DIVIDEND STUDY WITH ALTERNATIVE TESTS, PANEL DATA ANALYSIS AND PANEL GENERALISED AUTOREGRESSIVE CONDITIONAL HETEROSCEDASTICITY

By

NG CHEE PUNG

Thesis Submitted to Graduate School of Management, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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DEDICATION

To my family

... for the time I had to spend away from you all...

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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April 2017

Chair : Choo Wei Chong, PhD
Faculty : Graduate School of Management, Universiti Putra Malaysia

Conventional event-study methodologies have not taken event-induced variance, cross-correlation among abnormal returns, heteroscedasticity, serial correlation, and cross-sectional dependence into consideration. These methodologies use the symmetric *t*-test, even though asymmetric effects exist in the event-study. This might result in false inferences about the significance of the events and the validity of the theories being tested. To illustrate the extent of these problems, we attempt to use three more efficient approaches and adopt dividend events in our tests. Hence, the first contribution of this research is to analyse the advance proposed Adjusted BMP (Adj-BMP) test in order to resolve the event-induced variance and cross correlation among abnormal returns. To our knowledge, this is the first empirical evidence for the real application of the Adj-BMP test using dividend events. Most of the existing conventional event-study methodologies use cross-sectional data, but they do not take time series data into account. Kolari and Pynnönen (2010) stated that the above mentioned problem is akin to a panel data setting; hence, this study was motivated to explore the panel data analysis in event-study. Additional refinements include mitigating the problems that the average abnormal returns (AAR) tend to exhibit such as heteroscedasticity, serial correlation, and cross-sectional dependence, which in turn lead to a bias of standard errors in the panel data analysis. This motivated us to outline our second objective of this research, which is to propose the use of the novel panel data model with robust standard errors to examine the impact of dividends on AAR at the mean level. The existence of the event-induced variance problem and heteroscedasticity in the panel data analysis inspired the study to further examine the third objective, employing the conventional Autoregressive Conditional Heteroscedasticity (ARCH) model with the panel framework to capture the event-induced conditional variance of AAR. To our knowledge, this is the only empirical evidence evaluating the dividends' effects on volatility with this methodology. A total of 650 dividend events from 2000 to 2014 in the 20 largest market capitalisation listed companies in the Malaysian stock market were used as a sample. We examined nine various dividends events, namely two major types of dividends and seven combinations (Events *a* to *i*). Our results of the Adj-BMP test indicated that the Boehmer, Mucumeci, and Poulsen (BMP) test over-rejected the null hypothesis, and the Adj-BMP test showed that AAR still exist. Even though the Driscoll-Kraay Standard Errors on pooled Ordinary Least Square has been employed to

rectify the aforementioned problems, the results of the study showed the presence of AAR of dividend events in the Malaysian stock market. Hence, the findings of first and second objectives in this study could conclude that dividend events have an impact on AAR. The findings from the panel ARCH model suggested that dividend events do affect not only the AAR level, but also their conditional variances. Thus, from the study, it can be concluded that dividend events do affect the AAR conditional variance of the Malaysian stock market. The empirical findings of this thesis further support the idea of dividend relevance theory and the ARCH effect hypothesis. Overall, these three refinements improve both the reliability and the validity of event-study. The study has gone some way towards enhancing our understanding of the dividend events' impact not only on the AAR but also on the AAR conditional variance. This impact is especially seen in the Malaysian stock market through the refinements on test statistics, the panel data model and the panel ARCH model.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KAJIAN DIVIDEN DENGAN UJIAN ALTERNATIF, ANALISIS DATA PANEL DAN AUTOREGRESI HETEROSKEDASTISITI BERSYARAT PANEL

Oleh

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Kaedah konvensional tidak mengambil kira peristiwa mengaruhkan varians, korelasi silang antara pulangan tidak normal, heteroskedastisiti, korelasi serial dan kebergantungan silang (cross sectional dependence). Kaedah-kaedah ini menggunakan ujian *t* simetrik walaupun wujudnya kesan tidak simetrik dalam kajian peristiwa. Hal ini mungkin menyebabkan inferens yang palsu tentang kepentingan dan pengesahan teori-teori yang diuji. Bagi menyelesaikan masalah-masalah ini, kami cuba untuk menggunakan tiga pendekatan yang lebih efisen dan menyesuaikan peristiwa dividen dalam ujian kami. Oleh itu, sumbangan pertama kajian ini adalah untuk menganalisa Ujian Penyesuai BMP (Adj-BMP) untuk menyelesaikan peristiwa mengaruhkan varians dan korelasi silang antara pulangan tidak normal. Sebagai pengetahuan semua, ini adalah bukti empirikal pertama untuk aplikasi sebenar Ujian Penyesuai BMP menggunakan peristiwa dividen. Kebanyakan kaedah konvensional kajian peristiwa menggunakan data silang, tetapi tidak mengendahkan data siri masa. *Kolari* dan *Pynnonen* (2010) menyatakan bahawa masalah yang dibangkitkan di atas merupakan tetapan data panel. Oleh itu, kajian ini bermotif untuk meneroka analisis data panel dalam kajian peristiwa. Pembaikan lain termasuklah mengurangkan masalah-masalah purata pulangan tidak normal seperti heteroskedastisiti, korelasi serial dan kebergantungan data silang, yang mana boleh membawa kepada bias ke atas ralat piawai dalam analisis panel data. Hal ini memotivasikan kami untuk menggariskan objektif kedua kajian iaitu dengan mencadangkan penggunaan model panel data dengan ralat piawai teguh untuk mengkaji impak dividen terhadap pulangan tidak normal. Kewujudan masalah peristiwa mengaruhkan varians dan heteroskedastisiti dalam analisis panel data memberi ilham kepada kajian untuk memeriksa dengan lebih mendalam objektif ketiga, iaitu menggunakan kaedah model konvensional Autoregresi Heteroskedastisiti Bersyarat (ARCH) dengan rangka panel untuk menangkap peristiwa mengaruhkan varians bersyarat terhadap purata pulangan tidak normal. Untuk pengetahuan kita, ini hanyalah bukti empirikal yang menilai impak dividen terhadap votaliti bagi kaedah ini. Sebanyak 650 peristiwa dividen dari tahun 2000 hingga 2014, yang melibatkan 20 syarikat terbesar pasaran kapital yang disenaraikan dalam pasaran saham Malaysia telah dijadikan sebagai sampel. Kami mengkaji sembilan jenis peristiwa-peristiwa dividen, iaitu dua jenis dividen major beserta tujuh cantuman (Peristiwa-peristiwa *a* hingga *i*). Kami mendapati Ujian Penyesuai BMP menolak Hipotesis Nol sepenuhnya. Walaupun ralat piawai Driscoll-Kraay terhadap kaedah

Kuasa Dua Terkecil Terkumpul (pooled OLS) telah digunakan untuk menyelesaikan masalah yang telah dinyatakan, keputusan kajian masih menunjukkan bahawa wujudnya pulangan tidak normal semasa peristiwa-peristiwa dividen berlaku dalam pasaran saham Malaysia. Oleh itu, penemuan pertama dan kedua dalam kajian ini boleh disimpulkan peristiwa-peristiwa dividen mempunyai impak terhadap purata pulangan tidak normal. Penemuan dari panel ARCH model mencadangkan bahawa peristiwa-peristiwa dividen memberi kesan bukan hanya kepada purata tidak normal tetapi juga varians bersyarat. Daripada kajian ini dapat disimpulkan bahawa peristiwa-peristiwa dividen mempengaruhi varians bersyarat pulangan tidak normal pasaran saham Malaysia. Penemuan empirikal thesis ini menyokong idea bahawa teori relevan dividen dan ARCH memberi kesan kepada hipotesis. Secara keseluruhan, ketiga-tiga kaedah ini memperbaiki kebolehpercayaan dan pengesahan kajian peristiwa. Kajian ini membantu meningkatkan kefahaman kita terhadap impak kajian peristiwa bukan sahaja kepada purata pulangan tidak normal tetapi juga terhadap varians bersyarat purata pulangan tidak normal. Kesannya dapat dilihat terutamanya pada pasaran saham Malaysia melalui pembaikan terhadap ujian statistik, model panel data dan model panel ARCH.

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I certify that a Thesis Examination Committee has met on 10 April 2017 to conduct the final examination of Ng Chee Pung on his thesis entitled "Dividend Study with Alternative Tests, Panel Data Analysis and Panel Generalised Autoregressive Conditional Heteroscedasticity" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

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LIST OF ABBREVIATIONS

AAR	Average Abnormal Returns
Adj-BMP	Adjusted Boehmer, Mucumeci, and Poulsen
ARCH	Autoregressive Conditional Heteroscedastity
BMP	Boehmer, Mucumeci, and Poulsen
CAAR	Cumulative Average Abnormal Return
CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Return
CARs	Cumulative Abnormal Returns
CI	Composite Index
CRSP	Center for Research in Security Prices
df	degrees of freedom
DK	Driscoll and Kraay
e.g.	exempli gratia
EARCH	Exponential Autoregressive Conditional Heteroskedastity
EMH	Efficient Market Hypothesis
etc	Et cetera
FE	Fixed Effect
FGLS	Feasible Generalized Least Squares
FM	Fama and MacBeth
FTSE	Financial Times Stock Exchange
GARCH	Generalised Autoregressive Conditional Heteroskedastity
GED	Generalised Error Distribution
GJR	Glosten, Jagannathan and Runkle
GLS	Generalised Least Squares
HAC	Heteroscedasticity and autocorrelation consistent
HACC	Heteroscedasticity, autocorrelation and cross-section correlation
i.e.	id est
i.i.d.	Independent and identically distributed
KLCI	Kuala Lumpur Composite Index
KLSE	Kuala Lumpur Stock Exchange
LM	Breusch-Pagan Lagrangian Multiplier
LSDV	Least Squares Dummy Variable
MLE	Maximum Likelihood Estimation
MVRM	Multivariate regression method
NPV	Net present value

OLS	Ordinary Least Squares
PV	Present value
RE	Random Effect
REIT	Real Estate Investment Trust
U.S.	United States
VIF	Variance Inflation Factor
viz.	Videlicet

CHAPTER 1

INTRODUCTION

1.1 Chapter Description

This chapter provides introduction and the background of the study related to the test statistics, panel data models, volatility, and payout policy. In addition, the problem statement, research objectives, significance of study, outline of thesis, and summary are outlined.

1.2 Introduction

In the Malaysian context, PhD researches in quantitative methodology involve developing of new models and/or refining current models by adding new variables or deleting new variables. They refined current models in order to apply existing researches to other regions. Hence, their concern is about the significance values of these new variables. This thesis is interested in the significance values of the variables (**). Hence, the study focuses on test refinements in type I error through an empirical study of dividends in emerging market. This is the first objective of this study. According to (Black (2011)), type I error is committed by rejecting a null hypothesis when the null hypothesis is true.

There are over 500 published event studies carried out by researchers worldwide and this number is growing. Event studies analyse the behaviour of stock market prices around the events that occurred. In other words, event studies can focus on either a short-horizon effect or long-horizon effect around an event to provide key evidence of the market reaction towards new information. Event-study plays crucial role in finance research especially in the study of the Fama, Fisher, Jensen, and Roll (1969), which stated that dividend events affect the financial market. Markets are likely to react to new information regarding to type of dividend decisions that impact abnormal return of individual stocks (Al-Yahyaee, Pham, & Walter, 2011). Aside from finance area, event studies are pragmatic in various fields. For instance, in accounting studies highlighted that the earnings effect towards stock returns has received much attention. Apart from that, event studies are applicable in law and economics areas such as analysing the effect of regulation, and to evaluate damages in legal liability incidents.

Event studies function as a key purpose in financial studies owing to they provide a scientific method in testing market efficiency. Informational efficiency requires that markets absorb the news into stock prices in anticipation of the event outcomes. However, the uncertainty of an outcome maybe diminished before the actual date of the particular event most of the time. According to Brown, Harlow, and Tinic (1988), when uncertainty is decreased, the changing of price is likely to be positive on average. Hence, when uncertainty is diminished as the event outcome draws near, positive price should be anticipated. On the other hand, when event does not permit market participants to instantly evaluate the impact of event, subsequently the event outcome establishes an uncertainty inducing shock.

The landmark paper by Fama et al. (1969) set up a new milestone in event studies. After their research, event studies have since become ubiquitous in capital markets research. However, paper of Fama et al. (1969) only provided the value of abnormal returns. Later, some researchers improve this research area by augmenting test statistics elements to examine the significance of abnormal returns. Nonetheless, these test statistics fail to take into account the event-induced variance and cross-sectional correlation which is common in the event-study case. Therefore, type I error might occur.

Many researchers tend to neglect the problem of event-induced variance and cross-sectional correlation in event studies, thus their results and interpretations might cause misleading recommendations. To address this problem, a new *t*-test statistic was proposed, known as the adjusted Boehmer, Mucumeci, and Poulsen (Adj-BMP) test that was developed by Kolari and Pynnönen (2010). The Adj-BMP takes both cross-correlation and inflation of the event-date variance into account in improving the robustness of the *t*-test.

Besides using cross-sectional *t*-test analysis in the event-study, this thesis provides a new perspective analysis method that employs panel data in the event-study, which is the second objective in this thesis. Panel data are a combination of time series and cross-sectional data. This thesis applies different panel data models like Pooled Model, Random Effect (RE) Model and Fixed Effect (FE) Model analyse the size, sign, significance of dividends in abnormal returns.

This study not only focuses on the mean equation of abnormal returns, but also pays attention to the volatility (variance equation) of abnormal returns. Volatility in stock markets represents a risk to all retail and institutional investors, fund managers, corporate finance policy makers, top-level managers of listed companies and others to be considered in their strategic planning and decision making. Therefore, shocks that hit the overall economy, particular subsectors or individual companies will have an influence on the stock price of the respective company. Price risk is a dominant factor for both buyers and sellers in the stock market. At the same time, the hedging of risk is a key factor for the long term investors and institutional investors, especially when they cannot explore high risk stocks due to mandates from the Employee Provident Fund, Private Retirement Scheme Fund and so on. Moreover, the studies on volatility are scarce. Therefore, we are inspired to explore the research in this area. This study further extended the conventional Generalised Autoregressive Conditional Heteroscedasticity (GARCH) models to the panel regression framework in order to observe volatility in emerging market. This is the third objective of this research.

In this section, this dissertation introduces some test refinements in the event-study methodology, the background of study, and discussions on some basic ideas of different test statistics. The next chapter discourses these various test statistics in detail. Finally, the formula of the Boehmer, Mucumeci, and Poulsen (BMP) test developed by Boehmer, Masumeci, and Poulsen (1991) and the adjusted Boehmer, Mucumeci, and Poulsen (Adj-BMP) test are shown in data and methodology.

Two important decisions that part of a corporate finance's function are: 1) capital structure involving the carving out of appropriate debt-equity (or debt to total capital) mix; and 2) determination of form and quantum of distribution to shareholders

periodically. The latter is dividend policy domain. These two, naturally have influence on the ultimate goal of wealth maximisation for the shareholders. These two decisions are also interrelated, since a couple of dividend distribution forms alter the capital structure. Hence, decisions related to the dividend policy (payout policy) are not only very important but also complex. The decisions on the payout policy may involve four key issues:

a) What amount should be distributed to the shareholders?
b) Should the distribution be as stock dividends, cash dividends, or other methods?
c) What are the signaling implications of these earnings disbursement methods for the investors, management and other market participants?
d) Is there any volatility of stock returns when dividend payments are announced?

The earnings distribution methods are believed to have unique characteristics that convey some valuable signals to the market regarding the future prospects of the company. Therefore, they may serve as a communication device to disseminate information, which attempts to alleviate the problems of asymmetric information between managers and shareholders (or capital market in general). By taking a sample of companies in the Malaysian corporate sector, this study investigates the signaling significance of each distribution method, viz., stock dividends, cash dividends and special dividends in a different regulatory setting from that of emerging or developing markets. Apart from this, the wealth effect of the mode of payout policy is tested to signify its contribution to the major goal of corporate finance, i.e. shareholder wealth maximisation.

1.3 Background of the Study

The background of this study discusses the current study in two major aspects that is the importance of test refinement in event-study methodology and corporate finance. The test refinement starts with a brief explanation of the evolution in event-study methodologies, event-induced variance, cross-sectional correlation among abnormal returns, panel data models, and volatility. On the other hand, the studies in corporate finance part focusing on dividends.

In the history of development finances, event study has been thought of as a key factor in finance research. The study of Fama et al. (1969) on the stock splits has set up a new milestone in event studies. In othe words, they form fundamental idea on event study. More specifically, they inspected the effects of particular events on the distribution of stock returns. As mentioned in the introduction, they offer value for abnormal returns only.

Later, researchers further extend the main idea of event-study with introducing basic and simple test statistic which is the cross-sectional test. More specifically, this test uses an ordinary cross-sectional method carried out a *t*-test by dividing the average event-period abnormal returns by its contemporaneous cross-sectional standard deviation. After that, Patell found out that the the distribution of abnormal returns are no normal, thus he modified the cross-sectional test in order to standardised abnormal returns distribution and proposed the Patell test or the standardised residual test (Patell, 1976). The details and formula of the Patell test are discussed in the theoretical framework, review of literature and methodology. However, most of these statistical

tests assume the variances are constant. In addition, Brown et al. (1988) and Brown, Harlow, and Tinic (1989) showed that a temporary increase in the variance of the abnormal returns tend to be associated with a shift in the mean.

Boehmer et al. (1991) stressed that there is violation of abnormal returns are independent assumption which might result in some event-study tests such as Patell test over reject the null hypothesis. In other words, event-induced variance of abnormal returns affects the inferences of event-study methods. Thus, they suggested Boehmer, Mucumeci, and Poulsen (BMP) test to resolve aforementioned issue. This test is a simple modification to the cross-sectional method resulting in equally powerful tests where the null hypothesis is false, as well as the appropriate rejection rates where it is true (Boehmer et al., 1991). Furthermore, both the power and the size of the modified test are unchanged when applied to portfolios. In fact, the BMP test is a hybrid of the Patell test and the ordinary cross-sectional method. Therefore in research practice, some researchers start implemented BMP test to investigate various types of events in their studies.

Realising that event-induced variance and cross-sectional correlation issue in event studies result in inefficiency conventional event-study methodologies, Kolari and Pynnönen took the step of introducing the Adj-BMP test in 2010, to highlight the importance of even there is relatively low cross-correlation among average abnormal returns (AAR), event-date clustering is important factor which lead to over-rejecting the zero average abnormal returns null hypothesis when it is true. In other words, conventional event-study methodologies tend to commit type I errors.

As stressed by (Ederington, Guan, and Yang (2015); Kolari and Pynnönen (2010)), Adj-BMP test gives considerably more powerful tests where they construct deep understanding through event studies in stock market and bond market. This test takes into consideration not only event-induced variance but also cross-sectional correlation in order to help researchers acquire new findings, especially in impact of particular events on stock returns or bond returns. As a result, the first objective of this study applies Adj-BMP test to examine the impact of dividends in the Malaysian stock market. In addition, this dissertation studies a new perspective to investigate the event-study as discussed in the following section.

Most of the existing studies in the field of event-study methodologies have only focused on using cross-sectional data. Thus in research practice, cross-sectional data is implemented mostly for the researchers to examine the effect of particulars events in their studies. Nonetheless, this approach overlooks the time series information which might exist in the data set. In other words, the information in the data set is not being fully utilised.

Recognising that cross-sectional data and time series data need to be incorporated together to further enhanced the efficiency in data analysis, this study took the step of further extending the implement panel data in event-study methodologies. Therefore, the current study highlighted the importance of panel data in terms of controlling of individual heterogeneity, acquiring more information data sets, better studying on the dynamics of adjustment, and identifying parameters that would not be identified with pure cross-sections or pure time-series (Baltagi, 2013). The details of each benefit and justification of using panel data are provided in the next chapter.

As stressed by Kolari and Pynnönen (2010), cross-sectional correlation is a concern in event studies, which is akin to a panel data setting. Thereby this study was motivated in exploring the panel data analysis. Nonetheless, the assumptions of Panel Data Models do not hold in this study due to the heteroscedasticity, serial correlation, and cross-sectional dependence exist, which lead to the bias of standard errors. Therefore, this thesis further looks at the modified standard error to alleviate these concerns. In other words, the present study does not model these problems, but this dissertation used robust standard errors for inference the empirical findings. Hence, the second objective of this study is using panel data analysis with robust standard errors to examine the impact of dividends in the Malaysian stock market. In the same vein, Beck and Katz (1995) suggest to retain OLS parameter estimates, but replace the OLS standard errors with robust standard errors to mitigate bias of standard errors. This approach is further supported by other studies such as (Beck (2008); Beck and Katz (1996), 2004); Keele and Kelly (2006)). Recently, in the study of Michaelides, Milidonis, Nishiotis, and Papakyriakou (2015) adopted not only the Adj-BMP test to disentangle cross correlation among abnormal return, but also use panel regression model with robust standard errors.

The existing literature especially in finance area (Batchelor & Orakcioglu, 2003; Boehmer et al., 1991; George & Kabir, 2008; Kabir, Li, & Veld-Merkoulova, 2013; Salamudin, Ariff, & Md Nassir, 1999) overwhelmingly debate on event-induced variance concern and presence of the heteroscedasticity in panel data inspires this thesis to further investigate these topics. Realising that variance of abnormal returns in finance event study are in not constant state, this study took the step of introducing the panel Autoregressive Conditional Heteroskedastity (ARCH), to highlight the effect conditional variance of abnormal return in event-study.

Volatility has a significant role in the pricing of derivative securities, capital budgeting, portfolio selection and financial risk management. Volatility refers to the degree to which financial prices fluctuate. Volatility means risk and it represents a threat to the integrity as well as efficiency of the market affected. However, Poon and Granger (2003) stated that even though volatility is not equal to risk, when it is inferred as uncertainty, volatility can turn into main input to numerous significant financial applications like portfolio construction, investment, option pricing, security valuation, hedging as well as risk. Accurate volatility estimates will influence portfolio analysis and management methodologies.

In earlier part of this section, this thesis discusses a temporary increase in the variance of the abnormal returns (Brown et al., 1988, 1989). In fact, they debated that a temporary variation in the company's systematic risk leads to an increase in variance associated with an event. Subsequently, more studies on volatility are emerged (Batchelor & Orakcioglu, 2003; Boehmer et al., 1991; Engle, 1982; Engle & Bollerslev, 1986; Ferreira & Karali, 2015; Lee, 2010; Lee & Valera, 2016). The Generalised Autoregressive Conditional Heteroskedastity (GARCH) model was introduced by Bollerslev (1986). Subsequently, the GARCH model has been the basic workhorse and inspired dozens of more sophisticated volatility model. Since the panel data is getting popular in finance and economics, thereby the conventional GARCH models have been extended into panel framework and being adopted in some studies (Batchelor & Orakcioglu, 2003; Godinho & Cerqueira, 2016; Zhu, Füss, & Rottke, 2013). The following parts discuss on the dividends issues.

The objective of a dividend policy, like other financial decisions, should be the maximisation of the shareholders' wealth. However, currently there are still debates on company payout policy and its relevance; the question often asked what is the impact of the dividend policy and how it affects the market value of the company. Many researchers developed various explanations for dividend distributions. Dividend modes may have many things in common, but there are differences in view of their individual unique features towards achieving the respective motives set by the companies (Berk, DeMarzo, & Harford, 2015).

Dividend distribution is found to possess the capacity to take care of various motives ranging from shareholders' current consumption needs to signaling future prospects and passing through wealth creation. To date, what exactly dividend distribution does is a question cannot be solved and continued to be the centre of debate among researchers. To quote Fischer Black (1976) "The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together" (p. 5). A possible explanation for this issue might be the conventional event-study methodologies violet classical assumptions, therefore the empirical evidence in event studies is inconclusive. Hence, instead of relying the conventional event-study methodologies as practised by most researchers, the focus of this study is to investigate the effectiveness using advanced event-study methodologies based on the econometrics and statistic approaches to understand the impact of dividends event.

Among the economic aspects for dividend payout policy, many studies are being carried out to discern the two currently contentious effects of distribution methods, i.e. the wealth effect and signaling effect. The wealth effect analysis concentrates on the value creation function of earnings distribution methods. This is more on a short-term basis to measure the impact of the distribution announcement on the share prices. In other words, the wealth effect is estimated by taking the returns based on the share price movement sequel to a distribution event date (Lease, 2000). The importance of distribution method is assessed by identifying changes of return to shareholders in the aftermath of distribution event date. Meanwhile, the signaling effect focuses on long-term effect of the distribution methods. This is an examination of the effectiveness of the mechanism to act as a signaling device to disseminate information from the company to the market in order to tackle the asymmetric information issue (Lease, 2000). The distribution methods and other financial policies are tested to verify the signaling effect. It is tested from the viewpoint of their strength in conveying information about the future prospects of the company.

Recently, Malaysian listed companies and investors more focusing on dividends. Thus, this place specific demands on scholars to choose or develop the appropriate advance event-study methodologies that facilitate market participants understand the impact of dividends event on stock market. For this proposed shift of event-study methodologies to occur, advance event-study methodologies need to be designed and tested. Research is needed to investigate how to integrate the advance event-study methodologies with the dividends events in Malaysian stock market. This then is the intention of this study; to select appropriate advance event-study methodologies and to test their implementation in the Malaysian context.

1.4 Problem Statement

The test power of event-study methodologies has been debated since 1970s. A vast literature and studies describe a variety of event-study methodologies to improve their efficiency in examine the significance of the events (Corrado, 2011). These include test statistics and regression approaches. McWilliams and Siegel (1997) stated that although the event-study methodologies are the powerful tools in assessing significance of the events especially in financial studies, but their efficiency is still an area of long-standing confusion and dispute. This unresolved problem has led to some theories which are unjustifiably supported owing to inappropriate approaches. Thereby investment decision making is indirectly affected, which might be incurred huge investment loss.

To cater the need, even though many researchers have found conventional statistical tests with the over-rejection of null hypothesis problem, i.e. rejecting the null hypothesis of zero average abnormal return too often when it is true, in event studies, they still opt to neglect these hazards by using the conventional event-study methodologies such as Patell test and BMP test. In other words, these methodologies use the symmetric *t*-test, even though asymmetric effects exist in the event-study. Therefore, to ensure these methods at the maximum patch the effectives, the refinement in event-study methodologies should much be carefully under consideration. Furthermore, it is well documented that the conventional statistical tests required strong assumption (Brown & Warner, 1980, 1985), which has been a perceived discrepancy between theories and practical implementation. The violation of these assumptions resulting these tests to be mis-specific, thus basing conclusions on them is problematic. This condition will make the implementation of appropriate event-study test statistics become more challenging and more complicated because as what had been claimed by Boehmer et al. (1991) and Kolari and Pynnönen (2010) in their study explored the event-study test statistics found that the problems of event-induced variance and cross-correlation among abnormal returns. This statement is further supported by recent empirical evidence (Ederington et al., 2015).

Most of the existing conventional event-study methodologies use cross-sectional data, but they do not take time series data into account. In other words, the information in the data set is not being fully utilised. This expressed a strong need for a novel approach, i.e. panel data analysis. However, the sustainability of employing panel data analysis in finance is still a question mark for scholars. Petersen (2009) attempted employed finance panel data sets with regression approach in the asset pricing. Besides that, Kolari and Pynnönen (2010) documented that the problem with clustered event days is that they are analogous to a panel data setup. However, in regression approach the average abnormal returns (AAR) tend to have heteroscedasticity, serial correlation, and cross-sectional dependence problems, which will lead to the bias of standard errors in panel data analysis (Kolari & Pynnönen, 2010; Pesaran, 2004; Petersen, 2009; Wooldridge, 2010). Hence, these problems might result in unreliable inferences, therefore draw inappropriate conclusion regarding the impact of particular events on AAR. Consequently, the panel data analysis lacked competence due to the bias of standard errors, especially in the financial event-study is another problem.

There is an extensive of literature in event-study focusing on the mean level, but studies were rare argue on problem of volatility level. The ARCH model was introduced by Engle (1982) to identify conditional variance problem exist in empirical studies. Choo,

Muhammad, and Mat (1999) is one of earlier studies found out the conditional variance problem in Malaysian equity market. After that, there are some new literatures claimed that the conventional GARCH models are inefficient, especially in investigating the conditional variance problem (Escobari & Lee, 2014; Goulas & Zervoyianni, 2013; Koulakiotis, Lyroudi, & Papasyriopoulos, 2012; Lee, 2006, 2010; Lin & Kim, 2014). As what had been reported by Lee (2010), the conventional GARCH models are inefficient in estimating the conditional variance processes because these models fail to incorporate related information about heterogeneity across cross-sectional units. Since the AAR tends to violate homoscedasticity assumption and conditional variance problems exists in event-study are also a great concern (Ederington et al., 2015), thereby there is a must in exploring the effectiveness of advance volatility modelling in order to investigate the conditional variance of AAR in Malaysia stock market.

When conventional event-study methodologies are inadequate, therefore this creates problems in investigating the impact of dividends events on stock returns. The dividend seems like a puzzle, thereby we verify the two contradicting dominant theories in dividend, that are Dividend Irrelavent Theory and Dividend Relavent. Past studies (Al-Yahyaee et al., 2011; Chen, Firth, & Gao, 2002) have been focusing on dividend problems across various countries, but these studies facing the problem of inefficiency in event-study methodologies. Therefore, this condition will make the problem of whether stock returns are affected by dividend become more challenging and more complicated

With the current inefficiency in event-study methodologies and inconclusive empirical studies on dividend issues, the scholars use conventional event-study methodologies to study the dividends problems. Then this could lead to false empirical and theoretical interpretations. Therefore, if the validity of conclusions on empirical event-studies are to be maintained, event-study methodologies must be efficient as perceived by the quantitative scholars.

1.5 Research Questions

The research questions are as follows:

a) How the refinement event-study methodologies function under the event-induced variance and cross-correlation among abnormal returns circumstances?

b) Are the heteroscedasticity, serial correlation, and cross-sectional dependence exist in average abnormal returns when using the panel data models in the event-study?

c) Are the stock dividend, cash dividend increase, cash dividend decrease, same cash dividend, special dividend, special dividend and cash dividend increase events, special dividend and cash dividend decrease, special dividend and same cash dividend, and dividend reinvestment plan induce the volatility of average abnormal returns?

1.6 Research Objectives

The general objective of this study is to examine and investigate the event-study methodologies refinement comprehensively in the mean level and variance level of average abnormal returns as a result of various types of dividend events in the Malaysian stock market. Specifically, the following research objectives are addressed:

1) To investigate and provide comparative evidence of a proposed test-statistic under event-induced variance and cross-correlation among abnormal returns conditions in the event-study.

2) To study the panel data analysis in examining the dividend effects on average abnormal returns.

3) To examine the impact of dividends on average abnormal returns volatility in the Malaysian financial market.

This thesis comprises of two propositions. The first relates to presence of the abnormal returns in the respective dividend events by wrongly accept the null hypothesis while the second proposition relates to presence of abnormal returns volatility in the corresponding dividend events via proposing panel ARCH in event study analysis.

The importance of dividend payout policies impacts will be of interest to many parties. Corporate management aiming to achieve wealth maximisation goals would find the results useful while determining the mode of distribution. Investors or capital markets in general, would be interested in knowing the findings while managing their investment portfolio. International investors in particular, gaining an insight into the corporate dividend policy in an emerging market like Malaysia would reap an additional advantage in their international portfolio management. Finally, macro economic planners, including regulatory agencies, would find the study results helpful in understanding and appraising the function of capital markets.

1.7 Significance of Study

Malaysia, as an emerging market, has benefited from developments in its stock market over the past few decades. Easier means of access to capital markets, as well as wealth redistribution, has benefited both companies and individual investors. The national economy has also benefited from the developments made in the Bursa Malaysia.

From industry perspective, the significance of this study is the investment implications of dividend as it is of special interest to stock market investors, analysts, policy-makers, regulators, and the academic community. Each group looks at stock dividend, and cash dividend from a different perspective and how these groups benefits from this source of dividends information. For instance, managers and members of the boards of directors, knowing the impact of the respective dividend events, make better decisions regarding the distribution payment methods to their shareholders. Due to this study extends into volatility area, thereby they get some insight of the abnormal return volatility in market response to respective dividends. As the market is volatile, they might form the hedging strategies to minimise the risk.

On the other hand, investors get benefits from this research by having better and deeper insight into the nature and influence of these financial events and their possible impact on the abnormal returns and volatility. Indirectly, this encourages them, especially retail investors to incorporate the fundamental analyse to understand company aspect in their investment decision. In addition, the findings of this dissertation is essential to facilitate the market participants forming market timing strategies and lend some support from the idea of Xiang and Yang (2015). Finally, securities authorities, policy makers and regulators could benefit from this study by understanding the impact of the respective dividends on the abnormal returns and volatility. This leads them to make better decisions regarding the methods of such payments. Apart from that, when the financial market is extremely volatile, the authorities might set a price limit within controllable range at the right time or even take more aggressive action such as suspended that listed companies from any trading. As a result, this study sheds light on the impact of respective dividends on abnormal returns, volatility and the market reaction to their event-date, which benefits all participants of the emerging market.

Although there are a few works that investigated the dividend policy or dividend behaviour in Malaysia, but the studies of the joint various dividend events are limited. Moreover, market reaction to dividends from companies active in different sectors of the market has been examined even less. Apart from that, this study refines the event-study methodologies and applies them in emerging market. These refinement event-study methodologies do not limited to apply in the finance area, but also applicable to other fields include economics, marketing, tourism, terrorism, transportation, agriculture, and even law. Finally, an in-depth study in dividend may shed more light into the dividend policies, especially from the perspective of an emerging market.

1.8 Outline of Thesis

This study consists of seven chapters concerning the test with appropriate refinement in the event-study methodologies and empirical study of dividend in the Malaysian stock market context. Chapter 1 introduces the event-study methodologies and the dividend events to be studied. Chapter 2 emphasis the relevant theoretical literature and empirical developments linking to studies on event-study methodologies and dividend. Chapter 3 discourses research design, data, and the methodological issues, which involve refinements event-study methodologies to rectify the data and statistical problems. Chapter 4 presents the empirical analysis by using the Adj-BMP test in the respective dividend events. Chapter 5 discusses the empirical evidence emerged from the panel data analysis. The empirical evidence of Panel Generalised Autoregressive Conditional Heteroscedasticity is expatiated in Chapter 6. Lastly, Chapter 7 presents the conclusions and implications of the study.

1.9 Chapter Summary

This chapter expatiates the introduction and the background of the study to assist readers to understand more about the importance of refinements event-study methodologies and dividends in the corporate finance. This study might provide a paradigm shift in the refinements event-study methodologies after a review and

research in the event-study methodologies. The failure of the conventional event-study methodology in the event-induced variance and cross-sectional correlation among abnormal returns, leads to findings of the conventional event-study methodology possibly being over-exaggerated. Hence, this might lead people to make improper and irrational decisions. As a result, this study focuses on the test refinement and contributes to provide an empirical study in the Malaysian context. The subsequent chapter is regarding the theoretical framework and review of literature that elaborates the theories in corporate finance especially related to dividends, history of the event-study, test statistics, panel data models, panel GARCH models.

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