for investment. Investors can make decisions by evaluating and expecting the future movement of stock prices, whereas volatility in the capital market is not possible to eliminate entirely but reduced by making suitable dividend policies. The managers can use the findings of the study to make better decisions regarding the improvement their firm's performance.

5.3 Study Implications and Policy Recommendations

The findings of this thesis will provide knowledge to investors about dividend policy effects on stock price volatility in non-financial sectors of Bursa Malaysia. Bursa Malaysia stock market consistently expands on the global map. Therefore, an in-depth look at the dividend policy's influence on stock price volatility in Bursa Malaysia may assist Malaysian and foreign investors in making necessary investment decisions and may also be useful for policy makers.

The findings of this research will be useful to financial managers in non-financial companies of Malaysia. This will provide some information to managers regarding the reaction of dividend policy behavior on stock price volatility for non-financial companies. This study also suggests that the managers focus on the cost of capital and rate of return which can influence dividend policy's impact on stock price volatility. Furthermore, the findings of this study will be beneficial for stock analysts, who will get new empirical evidence of stock price volatility in non-financial industry. They could use these findings to evaluate and predict stock price movements and hence advise the investors on the selection of stocks with less risks.

There were little amount of literatures on the dividend policy effect on the stock price volatility in Bursa Malaysia. Mostly, previous studies focus on developed countries. Bursa Malaysia markets are characterized to be different from the stock markets of developed countries (Zakariya, Muhammad, & Zulkifli, 2012; Hashmijoo et al. 2012). The Malaysian stock market is considered as a more growing and turbulent market in Southeast Asia due to the profound change in the economy of Malaysia (Zakaria & Shamsuddin, 2012).

The payment behavior of dividend does not only varies from country to country, but also varies from sector to sector in both developed and emerging markets (Duke, Ikenna, & Nkamare, 2015). The requirement for dividends is increasing among investors in emerging markets (Yegon, Cheruiyot, & Sang, 2014). Majority of the studies on dividend policy and stock price volatility are not based on non-financial sectors and only provide general findings for one or two sectors, and hence, failing to include differences between sectors. As a result, some studies (Zakriya et al., 2012; Hashmijoo et al., 2012) stated that more detailed researches are required, particularly regarding the Bursa Malaysia market.

Most of existing literature concerning stock price volatility excludes non-finance companies in the sample due to methodological reasons, and hence, overlooking non-financial companies' stock price volatility. The author's in-depth look through literature also found few existences of documented study regarding dividend policy influence on stock price volatility in Bursa Malaysia. Based on the arguments about the importance of targeting specific sectors for the investigation of the dividend policy influence on stock price volatility, this study aims to investigate the dividend policy impact on stock price volatility based on “Bird-in-Hand” theory in Malaysian stock market.

5.4 Research Limitations

This study has few limitations. One of the limitation is that this study considers cash dividends only and ignored other option such as share repurchase, bonus, right shares, and preferred stock to regular options. This study follows “Bird-in-Hand” theory, which indicates that stock price volatility is more affected by dividends rather than retained earnings. In real life, there might be other factors affect stock price volatility. There may be other factors influencing dividend policy decisions which ignored by this study. This study is also limited to non-financial sectors only while financial sectors ignored.

5.5 Future Scope of the Study

This study has several recommendations to make for future researchers. This study observed a sample of 548 non-financial listed companies in Bursa Malaysia over the period of 2009 to 2016. Firstly, further researches would be possible by extending the size of the sample and time span.

Secondly, a comparison between the non-financial companies’ dividend policy effect on stock price volatility and companies from other countries can be conducted for future researches. Furthermore, a comparison of the findings with various sectors in light of dividend policy and stock price volatility can be conducted as well.

Thirdly, the moderating effect of this study should be tested by other researchers to justify the findings of this study. Despite the inclusion of the moderating effects of the cost of capital and rate of return variables in this study, other moderating effects can be studied and checked. In other words, a future study may include other interactions such as external or market factors' impact on the relationship between dividend policy and stock price volatility. Also, future studies can utilize other methodology to test the result of the study.

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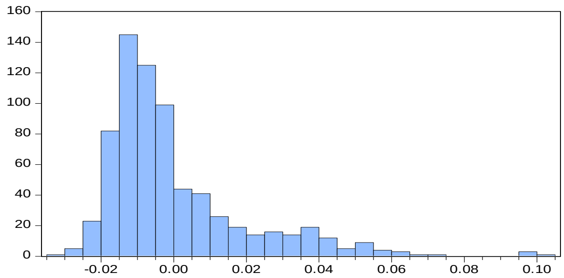
APPENDIX

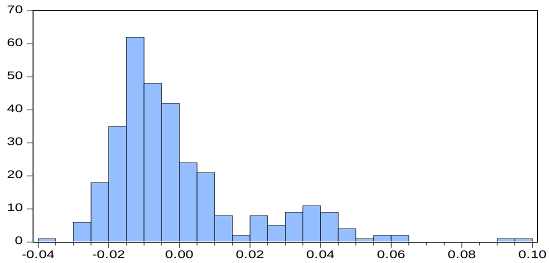
Appendix A.

Sector Results of Normality for stock price volatility measured by Parkinson Formula

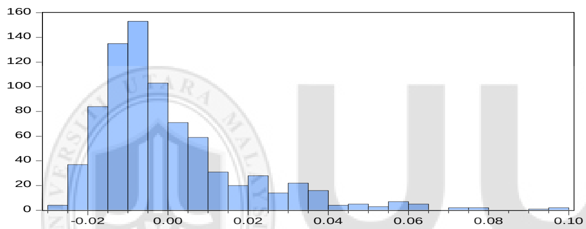
1. Construction sector



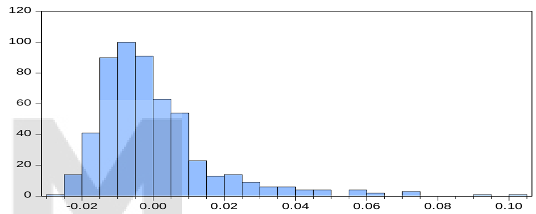
5. lantation Sector



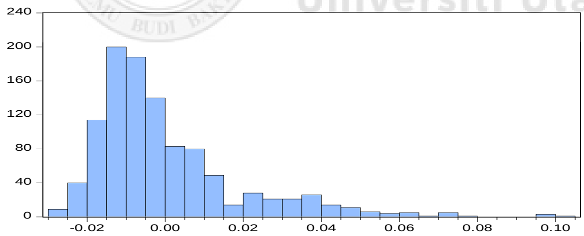
2. Consumer Product Sector



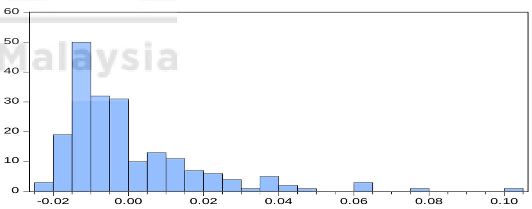
6. Properties Sector



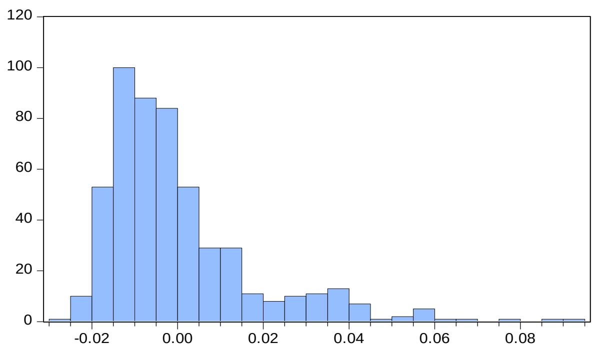
3. Industrial Product Sector



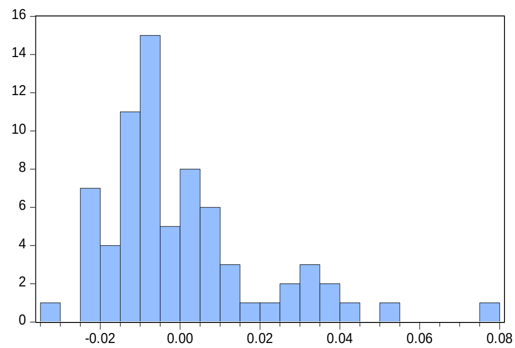
7. Technology Sector



4. Trading and Services Sector



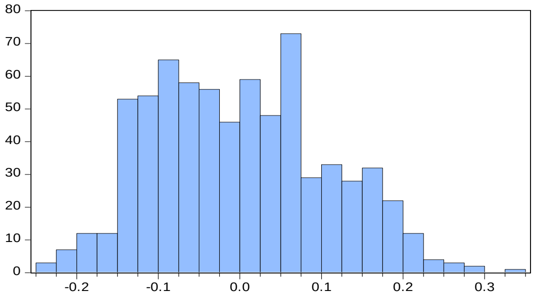
8. Others (Mining, hotel and IPC)



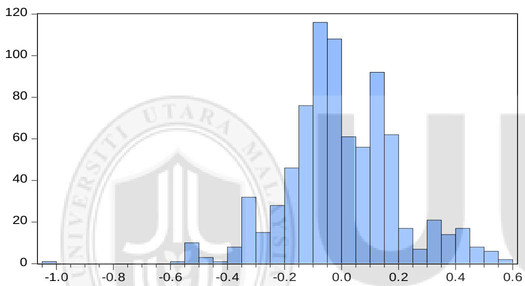
Appendix B.

Sector Results of Normality for stock price volatility measured by GARCH

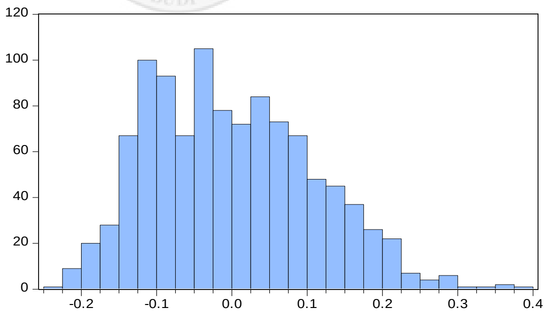
1. Construction sector



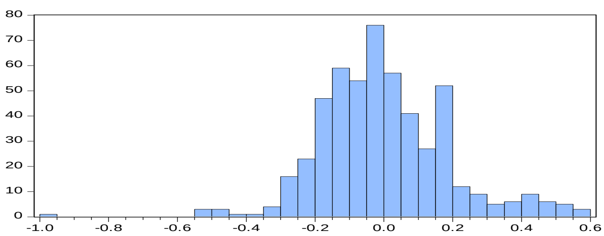
2. Consumer Product Sector



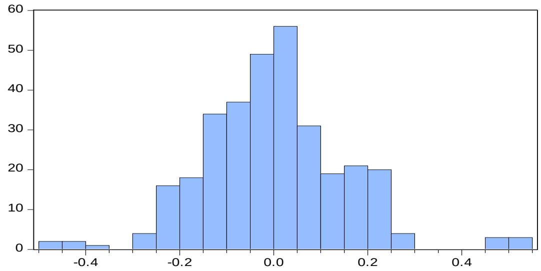
3. Industrial Product Sector



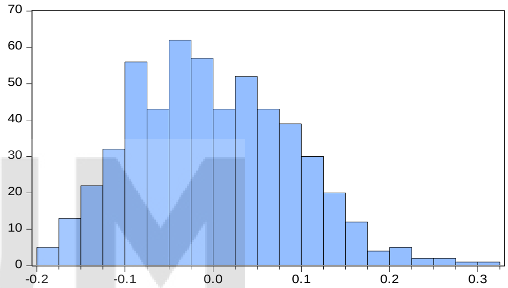
4. Trading and Services Sector



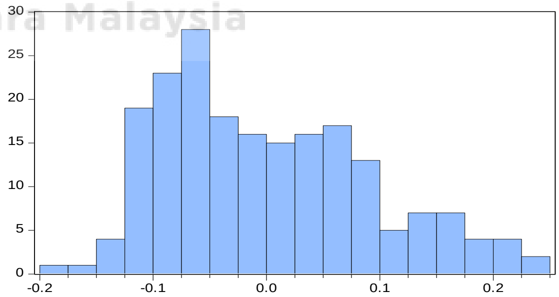
5. Plantation Sector



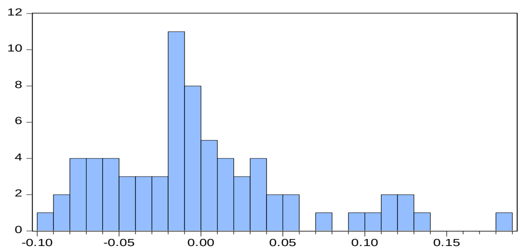
6. Properties Sector



7. Technology Sector



8. Others (Mining, hotel and IPC)



Appendix C

Results of Multicollinearity for Stock Price volatility measured by Parkinson Formula

1. Construction Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.959	1.043
DPR	.939	1.065
Size	.957	1.045
Growth	.935	1.069
Fin Lev	.969	1.032
ROR	.946	1.057
EPS	.974	1.027
COC	.952	1.050

2. Consumer Product Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.964	1.037
DPR	.993	1.007
Size	.964	1.037
Growth	.938	1.066
Fin Lev	.990	1.010
ROR	.986	1.015
EPS	.979	1.021
COC	.987	1.013

3. Industrial Product Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.993	1.007
DPR	.909	1.101
Size	.955	1.047
Growth	.873	1.145
Fin Lev	.976	1.024
ROR	.958	1.043
EPS	.968	1.033
COC	.964	1.038

4. Plantation Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.958	1.044
DPR	.798	1.253
Size	.915	1.093
Growth	.853	1.173
Fin Lev	.955	1.047
ROR	.853	1.173
EPS	.944	1.059
COC	.916	1.091

5. Properties Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.969	1.032
DPR	.969	1.032
Size	.956	1.046
Growth	.870	1.149
Fin Lev	.947	1.056
ROR	.935	1.069
EPS	.971	1.030
COC	.982	1.018

6. Technology Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.808	1.237
DPR	.901	1.109
Size	.924	1.082
Growth	.693	1.442
Fin Lev	.917	1.091
ROR	.828	1.208
EPS	.774	1.291
COC	.902	1.109

7. Trading and services Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.931	1.074
DPR	.838	1.193
Size	.962	1.039
Growth	.660	1.516
Fin Lev	.766	1.306
ROR	.854	1.172
EPS	.956	1.046
COC	.907	1.103

8. Others (Mining, hotel &IPC)

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.527	1.898
DPR	.492	2.033
Size	.540	1.852
Growth	.265	3.777
Fin Lev	.366	2.730
ROR	.278	3.594
EPS	.407	2.458
COC	.601	1.665

Appendix D

Results of Multicollinearity for Stock Price volatility measured by GARCH

1. Construction Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.959	1.043
DPR	.939	1.065
Size	.957	1.045
Growth	.935	1.069
Fin Lev	.946	1.057
ROR	.969	1.032
EPS	.974	1.027
COC	.952	1.050

2. Consumer Product Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.964	1.037
DPR	.993	1.007
Size	.964	1.037
Growth	.938	1.066
Fin Lev	.986	1.015
ROR	.990	1.010
EPS	.979	1.021
COC	.987	1.013

3. Industrial Product Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.993	1.007
DPR	.909	1.101
Size	.955	1.047
Growth	.873	1.145
Fin Lev	.976	1.024
ROR	.958	1.043
EPS	.968	1.033
COC	.964	1.038

4. Plantation Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.958	1.044
DPR	.798	1.253
Size	.915	1.093
Growth	.853	1.173
Fin Lev	.955	1.047
ROR	.853	1.173
EPS	.944	1.059
COC	.916	1.091

5. Properties Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.969	1.032
DPR	.969	1.032
Size	.956	1.046
Growth	.870	1.149
Fin Lev	.947	1.056
ROR	.935	1.069
EPS	.971	1.030
COC	.982	1.018

6. Technology Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.808	1.237
DPR	.901	1.109
Size	.924	1.082
Growth	.693	1.442
Fin Lev	.917	1.091
ROR	.828	1.208
EPS	.774	1.291
COC	.902	1.109

7. Trading and services Sector

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.931	1.074
DPR	.838	1.193
Size	.962	1.039
Growth	.660	1.516
Fin Lev	.766	1.306
ROR	.854	1.172
EPS	.956	1.046
COC	.907	1.103

8. Others (Mining, hotel &IPC)

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
DY	.527	1.898
DPR	.492	2.033
Size	.540	1.852
Growth	.265	3.777
Fin Lev	.366	2.730
ROR	.278	3.594
EPS	.407	2.458
COC	.601	1.665

Appendix E

Results of Correlation for Stock Price volatility measured by Parkinson

1. Construction Sector

	Stock PV-Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock PV-Parkinson	1	.152**	-.037	.023	-.095**	.047	-.024	.037	.018
		.000	.163	.272	.006	.105	.264	.163	.316
DY	.152**	1	.000	-.020	-.151**	.087*	.026	.088**	-.048
	.000		.497	.297	.000	.010	.241	.010	.101
DPR	-.037	.000	1	.001	.114**	.017	-.206**	-.050	.045
	.163	.497		.485	.001	.321	.000	.092	.115
AG	.023	-.020	.001	1	-.104**	-.070*	-.069*	-.031	.154**
	.272	.297	.485		.003	.032	.033	.207	.000
Size	-.095**	-.151**	.114**	-.104**	1	.093**	.027	-.055	.059
	.006	.000	.001	.003		.006	.237	.072	.058
EPS	.047	.087*	.017	-.070*	.093**	1	.058	.048	-.078*
	.105	.010	.321	.032	.006		.061	.099	.019
Finlev	-.024	.026	-.206**	-.069*	.027	.058	1	-.017	-.037
	.264	.241	.000	.033	.237	.061		.321	.160
COC	.037	.088**	-.050	-.031	-.055	.048	-.017	1	-.118**
	.163	.010	.092	.207	.072	.099	.321		.001
ROR	.018	-.048	.045	.154**	.059	-.078*	-.037	-.118**	1
	.316	.101	.115	.000	.058	.019	.160	.001	

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

2. Consumer Product Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	-.057	.035	.045	-.046	-.017	.040	.090**	.015
		.052	.158	.102	.098	.318	.128	.005	.333
DY	-.057	1	-.004	-.036	.130**	.052	-.046	-.105**	.075*
	.052		.456	.155	.000	.068	.095	.001	.017
DPR	.035	-.004	1	-.034	.049	.034	-.022	.014	-.042
	.158	.456		.167	.081	.169	.265	.347	.116
AG	.045	-.036	-.034	1	-.172**	-.028	-.004	-.054	.019
	.102	.155	.167		.000	.213	.457	.064	.292
Size	-.046	.130**	.049	-.172**	1	.049	.082**	-.070*	.045
	.098	.000	.081	.000		.084	.010	.023	.100
EPS	-.017	.052	.034	-.028	.049	1	-.040	.018	.048
	.318	.068	.169	.213	.084		.127	.307	.085
Finlev	.040	-.046	-.022	-.004	.082**	-.040	1	-.030	-.035
	.128	.095	.265	.457	.010	.127		.195	.160
COC	.090**	-.105**	.014	-.054	-.070*	.018	-.030	1	-.027
	.005	.001	.347	.064	.023	.307	.195		.222
ROR	.015	.075*	-.042	.019	.045	.048	-.035	-.027	1
	.333	.017	.116	.292	.100	.085	.160	.222	

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

3. Industrial Product Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	.084**	-.033	.059*	.009	.086**	.006	.000	.019
		.003	.137	.027	.390	.002	.417	.494	.269
DY	.084**	1	.037	.020	.009	.030	.044	.037	-.025
	.003		.112	.256	.382	.164	.075	.112	.204
DPR	-.033	.037	1	-.098**	.257**	.076**	-.076**	.017	.076**
	.137	.112		.001	.000	.007	.006	.291	.007
AG	.059*	.020	-.098**	1	-.140**	-.081**	-.045	-.026	.112**
	.027	.256	.001		.000	.004	.072	.200	.000
Size	.009	.009	.257**	-.140**	1	.127**	.124**	-.131**	.052*
	.390	.382	.000	.000		.000	.000	.000	.045
EPS	.086**	.030	.076**	-.081**	.127**	1	.034	.013	-.005
	.002	.164	.007	.004	.000		.132	.331	.437
Finlev	.006	.044	-.076**	-.045	.124**	.034	1	-.063*	-.089**
	.417	.075	.006	.072	.000	.132		.020	.002
COC	.000	.037	.017	-.026	-.131**	.013	-.063*	1	-.082**
	.494	.112	.291	.200	.000	.331	.020		.004
ROR	.019	-.025	.076**	.112**	.052*	-.005	-.089**	-.082**	1
	.269	.204	.007	.000	.045	.437	.002	.004	

4. Plantation Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	.161**	-.120*	.074	.027	.168**	-.026	.033	-.004
		.002	.016	.092	.312	.001	.321	.276	.471
DY	.161**	1	-.077	.002	-.114*	.159**	-.003	.005	-.035
	.002		.084	.487	.021	.002	.479	.461	.267
DPR	-.120*	-.077	1	-.015	.329**	-.029	-.322**	-.065	.081
	.016	.084		.394	.000	.300	.000	.123	.074
AG	.074	.002	-.015	1	-.104*	-.069	-.123*	-.104*	.187**
	.092	.487	.394		.032	.111	.014	.032	.000
Size	.027	-.114*	.329**	-.104*	1	.033	-.110*	-.104*	.104*
	.312	.021	.000	.032		.277	.024	.031	.032
EPS	.168**	.159**	-.029	-.069	.033	1	.048	.013	-.110*
	.001	.002	.300	.111	.277		.195	.408	.025
Finlev	-.026	-.003	-.322**	-.123*	-.110*	.048	1	-.094*	.043
	.321	.479	.000	.014	.024	.195		.047	.224
COC	.033	.005	-.065	-.104*	-.104*	.013	-.094*	1	-.151**
	.276	.461	.123	.032	.031	.408	.047		.003
ROR	-.004	-.035	.081	.187**	.104*	-.110*	.043	-.151**	1
	.471	.267	.074	.000	.032	.025	.224	.003	

5. Properties Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	-.039	.072*	-.023	-.071*	-.050	.050	.116**	.110**
		.182	.047	.299	.049	.122	.120	.003	.005
DY	-.039	1	-.052	-.010	.144**	.023	.083*	.060	.020
	.182		.115	.409	.000	.293	.027	.083	.323
DPR	.072*	-.052	1	.020	-.099*	.043	-.129**	-.052	.035
	.047	.115		.323	.011	.156	.001	.112	.211
AG	-.023	-.010	.020	1	-.176**	-.001	-.022	-.097*	-.003
	.299	.409	.323		.000	.487	.301	.012	.468
Size	-.071*	.144**	-.099*	-.176**	1	.184**	.188**	-.071*	-.023
	.049	.000	.011	.000		.000	.000	.048	.297
EPS	-.050	.023	.043	-.001	.184**	1	-.045	-.033	-.090*
	.122	.293	.156	.487	.000		.145	.218	.018
Finlev	.050	.083*	-.129**	-.022	.188**	-.045	1	-.052	-.080*
	.120	.027	.001	.301	.000	.145		.114	.031
COC	.116**	.060	-.052	-.097*	-.071*	-.033	-.052	1	.035
	.003	.083	.112	.012	.048	.218	.114		.207
ROR	.110**	.020	.035	-.003	-.023	-.090*	-.080*	.035	1
	.005	.323	.211	.468	.297	.018	.031	.207	

6. Technology Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	-.044	.029	-.013	-.121*	-.029	-.028	-.006	.035
		.270	.343	.425	.044	.344	.348	.466	.311
DY	-.044	1	.220**	-.185**	.224**	-.133*	.238**	-.151*	-.088
	.270		.001	.004	.001	.030	.000	.017	.108
DPR	.029	.220**	1	-.098	.024	.038	.048	-.193**	.002
	.343	.001		.083	.369	.298	.252	.003	.486
AG	-.013	-.185**	-.098	1	-.109	.004	-.002	-.028	.122*
	.425	.004	.083		.062	.477	.486	.349	.043
Size	-.121*	.224**	.024	-.109	1	.136*	.262**	-.401**	.167**
	.044	.001	.369	.062		.027	.000	.000	.009
EPS	-.029	-.133*	.038	.004	.136*	1	.148*	.032	.054
	.344	.030	.298	.477	.027		.019	.324	.223
Finlev	-.028	.238**	.048	-.002	.262**	.148*	1	-.005	-.150*
	.348	.000	.252	.486	.000	.019		.470	.017
COC	-.006	-.151*	-.193**	-.028	-.401**	.032	-.005	1	-.128*
	.466	.017	.003	.349	.000	.324	.470		.035
ROR	.035	-.088	.002	.122*	.167**	.054	-.150*	-.128*	1
	.311	.108	.486	.043	.009	.223	.017	.035	

7. Trading and Services Sector

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	.042	.008	.132**	.084*	.037	-.012	.071	.086*
		.169	.429	.001	.027	.197	.391	.053	.026
DY	.042	1	.103**	.017	.175**	.103**	.188**	.091*	-.080*
	.169		.009	.350	.000	.009	.000	.019	.034
DPR	.008	.103**	1	-.096*	.310**	.223**	.055	.180**	.193**
	.429	.009		.014	.000	.000	.107	.000	.000
AG	.132**	.017	-.096*	1	-.170**	-.077*	.004	.000	.003
	.001	.350	.014		.000	.040	.460	.496	.475
Size	.084*	.175**	.310**	-.170**	1	.449**	.284**	.097*	.054
	.027	.000	.000	.000		.000	.000	.014	.108
EPS	.037	.103**	.223**	-.077*	.449**	1	.015	.022	.153**
	.197	.009	.000	.040	.000		.370	.310	.000
Finlev	-.012	.188**	.055	.004	.284**	.015	1	.015	-.174**
	.391	.000	.107	.460	.000	.370		.371	.000
COC	.071	.091*	.180**	.000	.097*	.022	.015	1	-.018
	.053	.019	.000	.496	.014	.310	.371		.344
ROR	.086*	-.080*	.193**	.003	.054	.153**	-.174**	-.018	1
	.026	.034	.000	.475	.108	.000	.000	.344	

8. Others (Hotel, Mining and IPC)

	Parkinson	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Parkinson	1	-.224	.035	.311*	-.218	.190	.014	.114	-.293*
		.082	.414	.025	.089	.120	.466	.242	.033
DY	-.224	1	.195	-.213	.117	-.106	-.153	.106	.295*
	.082		.114	.093	.237	.258	.173	.258	.032
DPR	.035	.195	1	.115	.489**	.289*	.284*	-.258	-.469**
	.414	.114		.240	.001	.035	.038	.054	.001
AG	.311*	-.213	.115	1	-.073	.042	-.144	.365*	-.089
	.025	.093	.240		.328	.399	.188	.010	.293
Size	-.218	.117	.489**	-.073	1	.658**	.676**	-.540**	-.207
	.089	.237	.001	.328		.000	.000	.000	.100
EPS	.190	-.106	.289*	.042	.658**	1	.713**	-.392**	-.285*
	.120	.258	.035	.399	.000		.000	.006	.038
Finlev	.014	-.153	.284*	-.144	.676**	.713**	1	-.260	-.241
	.466	.173	.038	.188	.000	.000		.053	.067
COC	.114	.106	-.258	.365*	-.540**	-.392**	-.260	1	.195
	.242	.258	.054	.010	.000	.006	.053		.114
ROR	-.293*	.295*	-.469**	-.089	-.207	-.285*	-.241	.195	1
	.033	.032	.001	.293	.100	.038	.067	.114	

Appendix F

Results of Correlation for Stock Price volatility measured by GARCH

1. Construction Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.098**	-.005	-.002	-.184**	-.054	-.082*	-.048	-.038
		.005	.450	.474	.000	.073	.014	.100	.153
DY	-.098**	1	.000	-.020	-.151**	.026	.087*	.088**	-.048
	.005		.497	.297	.000	.241	.010	.010	.101
DPR	-.005	.000	1	.001	.114**	-.206**	.017	-.050	.045
	.450	.497		.485	.001	.000	.321	.092	.115
AG	-.002	-.020	.001	1	-.104**	-.069*	-.070*	-.031	.154**
	.474	.297	.485		.003	.033	.032	.207	.000
Size	-.184**	-.151**	.114**	-.104**	1	.027	.093**	-.055	.059
	.000	.000	.001	.003		.237	.006	.072	.058
EPS	-.054	.026	-.206**	-.069*	.027	1	.058	-.017	-.037
	.073	.241	.000	.033	.237		.061	.321	.160
Finlev	-.082*	.087*	.017	-.070*	.093**	.058	1	.048	-.078*
	.014	.010	.321	.032	.006	.061		.099	.019
COC	-.048	.088**	-.050	-.031	-.055	-.017	.048	1	-.118**
	.100	.010	.092	.207	.072	.321	.099		.001
ROR	-.038	-.048	.045	.154**	.059	-.037	-.078*	-.118**	1
	.153	.101	.115	.000	.058	.160	.019	.001	

2. Consumer Product Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	.019	-.057	-.008	.052	.110**	-.003	.013	.029
		.298	.054	.410	.070	.001	.467	.355	.202
DY	.019	1	-.004	-.036	.130**	-.046	.052	-.105**	.075*
	.298		.456	.155	.000	.095	.068	.001	.017
DPR	-.057	-.004	1	-.034	.049	-.022	.034	.014	-.042
	.054	.456		.167	.081	.265	.169	.347	.116
AG	-.008	-.036	-.034	1	-.172**	-.004	-.028	-.054	.019
	.410	.155	.167		.000	.457	.213	.064	.292
Size	.052	.130**	.049	-.172**	1	.082**	.049	-.070*	.045
	.070	.000	.081	.000		.010	.084	.023	.100
EPS	.110**	-.046	-.022	-.004	.082**	1	-.040	-.030	-.035
	.001	.095	.265	.457	.010		.127	.195	.160
Finlev	-.003	.052	.034	-.028	.049	-.040	1	.018	.048
	.467	.068	.169	.213	.084	.127		.307	.085
COC	.013	-.105**	.014	-.054	-.070*	-.030	.018	1	-.027
	.355	.001	.347	.064	.023	.195	.307		.222
ROR	.029	.075*	-.042	.019	.045	-.035	.048	-.027	1
	.202	.017	.116	.292	.100	.160	.085	.222	

3. Industrial Product Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.066*	-.013	.124**	-.066*	-.045	-.110**	.077**	.021
		.016	.331	.000	.016	.072	.000	.006	.244
DY	-.066*	1	.037	.020	.009	.030	.044	.037	-.025
	.016		.112	.256	.382	.164	.075	.112	.204
DPR	-.013	.037	1	-.098**	.257**	.076**	-.076**	.017	.076**
	.331	.112		.001	.000	.007	.006	.291	.007
AG	.124**	.020	-.098**	1	-.140**	-.081**	-.045	-.026	.112**
	.000	.256	.001		.000	.004	.072	.200	.000
Size	-.066*	.009	.257**	-.140**	1	.127**	.124**	-.131**	.052*
	.016	.382	.000	.000		.000	.000	.000	.045
EPS	-.045	.030	.076**	-.081**	.127**	1	.034	.013	-.005
	.072	.164	.007	.004	.000		.132	.331	.437
Finlev	-.110**	.044	-.076**	-.045	.124**	.034	1	-.063*	-.089**
	.000	.075	.006	.072	.000	.132		.020	.002
COC	.077**	.037	.017	-.026	-.131**	.013	-.063*	1	-.082**
	.006	.112	.291	.200	.000	.331	.020		.004
ROR	.021	-.025	.076**	.112**	.052*	-.005	-.089**	-.082**	1
	.244	.204	.007	.000	.045	.437	.002	.004	

4. Plantation Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.075	.081	-.035	-.066	-.051	.022	.117*	-.035
		.091	.074	.265	.119	.184	.349	.019	.268
DY	-.075	1	-.077	.002	-.114*	.159**	-.003	.005	-.035
	.091		.084	.487	.021	.002	.479	.461	.267
DPR	.081	-.077	1	-.015	.329**	-.029	-.322**	-.065	.081
	.074	.084		.394	.000	.300	.000	.123	.074
AG	-.035	.002	-.015	1	-.104*	-.069	-.123*	-.104*	.187**
	.265	.487	.394		.032	.111	.014	.032	.000
Size	-.066	-.114*	.329**	-.104*	1	.033	-.110*	-.104*	.104*
	.119	.021	.000	.032		.277	.024	.031	.032
EPS	-.051	.159**	-.029	-.069	.033	1	.048	.013	-.110*
	.184	.002	.300	.111	.277		.195	.408	.025
Finlev	.022	-.003	-.322**	-.123*	-.110*	.048	1	-.094*	.043
	.349	.479	.000	.014	.024	.195		.047	.224
COC	.117*	.005	-.065	-.104*	-.104*	.013	-.094*	1	-.151**
	.019	.461	.123	.032	.031	.408	.047		.003
ROR	-.035	-.035	.081	.187**	.104*	-.110*	.043	-.151**	1
	.268	.267	.074	.000	.032	.025	.224	.003	

5. Properties Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.099*	.105**	.024	-.197**	-.048	-.005	.074*	-.021
		.011	.007	.290	.000	.130	.450	.043	.315
DY	-.099*	1	-.052	-.010	.144**	.023	.083*	.060	.020
	.011		.115	.409	.000	.293	.027	.083	.323
DPR	.105**	-.052	1	.020	-.099*	.043	-.129**	-.052	.035
	.007	.115		.323	.011	.156	.001	.112	.211
AG	.024	-.010	.020	1	-.176**	-.001	-.022	-.097*	-.003
	.290	.409	.323		.000	.487	.301	.012	.468
Size	-.197**	.144**	-.099*	-.176**	1	.184**	.188**	-.071*	-.023
	.000	.000	.011	.000		.000	.000	.048	.297
EPS	-.048	.023	.043	-.001	.184**	1	-.045	-.033	-.090*
	.130	.293	.156	.487	.000		.145	.218	.018
Finlev	-.005	.083*	-.129**	-.022	.188**	-.045	1	-.052	-.080*
	.450	.027	.001	.301	.000	.145		.114	.031
COC	.074*	.060	-.052	-.097*	-.071*	-.033	-.052	1	.035
	.043	.083	.112	.012	.048	.218	.114		.207
ROR	-.021	.020	.035	-.003	-.023	-.090*	-.080*	.035	1
	.315	.323	.211	.468	.297	.018	.031	.207	

6. Technology Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	.021	-.134*	.009	.041	.135*	.148*	.043	.041
		.385	.029	.447	.282	.029	.018	.272	.282
DY	.021	1	.033	-.014	.040	.002	.444**	-.036	-.239**
	.385		.324	.424	.287	.489	.000	.309	.000
DPR	-.134*	.033	1	-.098	.024	.038	.048	-.193**	.002
	.029	.324		.083	.369	.298	.252	.003	.486
AG	.009	-.014	-.098	1	-.109	.004	-.002	-.028	.122*
	.447	.424	.083		.062	.477	.486	.349	.043
Size	.041	.040	.024	-.109	1	.136*	.262**	-.401**	.167**
	.282	.287	.369	.062		.027	.000	.000	.009
EPS	.135*	.002	.038	.004	.136*	1	.148*	.032	.054
	.029	.489	.298	.477	.027		.019	.324	.223
Finlev	.148*	.444**	.048	-.002	.262**	.148*	1	-.005	-.150*
	.018	.000	.252	.486	.000	.019		.470	.017
COC	.043	-.036	-.193**	-.028	-.401**	.032	-.005	1	-.128*
	.272	.309	.003	.349	.000	.324	.470		.035
ROR	.041	-.239**	.002	.122*	.167**	.054	-.150*	-.128*	1
	.282	.000	.486	.043	.009	.223	.017	.035	

7. Trading and Services Sector

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.010	.002	.035	.126**	.121**	-.017	.034	.091*
		.409	.485	.213	.002	.003	.351	.220	.019
DY	-.010	1	.103**	.017	.175**	.103**	.188**	.091*	-.080*
	.409		.009	.350	.000	.009	.000	.019	.034
DPR	.002	.103**	1	-.096*	.310**	.223**	.055	.180**	.193**
	.485	.009		.014	.000	.000	.107	.000	.000
AG	.035	.017	-.096*	1	-.170**	-.077*	.004	.000	.003
	.213	.350	.014		.000	.040	.460	.496	.475
Size	.126**	.175**	.310**	-.170**	1	.449**	.284**	.097*	.054
	.002	.000	.000	.000		.000	.000	.014	.108
EPS	.121**	.103**	.223**	-.077*	.449**	1	.015	.022	.153**
	.003	.009	.000	.040	.000		.370	.310	.000
Finlev	-.017	.188**	.055	.004	.284**	.015	1	.015	-.174**
	.351	.000	.107	.460	.000	.370		.371	.000
COC	.034	.091*	.180**	.000	.097*	.022	.015	1	-.018
	.220	.019	.000	.496	.014	.310	.371		.344
ROR	.091*	-.080*	.193**	.003	.054	.153**	-.174**	-.018	1
	.019	.034	.000	.475	.108	.000	.000	.344	

8. Others (hotel, Mining & IPC)

	Stock-PV	DY	DPR	AG	Size	EPS	Finlev	COC	ROR
Stock-PV	1	-.224	.035	.311*	-.218	.190	.014	.114	-.293*
		.082	.414	.025	.089	.120	.466	.242	.033
DY	-.224	1	.195	-.213	.117	-.106	-.153	.106	.295*
	.082		.114	.093	.237	.258	.173	.258	.032
DPR	.035	.195	1	.115	.489**	.289*	.284*	-.258	-.469**
	.414	.114		.240	.001	.035	.038	.054	.001
AG	.311*	-.213	.115	1	-.073	.042	-.144	.365*	-.089
	.025	.093	.240		.328	.399	.188	.010	.293
Size	-.218	.117	.489**	-.073	1	.658**	.676**	-.540**	-.207
	.089	.237	.001	.328		.000	.000	.000	.100
EPS	.190	-.106	.289*	.042	.658**	1	.713**	-.392**	-.285*
	.120	.258	.035	.399	.000		.000	.006	.038
Finlev	.014	-.153	.284*	-.144	.676**	.713**	1	-.260	-.241
	.466	.173	.038	.188	.000	.000		.053	.067
COC	.114	.106	-.258	.365*	-.540**	-.392**	-.260	1	.195
	.242	.258	.054	.010	.000	.006	.053		.114
ROR	-.293*	.295*	-.469**	-.089	-.207	-.285*	-.241	.195	1
	.033	.032	.001	.293	.100	.038	.067	.114	

Appendix G.

Model for total Non-financial Sectors (volatility Measured by Parkinson formula)

Dependent Variable: SPV
Method: Panel EGLS (Cross-section weights)
Date: 04/08/18 Time: 22:52
Sample: 2009 2016
Periods included: 8
Cross-sections included: 548
Total panel (balanced) observations: 4384
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DPR	0.001789	0.000574	3.117286	0.0018
DY	-0.003456	0.004487	-0.770239	0.0441
ROR	0.003972	0.001550	2.562240	0.0104
COC	0.019208	0.006014	3.193788	0.0014
INT_DPR_ROR	-0.010742	0.004797	-2.239328	0.0252
INT_DY_ROR	0.019832	0.044303	0.447638	0.6544
INT_DPR_COC	0.025896	0.018461	1.402770	0.0160
INT_DY_COC	-0.194600	0.129493	-1.502781	0.1330
AG	-2.75E-05	0.000536	-0.051383	0.9590
FS	-0.000314	0.000119	-2.633325	0.0085
FL	0.004269	0.000820	5.205140	0.0000
EPS	-0.003043	0.001487	-2.045531	0.0409
C	0.025849	0.002262	11.42689	0.0000

Weighted Statistics

R-squared	0.016837	Mean dependent var	0.038454
Adjusted R-squared	0.014137	S.D. dependent var	0.025200
S.E. of regression	0.017932	Sum squared resid	1.405447
F-statistic	6.237730	Durbin-Watson stat	1.021518
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	-0.028317	Mean dependent var	0.028995
Sum squared resid	1.612374	Durbin-Watson stat	0.803519

Appendix H.

Model for total Non-financial Sectors (volatility Measured by GARCH)

Dependent Variable: SPV__GARCH_
Method: Panel EGLS (Cross-section weights)
Date: 05/01/18 Time: 19:33
Sample: 2009 2016
Periods included: 8
Cross-sections included: 548
Total panel (balanced) observations: 4384
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DPR	-0.006399	0.001857	-3.446031	0.0006
DY	-0.070148	0.019807	-3.541565	0.0004
COC	0.100986	0.025115	4.020876	0.0001
ROR	0.007226	0.005185	1.393415	0.1636
AG	-0.001859	0.001430	-1.300643	0.1935
EPS	-0.017669	0.006130	-2.882607	0.0040
FL	-0.004271	0.002650	-1.611742	0.1071
FS	-0.004312	0.000820	-5.256325	0.0000
INT_DPR_COC	0.028751	0.052357	0.549133	0.5829
INT_DPR_ROR	-0.011963	0.020942	-0.571223	0.5679
INT_DY_COC	-0.377324	0.526765	-0.716303	0.4738
INT_DY_ROR	-0.277209	0.164099	-1.689280	0.0912
C	0.408004	0.009961	40.96085	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.945489	Mean dependent var	0.813944
Adjusted R-squared	0.937520	S.D. dependent var	0.528603
S.E. of regression	0.087110	Sum squared resid	29.01685
F-statistic	118.6530	Durbin-Watson stat	1.037599
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.671458	Mean dependent var	0.357117
Sum squared resid	29.21479	Durbin-Watson stat	1.587137