# FACTORS CONTRIBUTING TO PERFORMANCE AND RISK-TAKING OF THE MALAYSIAN LISTED COMPANIES

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# FACTORS CONTRIBUTING TO PERFORMANCE AND RISK-TAKING IN MALAYSIAN LISTED COMPANIES

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# ABSTRACT

The main objective of this thesis is to examine factors influencing risk-return of 531 non-financial Malaysian listed companies representing 4779 company-year observations from 2004 to 2012. Dynamic and static panel regressions are utilized to examine the impact of standard deviation (STD) and below-mean semi-deviation (BMSD) together with other determinants on performance. Similar methods are used to investigate the impact of performance and other determinants on risk-taking behavior represented by STD and BMSD. Dynamic models reveal a significant positive (negative) influence of lagged (contemporaneous) corporate risk-taking on accounting-based performance. An inverse relationship of contemporaneous corporate risk-taking ($RISK_{i,t}$) and performance ($PERF_{i,t}$) supports Bowman's paradox where risk preference among managers is not static but varies according to company's situation. Financial slack and leverage are also found to be important determinants of performance supporting the implication stated in the behavioural and agency cost theories respectively. Static models show a significant positive relationship of $RISK_{i,t}$ on market-based performance which highlights the disappearance of a negative contemporaneous risk-return relationship once market-based data is applied. A negative impact of leverage on performance supports the pecking order theory which maintains that well-performed company employs less amount of leverage. Dynamic models also report a significant positive (negative) effect of prior ROE on the STD (BMSD) of ROE supporting the implication stated in the house-money (framing) effect. Contemporaneous accounting performance, size, aspiration and leverage are also found to be influential determinants of risk-taking. Static models show a significant positive influence of $PERF_{i,t}$ on $RISK_{i,t.}$, which appear to challenge the Bowman's paradox. Meanwhile, the positive impact of aspiration and leverage on $RISK_{i,t.}$, supports threat-rigidity hypothesis and agency theory respectively. Generally, this study finds that investors are psychologically biased in making investment decision and that BMSD is more appropriate in measuring risks because the Malaysians are more concerned about downside losses.

**Keywords**: risk-return, downside risk, system-generalized method of moments, dynamic panel estimation, static panel estimation

## ABSTRAK

Objektif utama tesis ini adalah untuk mengkaji faktor-faktor yang mempengaruhi risiko-pulangan bagi 531 syarikat bukan-kewangan Malaysia yang tersenarai menggunakan 4779 cerapan tahun-syarikat sepanjang tempoh 2004 hingga 2012. Kaedah regresi panel dinamik dan statik digunakan untuk mengkaji kesan sisihan piawai (STD) dan sisihan-separa di bawah-min (BMSD) serta beberapa penentu lain terhadap prestasi. Kaedah sama turut digunakan untuk meneliti kesan prestasi dan beberapa penentu lain terhadap gelagat pengambilan risiko yang juga diwakili oleh STD dan BMSD. Model dinamik mendedahkan pengambilan risiko korporat terlat (semasa) memberi pengaruh positif (negatif) signifikan kepada prestasi berasaskan perakaunan. Hubungan songsang antara pengambilan risiko korporat ($RISK_{i,t}$) dengan prestasi ($PERF_{i,t}$) semasa menyokong paradoks Bowman yang menyata keutamaan risiko dalam kalangan pengurus adalah tidak statik tetapi berubah mengikut kedudukan syarikat. *Financial slack* dan leveraj kewangan juga didapati menjadi penentu penting bagi prestasi yang mana masing-masing menyokong implikasi yang dinyatakan dalam teori tingkah-laku dan teori kos agensi. Model statik menunjukkan wujudnya hubungan positif yang signifikan antara $RISK_{i,t}$ dengan prestasi berasaskan pasaran, yang mana sekaligus menidakkan hubungan negatif risiko-pulangan semasa apabila data berasaskan pasaran digunakan. Kesan negatif leveraj terhadap prestasi menyokong teori *pecking order* yang menegaskan bahawa syarikat berprestasi baik menggunakan tahap leveraj yang rendah. Model dinamik juga melaporkan kesan positif (negatif) pra-ROE yang signifikan ke atas STD (BMSD), dan ini menyokong implikasi yang dinyatakan dalam *house-money (framing) effect*. Prestasi perakaunan semasa, saiz, aspirasi dan leveraj juga didapati menjadi penentu yang berpengaruh ke atas pengambilan risiko. Model statik menunjukkan pengaruh positif $PERF_{i,t}$ yang signifikan terhadap $RISK_{i,t}$ yang seolah-olah mencabar premis paradoks Bowman. Sementara itu, kesan positif aspirasi dan leveraj ke atas $RISK_{i,t}$, masing-masing menyokong hipotesis *threat-rigidity* dan teori agensi. Secara umumnya, kajian ini mendapati bahawa para pelabur adalah bias secara psikologi dalam membuat keputusan pelaburan dan BMSD adalah lebih sesuai sebagai ukuran risiko kerana pelabur Malaysia lebih bimbang kepada kerugian *downside*.

**Kata kunci**: risiko-pulangan, risiko *downside*, sistem-kaedah momen umum, penganggaran panel dinamik, penganggaran panel statik

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| Terms | Definition |
|---|---|
| AGE | Company Age |
| ASP | Aspiration |
| BMSD | Below-Mean Semi-Deviation |
| FSlack | Financial Slack |
| GDPg | Nominal Gross Domestic Product growth |
| GMM | Generalized Method of Moments |
| INDBMSD | Average risks of all companies in the same industry as the sample company (measured by using below-mean semi-deviation) |
| INDPERF | Average performance of all companies in the same industry as the sampled company |
| INDSTD | Average risks of all companies in the same industry as the sample company (measured by using standard deviation) |
| INFLR | Annual Inflation Rate |
| LEV | Leverage |
| M2g | Money Supply Growth: A broader definition of Annual Money Supply |
| PERF | Performance of company *i* |
| SIZE | Company Size |
| S-GMM | System-Generalized Method of Moments |
| STD | Corporate risk as measured by standard deviation |

# CHAPTER ONE

# INTRODUCTION

## 1.0 Introduction

Determinants of organisational risk-taking and their impacts on the performance of corporations are critical issues in financial economics (Fletcher, 2000; Hodoshima, Garza-Gomez & Kunimura, 2000; Blitz & Van Vliet, 2007; Huang & Hueng, 2008; Campbell, Polk & Vuolteenaho, 2010; Rossi & Timmerman, 2012) and strategic management fields (McNamara & Bromiley, 1999; Shimizu, 2007; Andersen, Denrell & Bettis, 2007; Henkel, 2009; Chou, Chou & Ko, 2009; Li, Yang & Zhang, 2014). In the wake of a series of high profile corporate scandals, such as Arthur Anderson, Enron, World Com and Tyco, organisational decision makers are forced to recognise the source of risk in a wider context. One of the critical issues is how an organisation as a complex entity acquires accurate as well as comprehensive information and uses it to identify, perceive and manage risk. Having clear information about sources of risk allows an organisation to find the best way to manage the risk. Implementing effective risk management is not only limited to identifying, analysing and mitigating risk. Organisational decision makers should communicate and share risk-related information with shareholders as well as other stakeholders. This effort will promote a better market transparency. Making related information available in the market will induce markets' efficiency. Ultimately, this communication process will enhance shareholders' wealth.

Unfortunately, empirical literature in both financial economics and strategic management fields shows mixed evidence about the pattern of corporate risk-return relationships (Maurer, 2008; Rossi & Timmerman, 2012). Mixed evidence also exists in terms of the direction of causal impact between risk and return (Fiegenbaum & Thomas, 1988; Nickel & Rodriguez, 2002). The inconclusive results will impinge investors' strategy to secure the best investment opportunities with minimum risk for a given level of returns and maximum return for a given level of risks. Many scholars have claimed that the inappropriate matched between methodological application and the characteristic of market returns (where the research is carried out) have contributed to the failure to examine the actual risk-return relationships as well as the unclear causality interactions (Marsh & Swanson, 1984; Ruefli, 1990; Kothari, Shanken & Sloan, 1995; MacKinlay, 1995; Ruefli, Collins & Lacugna, 1999; Rodriguez & Nickel, 2002; Andersen *et al.*, 2007). Hence, by using both traditional and non-traditional risk measures as well as accounting-based and market-based data, this research is able to compare and contrast the approaches and justify the acceptable method to examine the risk-return relationship of listed companies in Malaysia.

The Malaysian stock market is of special interest as Morgan Stanley Capital International (MSCI) views it as one of the emerging markets in the Asian region which could offer a good place for investment (Lingaraja, Selvam & Vasanth, 2014). Even though comparatively the emerging market of Malaysia is claimed as efficient during the study period of 2004 to 2013 within the group of Asian region[1] (Lingaraja *et al.*, 2014), the profile of risk and return in this market may be different from those

[1] By having sound domestic macroeconomic fundamentals, ample liquidity of financial markets and good banking systems enable Malaysia to have sufficient buffers against external shocks, namely, USA sub-prime financial crisis and European sovereign debt crisis (Abidin & Rasiah, 2009; Ibrahim, 2010; Samsi, Yusof & Cheong, 2012).

of efficient market in developed countries. This is because it is well known that emerging markets and developed markets have dissimilar characteristics (Bekaert, Erb, Harvey & Viskanta, 1998; Bekaert & Harvey, 2002; Bekaert & Harvey, 2003). Brown, Harlow and Tinic (1993) claim that markets in developed countries are efficient and there is a positive relationship between return and volatility of returns. Since the Malaysian stock market is characterised as emerging market where assets returns are highly volatile and not normally distributed (Gan, 2002; Shamiri & Abu Hassan, 2007; Shamiri & Isa, 2009; Tan & Islam Khan, 2010), a negative risk-return relationship might be expected. However, it is too early to justify. This is because the investigation on two-way relationship between risk and return variables and the influence of other factors such as firm related factors and economic factors on the two parameters is still lacking in the Malaysian market. Furthermore, as far as the Malaysian literature is concerned, the studies available thus far do not incorporate a broad set of organisational theories that shed light on the empirical issues. A better model of the causal risk-return interactions can be represented by integrating a few organisational theories in a research framework (Wiseman & Catanach, 1997; Deephouse & Wiseman, 2000). Hence, this study is undertaken to fill this gap. The findings of this research will add value to the literature relating to risk measure, risk-return relations and efficient market hypothesis in emerging markets. A more comprehensive model will provide a more accurate risk-return relationship which is useful for different stakeholders.

## 1.1 Background of the Research

While risk-taking in the context of strategic decision making by individual has been recognised as an imperative and complex conception, risk-taking by a group of people or by an organisation is doubly more intricate (Bettis, 1981; Baird & Thomas, 1985; Ray, 1994). This view is not baseless because behavioural theory states that the package of characteristic of individual which comprises of background, beliefs, attitudes, preference and problem-solving styles can be translated into an organisation through a group who make up the management teams. Consequently, many researchers have placed great interest in scrutinizing the strategic risk-taking behaviour of a management team or an organisation based on a platform of studies on individual risk-taking behaviour (Hambrick & Mason, 1984; Baird & Thomas, 1985; Sitkin & Pablo, 1992).

The role of risk-taking behaviour of large corporations, in which possession of firm's shares is widely distributed, has traditionally involved individual professional managers on behalf of the shareholders. In a standard scenario, the managers of a company who are undiversified with regard to company-specific wealth are exposed to more risk than diversified shareholders. Therefore, managers are assumed to be more risk-averse while shareholders or investors, as principals, are believed to be relatively less risk-averse (Williamson, 1998). Risk-averse preference implies that as rational economic agents, the managers will only accept high risk decisions if they could obtain a higher return and maximise their utility function. Conservatively, this behaviour is deemed to be compatible with the settings of an efficient market wherein assets are priced with the aim that their expected return will compensate economic agents for their expected risk. As a result of collective risk-averse preferences amongst economic agents, a positive linear relationship between risk and return can be observed as promoted by Sharpe's (1964) capital asset pricing model (hereafter referred to as CAPM) theory (Lintner, 1965; Fisher & Hall, 1969; Black, 1972;

Brealey & Myers, 2003). Ever since the development of the CAPM theory which is considered as one of the fundamental tenets of modern portfolio theory, it has been the subject of immense attention in the corporate finance and other related areas.

The studies of the risk-return relationship and risk-averse behaviour with regards to corporations have been comprehensively researched in the financial economics field (Sharpe, 1964; Lintner, 1965; Fisher & Hall, 1969; Black, 1972; Black, Jensen & Scholes, 1972; Fama & MacBeth, 1973; Hurdle, 1974; Fama & French, 1992; Kothari *et al.*, 1995; Fama & French, 1996; Pettengill, Sundaram & Matthur, 1995; Haugen, 1999; Clare, Priestley & Thomas, 1998; Chou, Hsu & Zhou, 2000; Vos & Smith, 2003; Choi & Fu,2005; Abdul-Rahim & Mohd Nor, 2006; Blitz, Pang & Van Vliet, 2013) as well as in the industrial organisation economics and strategic management fields (Conrad & Plotkin, 1968; Cootner & Holland, 1970; Armour & Teece, 1978, Bowman, 1980, 1982, 1984; McNamara & Bromiley, 1999; Deephouse & Wiseman, 2000; Maurer, 2008; Denrell, 2008) in various economic settings. Some of the above mentioned studies are based on contemporaneous relation between corporate risk-taking and performance and some are based on dynamic relationship.

The early tests of the CAPM by Lintner (1965), Black (1972), Black *et al.* (1972) and Fama and MacBeth (1973) provide strong support for the positive relationship between market-based variables of risk and return. The proponents of the CAPM maintain that beta (a systematic risk measure) is the only factor that determines returns since any form of unsystematic risk can be diversified away. In addition, other studies to name a few, Fisher and Hall (1969) and Hurdle (1974) document positive relationship between accounting-based variables of risk and return. In the field of industrial organisation economics, Conrad and Plotkin (1968) and Cootner and Holland (1970) also utilise accounting-based data to test the risk-return relationship. They find significant positive relationship between risk and return at both firm and industry levels in the US settings. Their findings strengthen the usefulness of the fundamental tenets of modern portfolio theory as a basic guidance in selecting equity stocks in capital markets.

However, another research stream in financial economics pioneered by Fama and French (1992) challenges the traditional positive risk-return relationship. By examining the data for the US stock market from 1962 to 1989 using three-factor model, Fama and French (1992) conclude that the relationship between market beta and average monthly returns of New York Stock Exchange (NYSE) is insignificant. The insignificant relationship denies the traditional assumption that economic agents are compensated for accepting higher beta while being penalized for taking lower beta in the portfolio. A flat relationship is revealed even when beta is regarded as the only independent variable. Apparently, the findings devalue the importance of beta as the one and only measure of risk (Abdul-Rahim & Mohd Nor, 2006). The contradictory finding on the CAPM theory by Fama and French (1992) creates a debate among scholars (Kothari *et al.*, 1995; Pettengill *et al.*, 1995; Haugen, 1999), inspiring them to re-examine the relevance of beta as a traditional risk measure in explaining future portfolio performance. This interest has sparked a new research stream largely acknowledged as “the death of beta”. However, the findings of this new research stream are found to be inconclusive. Some of the empirical findings support the standard positive risk-return relationship (Kothari *et al.*, 1995; Clare *et al.*, 1998; Chou *et al.*, 2000); some are in agreement with the notion of “the death of beta”

(Ferson & Harvey, 1994; Fama & French, 1996; Jagannathan, Kubota & Takehara, 1998; Vos & Smith, 2003; Blitz *et al.*, 2013), some document a negative relationship (Turner, Startz & Nelson, 1989; Lettau & Ludvigson, 2002; Blitz & Van Vliet, 2007), while the rest document both positive (during bearish period) and negative (during bullish period) relationships (Pettengill *et al.*, 1995; Choi & Fu, 2005).

From the perspective of strategic management, the argument on risk-return relationship also gains great attention from many scholars. Pioneered by Bowman's (1980) seminal work, many studies have documented negative relationship between corporate risk and return for all or a group of companies (Bowman, 1982, 1984; Fiegenbaum & Thomas, 1985, 1986, 1988; Singh, 1986; Bromiley, 1991a, 1991b; Wiseman & Bromiley, 1991; Miller & Leiblein, 1996; Maurer, 2008). The evidence that supports a negative relationship between accounting risk and return is generally grouped under the research theme of "Bowman's paradox". It signifies Bowman's (1980) puzzling result which runs counter to the standard positive risk-return relationship. Basically, the proponents of Bowman's paradox argue that the management's reaction towards toward risk and return is not static but vary in relation to the position of the company. The argument is that managers tend to engage in risky behaviour once they notice that the company fails to maintain its targeted performance and vice versa. These arguments significantly support the behavioural models of decision making which is built on behavioural theory of the firm (Cyert & March, 1963) and prospect theory (Kahneman & Tversky, 1979). In contrast to the standard positive risk-return relationship and Bowman's paradox, Oviatt and Bauerschmidt (1991) unveil a flat relationship between risk and return, thus, intensifying the existing complex results of risk-return association. The studies under this research theme are further researched by incorporating agency theory into behavioural models of decision making (Wiseman & Catanach, 1997; Wiseman & Gomez-Mejia, 1998; Deephouse & Wiseman, 2000). They assert that corporate risk preference and risk-taking behaviour will be better explained by integrating the agency-based model into behavioural views.

Based on the above-mentioned literature, both advocates of the death of beta and Bowman's paradox go against the established financial tenets. The phenomenon of puzzling risk-return relationship not only pertains to the death of beta research stream, which is founded on market-based variables but also to the Bowman's paradox research stream, which is mostly derived from accounting-based variables. Regardless of the different research streams, the debates on the paradox evidence in the literature on both accounting-based and market-based risk-return relationship lead to a continuous demand for further research, thus, keeping this research interest alive. Some have argued that the inconsistency in the pattern of risk-return relationships is due to the problems of research design. The opponents of Fama and French (1992) three-factor model criticise that the results of the model, which are developed without a theory in hand, are probably produced from an artifact of a massive data mining exercise (Black, 1993). Furthermore, the validity of the multifactor model of risk and return model is questionable due to the survivorship bias and beta mis-measurement (Kothari *et al*., 1995) and the model fails to explain the deviation from CAPM (MacKinlay, 1995). Similarly, many strategic management scholars maintain that both the inconsistent risk-return relationship over time and Bowman's paradox are also due to an artifact of research data and research methods employed by the researchers (Marsh & Swanson, 1984; Ruefli, 1990; Baucus, Golec & Cooper, 1993;

Ruefli & Wiggins, 1994; Ruefli *et al*., 1999; Rodriguez & Nickel, 2002; Denrell, 2004; Andersen *et al*., 2007; Chou *et al*., 2009).

Previous researchers suggest that risk has multiple dimensions (Balzer, 2001) and the different risk measures employed have a different influence on the pattern of risk-return relationships (Miller & Bromiley, 1990; Wiseman & Catanach, 1997; McNamara & Bromiley, 1999). This finding shows the importance of an appropriate choice of risk proxies in empirical research. Janney and Dess (2006) highlight three conceptualisations of risk, namely, variance of returns, downside loss and potential gains. Markowitz (1952) who introduces Modern Portfolio Theory (MPT) quantifies investment risk using variance of returns or standard deviation of returns. Due to its user-friendly concept, many scholars adopt this measure of risk. Furthermore, this risk measure has been generally taught as a fundamental topic in financial text books and commonly applied by many practitioners in capital and financial markets. However, the application of variance or standard deviation as a traditional risk measure has long been criticised due to certain limitations. One of the well-known limitations is that the variance is symmetrical; hence, it is not sufficient to capture the true distribution of the positive and negative returns (Grootveld & Hallerbach, 1999; Estrada, 2003; Veld & Veld-Merkoulova, 2007). Due to this limitation, the application of the standard mean-variance approach in the previous research on corporate risk-return relationship is disputed (Marsh & Swanson, 1984; Ruefli, 1990).

There is a strand of literature that provides evidence on the appropriateness of downside loss as an alternative measure of risk. According to Shapira (1995) and Miller and Leiblein (1996), on average, managers perceive risk more in terms of the probability of returns that fell below the targeted returns. In addition, Mao (1970) and Sing and Ong (2000) provide evidence that investors are also more concerned about downside loss. Veld and Veld-Merkoulova (2007) report that even though investors apply more than one risk measure, downside risks measure is the most popular. Although the popularity of downside risk among managers and investors is growing and to a certain extent it is comparatively more dominant over the standard mean-variance method, neither method can be directly compared due to the distinctiveness assumptions and definition of each risk measure (Cheng & Wolverton, 2001; Cheng, 2001). In fact, different risk measures may represent different dimensions of risk (Miller & Bromiley, 1990). This complexity shows that the concept of risk is somewhat subjective (Balzer, 2001; Rachev *et al.* 2008; Mau, 2009; Schoppe *et al*., 2014). This is probably because different market players have relatively different perception on risk. Thus it provides an avenue for the current research to fill the gap.

Apart from measurement of risk, economic condition is also found to play an important role in determining the risk-return relationship (Fiegenbaum & Thomas, 1986; Deephouse & Wiseman, 2000). By employing accounting measures, Fiegenbaum and Thomas (1986) discover a significant negative risk-return association during a relatively volatile period, while the relationships appear to be insignificant when the market-based risk measure is used. In addition, some researchers such as Pettengill *et al.* (1995), Fletcher (2000), Hodoshima *et al.* (2000), Tang and Shum (2004, 2007), and Choi and Fu (2005) document that the beta-return relationship is significantly positive in a bearish market but negative in a bullish market. The deviation in findings between the two market conditions suggests the importance of macroeconomic factors in influencing risk-return relationship (Deephouse & Wiseman, 2000).

The debate over the empirical issues relating to the paradoxical risk-return relationships is rampant in the developed markets. Over the past decade, the debate has also been extended into the emerging markets, which includes the Malaysian market. Many scholars agree that emerging markets are a promising area for economic and financial market research. The rationale behind this is that emerging markets offer considerable out-of-sample tests for the existing models (Bekaert & Harvey, 2002). Harvey (1995a; 1995b) and Estrada (2000) attempt to explain the paradigm of risk-return relationship in emerging markets and document no relationship between expected returns and betas. Focusing on risk-return relationship of the Malaysian stock market, Sanda, Shafie and Gupta (1999) also unveil insignificant relationship between return and beta. However, Jiang and Zhang (2008) document negative risk-return relationship in China. In contrast to the finding by Sanda *et al*. (1999), other studies conducted in the Malaysian stock market such as Yakob and Delpachitra (2006) and ElShareif, Tan and Wong (2012) reveal positive relationship between the variables.  Using Dhaka stock exchange, Mollik and Bepari (2011) also reveal positive risk-return relationship. Mixed findings in the Malaysian market provide an avenue for this research to be implemented.

It is important to acknowledge the unique characteristics of emerging markets, which have been neglected in previous studies (Stevenson, 2001). Pioneered by Harvey (1995a, 1995b), considerable studies, to name a few, Stevenson (2001), Susmel (2001), Hwang and Pederson (2002) and Pavabutr (2003), document that emerging market returns are not normally distributed. Bekaert *et al.* (1998), and Bekaert and Harvey (2002) confirm the existence of a significant skewness and kurtosis of emerging market log returns. The Malaysian equity market is no exception (Gan, 2002). Another observable characteristic inherent in the emerging market is that the return is highly volatile (Bekaert & Harvey, 2003). In such case, the emerging market cannot be treated in the same manner as the developed market (Bekeart & Harvey 1995). In the emerging market, the application of downside risk is suggested to be more appropriate as a risk measure instead of standard mean-variance risk measure (Harvey, 2000; Estrada, 2000, 2001; 2002, 2005; Lee, Phoon & Wong, 2006). The concept of downside risk measure has long been recognised in academic research as a set of supplementary measures for the conventional portfolio (Nawrocki, 1999). He regards that downside risk measures could offer a major improvement over the traditional portfolio theory. The application of this risk measure has long been promoted by a large number of outstanding theorists and practitioners, among them are, Roy (1952), Markowitz (1959), Mao (1970), Bawa (1975) and Fishburn (1977). Previous research document various ways of measuring downside risk, however, the below-mean semi deviation is found to be the most relevant in the context of emerging markets (Estrada, 2000; Beach, 2011, Alles, 2013).

This study integrates behavioural models of decision making, agency theory and other relevant theoretical views into the research framework. A blend of a broader set of organisational theories could give a better explanation on risk-return relationship (Wiseman & Catanach, 1997; Deephouse & Wiseman, 2000). The intention of this study is to offer some explanations that could reconcile contradictory evidences and theories' implications on the issue discussed. Such explanations could hopefully help management of a company, investors and other stakeholders to plan and implement strategies to benefit each party.

## 1.2 Problem Statement

Managers acting on behalf of the shareholders of large corporations have traditionally played a crucial role in risk-taking decisions. Conservatively, decision makers are assumed to be prone to risk-averse behaviour (Jensen, 1986; Coffee, 1988; Gomez-Mejia & Wiseman, 1997). Apparently, this behaviour will lead to positive risk-return relationships (Fisher & Hall, 1969; Hurdle, 1974; Brealey & Myers, 2003). This risk preference is deemed to be compatible in the settings of an efficient market wherein assets are priced with the aim that their expected return will compensate shareholders for their expected risk. However, the empirical issue of Bowman's paradox which has been widely discussed in Western countries since Bowman's (1980) seminal work denies the standard assumption of positive risk-return relationship and risk-averse behaviour derived from the CAPM theory.

Many management scholars empirically prove risk-seeking behaviour amongst manager leads to negative risk-return relationship (Bromiley, 1991a, 1991b; Fiegenbaum & Thomas, 1985, 1986, 1988; Wiseman & Bromiley, 1991). This phenomenon emerges as the management team of a poorly performed company is willing to bear higher risk, and do not mind to accept lower returns as long as the company has a chance to get out from unfavourable condition. The temptation to engage in risk-seeking behaviour reflects the irrational behaviour of organisational decision makers in making investment decision (Tversky, 1990). Behavioural finance suggests that the decision makers' risk preference is affected by several cognitive and psychological errors (Ritter, 2003). Apparently, anomaly in risk preference contradicts the core assumption of efficient market hypothesis (EMH). The paradox in accounting-based risk-return relationship remains unexplained as Oviatt and Bauerschmidt (1991) fail to detect any significant relationship between risk and return based on three-stage least squares (3SLS) estimates. In addition, Chang and Thomas (1989) document both positive (managers tend to pursue risky investments as they experience certain level of higher returns) and negative relationship (managers also tend to gamble on risky investments as they experience certain level of lower of returns) or a curvilinear risk-return relationship.

The inconsistency in risk-return relationship is also documented in a new research stream in financial economics, known as "the death of beta". Some document unclear relationship (Fama & French, 1992, 1996; Ferson & Harvey, 1994; Strong & Xu, 1997; Jagannathan *et al.*, 1998; Darrat *et al.*, 2011), some report positive relationship (Clare *et al.*, 1998; Chou *et al.*, 2000), while some unveil negative relationship (Blitz & Van Vliet, 2007). A complex finding on risk-return relationship increases as researchers document a positive relationship in the condition of bearish market but negative relationship in the bullish market (Fletcher, 2000; Hodoshima *et al.*, 2000; Tang & Shum, 2004, 2007; Choi & Fu, 2005).

Singh (1986) addresses the issue of inconsistency in risk-return relationship as one of the unresolved organisational problems. To answer this issue, growing bodies of research headed by strategic management scholars have developed a causal model of corporate risk-taking and performance. However, the results of these efforts show unclear causality interactions. A number of researchers acknowledge the existence of a negative influence of performance on future risk-taking (Bowman, 1984; Bromiley, 1991; Miller & Leiblein, 1996; Maurer, 2008). While Bowman (1984) discovers that future performance is not affected by prior risk-taking, some other researchers such as Miller and Bromiley (1990), Bromiley (1991a), and Wiseman and Bromiley (1996) document that future performance is negatively influenced by prior risk-taking behaviour. In contrast, Miller and Leiblein (1996) and Maurer (2008) find future performance is positively affected by prior risk-taking.

The mixed evidence on risk-return relationship may be due to the inappropriate methodology employed in previous studies (Marsh & Swanson, 1984; Ruefli, 1990; Kothari *et al.*, 1995; MacKinlay, 1995; Ruefli *et al.*, 1999; Rodriguez & Nickel, 2002; Andersen *et al.*, 2007). Academics and practitioners that follow the debate on risk-return relationship are looking for guidance on how to appropriately measure risk according to the characteristic of market returns. Even though the standard mean-variance is widely taught in most financial textbooks, the appropriateness for applying this traditional risk measure has long been queried by scholars and practitioners due to its underlying inflexible assumption of symmetrical return distribution (Lee *et al.*, 2006). This assumption may only be valid in the efficient markets and less applicable in the emerging markets due to the non-normality return distribution criterion (Bekaert *et al.*, 1998). Hence, downside risk measure has been suggested as an alternative risk measure to better reflect the characteristic of emerging markets (Bekaert & Harvey, 2014). However there is argument that risk is a subjective and relative concept (Balzer, 2001; Rachev *et al.* 2005). Miller and Bromiley (1990) suggest that different risk measures may signify dissimilar level of risk. Therefore, failure to take into account both risk measures in research analysis will result in insufficient holistic argument about risk. Thus it will lead to bias findings on risk-return relationships.

The establishment of the direction of corporate risk-return relationship which fit the risk tolerance is essential as it would affect investors' as well as companies' strategy to manage risk and secure the best investment opportunities with minimum risk for a given level of return and maximum return for a given level of risk. However, misleading information would lead to wrong investment decision and ultimately jeopardise the aims to increase shareholders wealth. Based on the issues discussed above, the following research problems have been identified. Although the interest in clarifying conventional economic wisdom on the risk-return relationship and risk-averse behaviour with regards to corporations is obvious, mixed evidences are found in both financial economics and the strategic management fields. In addition to inconclusive results on the risk-return relationship and risk-averse behaviour, the two-way relationship between past performance and risk-taking behaviour as well as risk-taking behaviour and future performance are also ambiguous. The inappropriateness of the methodological application in previous studies has contributed to the failure of determining the real risk-return relationships and the direction of causal impact between risk and return.

Moreover, the lack of considerations on the combination effect of other company-specific (size of company, age of company, financial slack, aspiration, leverage) and macroeconomic variables (inflation rate, growth of money supply and GDP growth) on risk-return in previous model might contribute to inconclusive results. To the author's knowledge, there has been relatively little explanation that has satisfactorily reconciled the existing differences in theories' implication and empirical findings.

## 1.3 Research Questions

The findings of this study are expected to answer these questions:

1. Do traditional risk measure (standard deviation) and other determining factors (size of company, financial slack, leverage, inflation rate, growth of money supply, prior performance and industry performance) affect performance?
2. Do downside risk measure (below-mean semi-deviation) and other determining factors (size of company, financial slack, leverage, inflation rate, growth of money supply, prior performance and industry performance) affect performance?
3. Do performance and other determining factors (size of company, age of company, aspiration, leverage, inflation rate, GDP growth, prior risk and industry risk) affect risk-taking behaviour represented by standard deviation?
4. Do performance and other determining factors (size of company, age of company, aspiration, leverage, inflation rate, GDP growth, prior risk and industry risk) affect risk-taking behaviour represented by below-mean semi-deviation?

## 1.4 Research Objectives

While a growing body of studies have added value to the literature relating to risk-return relationships, most of the studies have neglected to cover these empirical issues comprehensively in the emerging markets setting. To fill the gap, this study aims to model determinants of corporate risk-taking behaviour and the performance of Malaysian listed companies. Specifically, the research objectives are as follows:

1. To examine the impact of traditional risk measure (standard deviation) and other determining factors (size of company, financial slack, leverage, inflation rate, growth of money supply, prior performance and industry performance) on performance.
2. To examine the impact of downside risk measure (below-mean semi-deviation) and other determining factors (size of company, financial slack, leverage, inflation rate, growth of money supply, prior performance and industry performance) on performance.
3. To investigate the impact of performance and other determining factors (size of company, age of company, aspiration, leverage, inflation rate, GDP growth, prior risk and industry risk) on risk-taking behaviour represented by standard deviation.
4. To investigate the impact of performance and other determining factors (size of company, age of company, aspiration, leverage, inflation rate, GDP growth, prior risk and industry risk) on risk-taking behaviour represented by below-mean semi-deviation.

## 1.5 Significance of the Study

Understanding of the risk-return relationship provides a few advantages to different stakeholders. By comparing and contrasting the application of standard deviation (*STD*) and below-mean semi-deviation (*BMSD*) in the research models, this study has more potential in explaining diverse reactions of economic agents towards various dimension of risk in an emerging market. The utilization of both risk measures is crucial because it will lead to disclosure of a more holistic risk-return profile of companies relative to their counterparts operating in the same economic settings.

Consequently, a better decision can be made by individuals, as well as institutions, pertaining to investment strategies.

To the author's knowledge, this is the first attempt to utilize generalized method of moments (GMM) estimator in investigating the dynamic nature of relationship between risk and return variables and the influence of other determining factors on the two parameters within the context of the Malaysian market. By using system generalized method of moments (S-GMM) which is claimed as robust in the class of all GMM estimators, this research could offer a better explanation on the possible linkages between past performance and risk-taking as well as between risk-taking and future performance. Considering the lack of comprehensive evidences on risk-return relationships pertaining to Malaysian companies, this research attempts to integrate behavioural models of decision making, agency theory and other relevant theoretical views into a research framework. Contradictory as well as consistent arguments of different theories' implications on the issues discussed are expected to add value to the explanation of the relationship between the corporate risk-taking and corporate performance in this region.

Taken as a whole, this research effort should broaden the existing body of knowledge in the field of corporate finance as well as behavioural finance, particularly useful to economic agents such as organisational decision makers, investors and regulators. For the management of a company, this research outcome may strategically provide guidance on planning and managing their investment activities to increase shareholders' wealth. A better assessment of risk would eventually contribute to wealth creation. In terms of investors or shareholders, the results could enhance their awareness and understanding of the collective investment behaviour of companies. Hence, it could assist them to select the appropriate investment according to their risk preferences. With regard to the Securities Commission (SC), the outcomes could furnish this regulatory body with more accurate risk-return assessment model. In line with SC's statutory function, this security market supervisory body is obligated to encourage the application of reliable risk measure amongst stakeholders. By facilitating market participants with informative investment guidance, greater development of securities market in Malaysia would be promoted.

## 1.6 Organisation of the Thesis

The organisation of the rest of the thesis is as follows. Chapter two discusses: (i) the underlying theories used to explain the risk-return relationship; (ii) empirical evidence describing the corporate risk-taking behaviour in relation to performance; (iii) empirical evidence on market-based and accounting-based performance measures; (iv) empirical evidence relating to the standard risk measure; (v) empirical evidence relating to the downside risk measure; (vi) empirical evidence relating to the influence of company-specific characteristic on corporate performance and risk-taking behaviour, and (vii) empirical evidence concerning the influence of macroeconomic variables on risk and return relationship. Chapter three describes how the present study is practically carried out. This chapter begins with an elaboration of data sources and sample selection for this study. It also presents the research framework and outlines the development of hypotheses. Discussion on the research design and methods to answer research objectives are also presented in this chapter. In chapter four, the results of the study are presented. Moreover, this chapter discusses the findings by relating them to implication of the theory and past works. Finally, chapter five summarises the findings and highlights the implications of the study. Recommendations for future research and limitations of the present study are also explained in the last chapter.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

This chapter reviews the literature on which this research is based. Relevant underlying theories in explaining risk-return relationship is first discussed in Section 2.1. Two behavioural models of decision making, namely, behavioural theory of the firm and prospect theory are the backbone of this research. Besides that, agency theory and other relevant theoretical views are also incorporated in this research. Then, Section 2.2 presents literature review on the standard prediction of risk-return relationship, followed by Bowman paradox and the death of beta. Section 2.3 presents a review on the empirical findings of performance measures. Empirical evidence relating to standard risk measure is discussed in section 2.4. Discussion on downside risk measure in the setting of developing markets is presented in Section 2.5. Then, literature review on determining variables that are expected to have an impact on risk-return relationship is discussed in Sections 2.6 and 2.7. Finally, Section 2.8 provides a summary of the literature discussed.

## 2.1 Underlying Theories

Research on strategic risk-taking behaviour in relation to performance has been done fairly extensive, and the literature reveals a few underlying theories. Among them, behavioural theory of the firm (Cyert & March, 1963), prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) and agency theory (Jensen & Meckling, 1979; Eisenhardt, 1989) are often used the main underlying theories to explain how decision makers react to risk and performance. Apart from that, other related theoretical views are also considered. A combination of several theories is able to offer comprehensive explanations on risk-return relationship (Wiseman & Catanach, 1997; Deephouse & Wiseman, 2000). Hence, a clearer picture of the relationship could be depicted.

### 2.1.1 Behavioural Theories of Decision Making

The established financial tenet suggests a positive risk-return relationship. In contrast, Bowman's paradox has led to the finding that greater risk may not lead to higher return (Bowman, 1980, 1982, 1984; Bromiley, 1991a, 1991b; Fiegenbaum & Thomas, 1985, 1986, 1988; Wiseman & Bromiley, 1991; Oviatt & Bauerschmidt, 1991; Maurer, 2008; Andersen *et al.*, 2007). This proposition has been guided primarily by two main behavioural theories of decision making: the behavioural theory of the firm (Cyert & March 1963) and prospect theory (Kahneman & Tversky 1979). The first theory provides evidence of risk-return relationship from the perspective of organisational decision making, while, the latter theory provides evidence from the perspective of individual decision making. Rooted from these behavioural theories of decision making, there are other behavioural concepts, namely, framing effect (Tversky & Kahneman,1981), house-money effect (Thaler & Johnson,1990) and threat-rigidity hypothesis (Staw, Sandelands & Dutton, 1981) which are relevant in explaining risk-return relationship. Another behavioural concept, Wiseman and Gomez-Mejia’s (1998) behavioural agency model is covered under agency theory in the following sub-section.

#### 2.1.1.1 Behavioural Theory of the Firm

The first noticeable opponent for the neoclassical economic theory of organisation has been around for more than four decades. The Cyert and March's (1963) behavioural theory of the firm is hinge on empirical analysis of economic behaviour in an organisation. The development of this theory was motivated by the critics from behavioural studies on the unreliability of the standard assumptions of maximisation utility and complete rationality conjectured in the neoclassical theory of the firm. In line with the efforts by other institutional economists from the Carnegie School of thought (Simon, 1947, 1952, 1982; March & Simon, 1958), Cyert and March (1963) also argue that there are sociological and psychological information that are noticeably not present in the traditional approach on the subject of organisations. Due to this absence, they contend that the divergence between reality and people's capability become apparent in oligopolistic markets.

Cyert and March's (1963) theory gives attention to the microeconomic factor of organisational behaviour, particularly, the search for decision criteria and actual decision making processes within internal organisation. Built on comprehensive observations on the internal operation of business organisation and thorough assessments on the interaction between the corporation and its external environment, Cyert and March develop contemporary theoretical ideas on the subject of the prediction of firm economic behaviour. To certain extent, their efforts play a role in filling the gap between reality in a complex organisation and traditional economic theory of organisation.

In theory, Cyert and March regard companies as large and complex systems of standard operating procedures or routines managed by a group of human beings as contended by March and Simon (1958). Cyert and March attempt to explain how humans in the system of cooperative behaviour (Barnard, 1938; Simon, 1947), so called professional managers, take parts in making critical decisions in different divisions within the domain of variety coordination of control. Managers are perceived as economic agents who are apparently bounded with their implicit uniqueness, namely, their psychology, values, irrationality, uncertainties and greediness. Due to this conception of bounded rationality, managers are unable to work in the best interest of the owners (Simon, 1947; 1982). Findings on the cognitive limits of individual decision makers impinge important implications for firm behaviour and performance.

Mahoney (2002, 2004) summarizes two key organizing mechanisms introduced by Cyert and March (1963) in an effort to produce a broad conception of behavioral theory of the firm. The first device encompasses a group of in-depth variable concepts with regard to the goal of an organisation, the organisational expectations, the organisational choices and the organisational control. The second device covers a group of relational concepts relating to quasi resolution of conflict, uncertainty avoidance, problemistic search and organisational learning.

In developing the theory, Cyert and March give close attention to organisational targeted performance or aspirations as determinants of managerial choices. It indicates that organisation measure targeted performance by using various dimension, including production, inventory, sales, market share and profitability. The degree of emphasis on any particular dimension of performance is driven by top management priorities and previous experience. According to the theory, managers in companies have both levels of performance they aspire to and levels of performance they expect. If expectations fall below aspirations or targets, managers search for solutions that can raise expected performance to the aspiration level; and if they cannot find such solutions, they lower the aspirations. The system is buffered by slack-excess resources that a company can use to loosen the ties between environmental changes and the need for organisational responses. According to the theory, slack grows in organisations that are performing well, thereby preventing an excessive upward rise in aspiration levels. But during adversity, slack decreases and aspiration levels are maintained. Thus, slack serves to stabilize aspiration levels and absorb fluctuations in environments.

Evidently, theoretical elements of Cyert and March's (1963) behavioural theory of the firm has become the foundation for contemporary research in the field of organisational studies in management, economics, political science, and sociology (Argote & Greve, 2007). The theory appears to be constructive as a guide to expand adaptive procedures using the organisation's limited capacities more effectively.

#### 2.1.1.2 Prospect Theory

Prospect theory is another model grouped under the behavioural models of decision making. Generated from the studies of experimental economics and cognitive psychology, the original version of this theory has been introduced by Kahneman and Tversky (1979) as an alternative model to the normative model. It has been contended that, the rationality assumptions of traditional expectation principle have failed to empirically picture and support the way an individual decision maker make choices in risky state of affairs (Slovic & Tversky, 1974). This shortcoming apparently causes unanticipated choice of action in certain circumstances.

In the role of a leading substitute to traditional expectation principle (Levy, 1992), the prospect theory which is generally classified under utility maximisation theories (Levy, 1997) illustrates the process of decision making under uncertainties in two phases. The first phase, known as the editing stage is concerns with preliminary action to simplify the choice problem by the decision makers. In this stage, decision makers as economic agents generally tend to think and portray their inclination to make decision founded on adjustment in wealth (gains and losses with respect to a reference point) rather than absolute wealth. The reference point emerges as a focal assumption of this psychological model of decision making because decision makers regard gains (outcomes higher than the reference point) and losses (outcomes lower than the reference point) in a different manner (Tversky & Kahneman, 1991). Based on coding certain point of reference, they recognize the accessible selections, the potential outcomes as well as edit the value and probability of each and every outcome.

In the following phase of decision process, known as the evaluation stage, they link the value of possible outcomes with their weighted probabilities and then decide on the alternative having a higher utility. Graphically, in this alternative explanatory framework of investor's behaviour, the combination values of possible outcomes are translated by an S-shaped value function. This S-shaped conveys that the value function is characterized by deviation from the reference point; concave for gains while convex for losses (termed as value inflection by O'Connell & Teo, 2003), and steeper for losses than gains (called loss aversion which reflects the observed behaviour of decision maker's being extra responsive to losses than to gains).

Furthermore, probabilities are translated by an asymmetric reverse S-shaped probability weighting function which tells that decision maker tend to subjectively overweight small probabilities (less than 0.40) or probable outcomes in comparison with medium and large probabilities (greater than 0.40) or in other words outcomes that are certain. The interaction between the value function and probability weighting function bring about four-fold pattern of non-standard risk attitudes of decision makers; namely, risk seeking for low probability gains, risk seeking for high probability losses, risk aversion for high probability gains, and lastly risk aversion for low probability losses. This mixture of behavioural patterns shows that decision makers are not consistently risk averse as maintained by normative model of rational choice. An extensive analysis of empirical literature by Fiegenbaum and Thomas (1988) confirms the rejection of the conventional economic wisdom of risk aversion behaviour uniformity.

The extended version of prospect theory, known as cumulative prospect theory was introduced by Tversky & Kahneman (1992) to calibrate some theoretical drawbacks in the original prospect theory, particularly, the main weakness of mistreatment of first-order stochastic dominance. The first-order stochastic dominance which also called stochastic ordering expects that any change of probability mass from the state of poor outcomes to improved outcomes leads to a better prospect (alternative). Due to the violation of the first-order stochastic dominance, the original version of prospect theory which had emerged as the most promising non-expected utility model in the 1980's had become less attractive relative to the calibrated version (Fennema & Wakker, 1997). Apparently, the extension of prospect theory has taken important steps towards a more accurate description of individual behaviour under risk which expected-utility theory does not offer. Whilst upholding the core ingredients of original prospect theory, cumulative prospect theory makes use of theoretical advantages of the rank-dependent approach, a weighting function method, which was developed by Quiggin (1982), Schmeidler (1989) and Luce and Fishburn (1991) for transforming objective (probabilities are known) into subjective (probabilities are unknown) cumulative probabilities. This method permits for alternatives by means of a sizeable magnitude of outcomes or even continuous outcomes, which is in harmony with stochastic dominance (Tversky & Kahneman, 1992).

This expansion permits the application of the theory to explain more reasonable behaviour of investors (Odean, 1998; Odean, 1999; Barber & Odean, 2000; Barber & Odean, 2001). Moreover, the theory provides a channel to elucidate a wide range of economics problems (Camerer, 2000) such as bank risk-taking (Johnson, 1994; Godlewski, 2004), dealers and consumer decisions in marketplace (List, 2004), and many more. Mounting employment of the theory in explaining individual (Kanbur, Pirttila & Tuomala, 2004; Brunnemeier, 2004), group of professionals (O'Connell & Teo, 2003; Locke & Mann, 2000) and organisational level decision (Bowman 1980; Fiegenbaum & Thomas, 1988; Chang & Thomas, 1989; Bromiley, 1991a, 1991b; Jegers, 1991) reflects its popularity (Starmer, 2000) and recognition of the theory's contribution in enhancing the boundary of knowledge. Apparently, this theory has offered a new avenue for crystallizing the relationship between risk-taking behaviour and performance of organisation (Sinha, 1994). Due to its success in encapsulating laboratory-base behavioural observation, this theory has been regarded as the most appealing and dominant model of risk-taking behaviour (Godlewski, 2004).

#### 2.1.1.3 Other Relevant Behavioural Theories of Decision Making

The BToF and prospect theory predict prior outcome affects risk attitude of organizational decision makers and individual respectively. Whether prior outcome is regarded as a gain or a loss depends on selected reference point or level of aspiration as a benchmark. Rooted from the presumption of these behavioural theories of decision making, framing effect (Tversky & Kahneman, 1981), house-money effect (Thaler & Johnson, 1990) and threat-rigidity hypothesis (Staw *et al.*, 1981) are introduced. These behavioural models argue the influence of prior outcomes on risky choice in different ways.

The Tversky and Kahneman's (1981) framing effect refers to a phenomenon where the tendency of market participants to pursue risky decision when they experienced losses in the past and to avoid risky actions once they previously enjoyed gains. In other words, the perception of losses and gains relative to certain level of benchmark leads to diverse risk tolerances. As maintain in the propect theory, framing effect agrees that market participants are more responsive to small losses than to small gains (Tversky & Kahneman, 1981; Kahneman & Tversky, 1984).

On the other hand, Thaler and Johnson's (1990) house-money effect suggests that market participants have the inclination to engage in risky investments after experiencing gains (Massa & Simonov, 2005; Ackert, Charupat, Church & Deaves, 2006; Frino, Grant & Johnstone, 2008). The proponents of house-money effect claim that market participants are mentally split the amount of their invested capital and the profits into two different artificial accounts. This mental accounting would lead market participants to take more risky investment by only reinvesting the profits as they regard the profits are not yet their personal wealth.

Threat-rigidity hypothesis (Staw *et al.*, 1981) proposes another alternative explanation for psychological bias in making investment decision at the individual, group, and organizational level. The threat-rigidity hypothesis suggests that low performers view prior losses as a threat to their survival. Consequently, they are inclining to become rigid and focus more on protecting an organization's position by lowering risk-taking (Dutton & Jackson, 1987). The existence of risk-averse after losses is further supported by other researchers (see for example, March & Shapira, 1987; McNamara & Bromiley, 1997; Lant & Hurley, 1999; Audia & Greve, 2006). Lant and Hurley (1999) claim that the evidence of threat-rigidity reaction is actually takes place even when performance is just below the selected reference point.

### 2.1.2 The Standard Agency Theory and Other Related Models

The underlying basis of agency theory is the social relationships between one party (the principal) and another party (the agent). In its broadest sense, this agency relationship is concerned with the general delegation of authority and decision making power, the situation in which one or more principals engage the agent who possesses specialized knowledge and skills, to perform tasks on behalf of the principal(s) according to the contract (Jensen & Meckling, 1976). The description of this relationship forms an overt delegation of authorisation to an agent (Saam, 2007).

It is known that principal-agent relationship exists in a wide range of social perspective and has evolved in line with the modernization of society lifestyle. Since its inception in the early 1970s, agency theory has set its footing (Ross, 1973, Kiser, 1999) and has been employed in various principal-agent relationships (Harris & Raviv, 1978). Among all agency relations, owner-manager, debtholder-shareholder and employer-employee have been the centre of attention among many scholars (Saam, 2007). The use of agency theory appears in many scholarly work in various disciplines including sociology (e.g., Eccles, 1985; White, 1985; Shapiro, 2005), marketing (e.g., Basu, Lal, Srinisavan & Staelin, 1985; Bergen, Dutta & Walker Jr, 1992; Kuwornu, Kuiper & Pennings, 2009), economics (e.g., Spence & Zeckhauser, 1971; Sloof & Praag, 2008), finance (e.g., Fama, 1980; Wright, Hoskisson & Busenitz, 2001), accounting (e.g., Demski & Feltham, 1978; Nikkinen & Sahlstrom, 2004), political science (e.g., Mitnick, 1986; Lord, 2000), management and organisational behavior (e.g., Eisenhardt, 1985, 1988; Kosnik, 1987; Clemen, 2002; Burney, Henle & Widener, 2009), and organisational economics (Barney & Ouchi, 1986, Donaldson, 1990; Lajili & Mahoney, 2006). Some researches on agency theory suggest that this theory is a valuable addition to organisational theories (Eisenhardt, 1999; Kiser, 1999; Podrug, Filipovic & Milic, 2010).

Regardless of various appearances and applications of agency theory proposed by the scholars in any field of studies, the core idea in the principal-agent relationship is creating a contractual relationship between two or more parties. Basically, the contract must serve two functions (1) to transfer the benefits of better information from agent to principal, and (2) to provide incentives to the agent to work for acquiring such information. One of the motivations of agency theory is to study the effectiveness of these general functions of a bond contractual relationship between the agents and the principals given that humans are irrational, self-serving, and inclined to opportunism. With the interest to investigate optimal contract, Bhatacharya and Pfleiderer (1985) highlight that before a contract is signed, the principal would need to ensure that the appointed agent is better informed about his or her own quality of being an agent. After the contract is signed, the agent can acquire superior information or demonstrate greater ability or effort to perform which will deliver a better result than the principal acting alone. Nonetheless, the outcome does not only depend on the agent's effort, but also on the environmental factors beyond the control of an agent (Ba & Pavlou, 2002). With this limitation, the task of a principal is to pursue a contract which encourages the best agent to participate and, at the same time, gives an agent the right incentives to work hard to achieve the result.

From the perspective of owner-manager relations, the shareholders place high expectation on the performance of the appointed management team. This is based on the trust and confidence in the ability of an agent to secure information and to carry out management tasks (Pratt & Zeckhauser, 1985) in an uncertain surrounding (Ba & Pavlou, 2002) for the best interest of shareholders. Once an investor agrees to sign a contract, in which he or she becomes part of the shareholders, it is implicitly understood the existence of a boundary between the agents who make corporate decisions (managers) and the principals (shareholders) who provides the resources. Centered on the issue of separation between corporate ownership and management control, the traditional agency theory has evolved as the foundation of modern agency theory introduced by Jensen and Meckling (1976).

In today's modern large corporation, it is impossible for the principals to fully monitor the appointed agents. This issue has been the fundamental element of the principal-agent model in any forms of social relation. This agency issue has been well recognized since the work of Berle and Means (1932). The most general factors related to this agency problem are (1) divergence of goal, (2) divergence of risk preferences, and (3) existence of information asymmetry.

The traditional notion on this conflict of goal is that shareholders have the desire to maximise their profits or shareholder value, whereas professional managers who are being hired as agents of the shareholders have other personal interest to be maximised. Both the goals of shareholders and managers will be materialised based on managers' effort and other exogenous random elements. In the classic principal-agent problem studied by Jensen and Meckling (1976) and Williamson (1985), managers who are empowered by the owner of the firm may give priority in putting efforts to pursue their own personal objectives such as maximising individual prosperity, increasing power and status, and creating more perquisites or the like at the expense of shareholders. This is consistent with Grossman and Hart (1983), Holmstrom (1979), and Mirrlees (1999) who discover that the agent takes unverifiable action that directly affects the profits to principal. Berle and Means (1932) and Pratt and Zeckhauser (1985) maintain that the separation of management and ownership may allow a certain extent of under-accomplishment of the shareholders wealth maximisation by the agent. As the behaviour of the management of the firm inclines to the detriment of shareholders, managers are labeled as opportunistic and self-interested agents (Williamson, 1985).

In this case, standard agency model considers that managers of the firm are inclined towards risk-averse attitude. As traditionally assumed rational entity and utility maximiser, managers prefer lower risk due to inability to diversify their employment security and source of income (Jensen & Mecling, 1976; Fama, 1980; Kroll, Wright & Theerathorn, 1993). On the other hand, shareholders can be regarded as less risk averse since they could diversify away their shareholdings across multiple firms, hence reducing firm specific risk. Due to different risk preferences, the agent and principal differ in business decision making.

March and Shapira (1987) and Wiseman and Gomez-Mejia (1998) criticise that the classical conception of risk and the static risk aversion assumption asserted in agency theory is unnatural and unrealistic in relation to human behaviour. This is because, as human beings, managers are not totally rational in making decision. Drawing from agency and prospect theories, March and Shapira (1987) and Wiseman and Gomez-Mejia (1998) introduce new perspective of agency theory. March and Shapira (1987) proposes that majority of professional decision makers view risk as uncertainty about future events and the amount of potential failure rather than the variance between possible outcomes. Furthermore, the decision makers believe that risk is a manageable and controllable factor and they are inclining to take into consideration certain benchmark when evaluating risk. This study reports that as company's performance exceeds the benchmark, managers will engage in action that reduce risk and vice versa. Therefore, they have a tendency to shift their risk-taking level depending on situation.

Wiseman and Gomez-Mejia's (1998) behavioural agency model provides helpful definitions pertaining to various managerial risk-taking behaviours. The model shows that managers may exhibit risk-seeking as well as risk-averse behaviour in different situations. Managers' risk preferences are very much depending upon the framing of prediction, whether gains or losses and their attached probabilities. This model posits that managers who are encountering a gain of wealth will become increasingly risk averse as the probability of having gain increases. On the other hand, managers who are facing a wealth loss will become increasingly risk seeking as the probability of losses rises.

Another major factor that contributes to agency problem of equity is the existence of information asymmetry. Given the nature of principal-agent relationship, the management of the firm often possesses an asymmetric information advantage over their shareholders. Information asymmetry may exist in two forms, namely, hidden information that leads to adverse selection problem and hidden action which gives rise to moral hazard problem (Arrow, 1985; Pratt & Zeckhauser, 1985; Amit, Brander & Zott, 1998). Hidden information refers to pre-contractual private information, a situation where the management of firm deliberately keeps private their ability and provide outcomes which they themselves quite uncertain to achieve. Therefore, the shareholders do not have sufficient information to accurately anticipate and attest the agent’s ability and skills. By having this asymmetric information advantage, the self-interested agent has the opportunity to misrepresent the privately-held information and thus lead him to maximise his welfare at the expense of the principal as described in hidden action or moral hazard problem (Clemen, 2002). This means that hidden action is an ex-post hidden informational problem that occurs after the agent and principal have agreed to execute the contract. Based on risk shifting model, Arrow (1985) defines hidden action as the process of an agent taking advantage on his or her comparatively superior access to knowledge and power, and the limitations of investors' monitoring effort to hide risk-taking action that benefit the agent. The more freedom an agent enjoys and the greater the specialised knowledge requires to perform a task, the more opportunities for the agent to undertake unobservable actions in the expense of principal (Holmstrom, 1979).

In the light of the asymmetric information problem between managers (insiders) and investors (outsiders), Myers and Majluf's (1984) pecking order theory addresses an issue of a hierarchy of corporate financing sources. The theory predicts that, to finance business opportunities, a manager of a well-performed company is more likely utilising retained earnings rather than debt, follows by using short-term debt over long-term debt, and employing debt over equity as the last resorts (Myers & Majluf, 1984). Generally, once new equity (the most expensive means of finance) is issued to support new investment opportunities, this financing decision gives indication to the investors that the company is overvalued (Ross, Westerfield & Jordon, 2010). As a result, they commonly react negatively to the announcement of issuing new shares (Ross, *et al.*, 2010).

A number of previous literature have shown that corporate governance mechanisms are important to be implemented in order to promote a more transparent and effective decision making criteria for the management to obey (Tirole, 2001; Al-Faki, 2006; Orobetz, Gugler & Hirschvogl; 2009). In the context of Jensen's (1986) free cash flow hypothesis, leverage is considered as one of the governance mechanisms which can reduce the opportunistic behaviour of managers in over-investing the financial resources under their control at the expense of shareholders. The proponents of free cash flow hypothesis argue that by having greater debt financing leads managers to put more efforts on managing risky projects that have greater potential for larger returns. Failure to meet debt payment will expose the company to bankruptcy problems (Altman, 1993), which in turn may cause the threat of manager's replacement (Jensen, 1989). Thus, this kind of governance mechanism would mitigate the manager-shareholder conflict of interest; hence, improved shareholders' value (Jensen, 1986; Harris & Raviv, 1991). The evidence of free cash flow hypothesis is further supported by a number of researchers (see for example, Campello, 2006; Berger & Bonaccorsi di Patti, 2006; Franck, Huyghebaert & D'Espallier, 2010).

### 2.1.3 Other Relevant Conception to the Study

There are other theoretical ideas, namely, size effect and Fisher's effect which are applicable to explain factors contributing to performance and risk-taking.

#### 2.1.3.1 Size Effect

The issue of size effect is first documented by Banz (1981) and Reinganum (1981). Using a sample of firms listed on the NYSE over the period 1926 - 1975, Banz (1981) documents that the quintile made up of portfolio of smaller stocks do better than the larger stocks by 0.40 percent per month. Furthermore, Reinganum (1981) examines the size effect based on firms listed on the NYSE and AMEX between 1963 and 1977. By holding systematic risk constant, he reports that the small-cap stocks in the decile portfolios earn a monthly risk adjusted return that is 1.77 percent higher than the large-cap stocks. The finding on size effect is further supported by Fama and French

(1992). Based on a sample of NYSE, AMEX and NASDAQ over the period 1963 to 1990, they report an obvious trend for the smallest size decile to outperform the largest size decile. They also document that the size effect remains significant even after controlling for beta. Therefore, Fama and French (1992) claim that the coefficient on size reflects an explanatory power of company size in explaining the cross section of returns. Amel-Zadeh (2011) validates the existence of size effect in the Germany equity market. He suggests that the impact of company size on stock returns is conditional on market situation where in the bearish (bullish) market, smaller (larger) companies outperform larger (smaller) companies. The above findings suggest that excess returns would have been earned by holding stocks of small size companies.

Many researchers have sought to explain size effect based on various factors, such as market forces, informational deficiency, liquidity effect and transaction cost disparity. Based on the basic valuation model, Berk (1995, 1997) and Clubb and Naffi (2007) argue that size and return will always be inversely related due to the market forces. Theoretically, given that expected return of stock increases, market forces trigger upward pressure on the discount rates of stocks. Such situation ultimately causes the decreases in company size as measured by the company's market value. Merton (1987) and Zhang (2006) provide another explanation for the inverse relationship between size and return. They associate the size effect with the higher information asymmetry of small companies. This is because small companies are less followed by investors (Banz, 1981) and professional investment analysts as (Botosan, 1997) as well receive lesser coverage in the financial media (Firth, 1981, Jenkins, 2006). This phenomenon is known as neglected firm effect (Arbel & Strebel, 1982; Carvell &

Strebel, 1987). As small companies secure less attention by various stakeholders, their shares cannot be easily evaluated and interpreted. The lack of information about the small companies makes investment in these companies as a risky investment (Bostrom & Petersson, 2011). Being neglected companies, fortunately leads to an upward surprise in earnings of these stocks (Merton, 1987; Fang & Peress, 2009). The excess return yielded by investing in these unpopular and risky stocks can be interpreted as a reward for the extra effort of gathering limited and costly information about the stocks (Lustig & Leinbach, 1983).

Alternative explanation for the size effect is liquidity effect (Amihud & Mendelson, 1986; Amihud & Mendelson, 1991; Brennan, Cordia & Subrahmanyam, 1998; Liu, 2006; Cui & Wu, 2007; Lin, You & Huang, 2012). Liquidity effect refers to the observation that small-cap stocks are less liquid than large-cap stocks. Some researchers relate information asymmetry in small companies with liquidity effect (Chae, 2005; Liu, 2006; Lin *et al.*, 2012). Due to information asymmetry, small-cap stocks are unable to trade efficiently in a large quantity at a low trading cost (Amihud & Mendelson, 1991; Chae, 2005). Thus, small companies are motivated to secure abnormal returns to enable them to compensate investors for the higher transactions costs (Amihud & Mendelson, 1986; Brennan & Subrahmanyam, 1996), in converting the asset into cash (Lippman & McCall, 1986; Krainer, 2001), and the higher uncertainty in performance forecasting (Barry & Brown, 1984). This liquidity premium will benefit investors who are willing to bear with the riskiness of holding the illiquid assets in a long trading horizon (Amihud & Mendelson, 1986; Liu, 2006). Dhawan (2001) confirms that, in spite of small companies are two to four times riskier than larger companies, they take positive attitude towards facing the challenges. Hence, they are able to take constructive actions to overcome the financial related constraints. Ultimately they are able to improve their performance at the expense of increasing their riskiness (Whited & Wu, 2006).

However, the evidence on the issue of size effect has not always been one-sided. For example, studies based on data from the US (Chang & Thomas, 1989; Horowitz, *et al.*, 2000; Schwert, 2003; Chaibi, Alioui & Xiao, 2014), Korea (Mukherji, Dhatt & Kim, 1997), UK (Dimson & Marsh, 1999; Dimson, Marsh & Staunton, 2002), Nigeria (Muritala, 2012), Tanzania (Kipesha, 2013) and Malaysia (Mohd Ali, 2006) suggest that small size companies have substantially lower returns than large size companies. These researches show that the reversed size effect is not only happen in emerging markets but also exist in mature markets. Schwert (2003) suggests that the size effect appears to be reversed because practitioners begin to utilize investment tools which enable them to exploit the small-firm anomaly for their portfolio maximisation. Some studies have shown that large firms have a direct impact on performance due to the ability in operating business efficiently (Kumar, 2004; Bos & Kolari; 2005; Van Biesebroeck, 2005; Aljifri & Moustafa, 2007), utilizing economies of scales and dominating the market (Bain, 1954; Kumar, 2004; Serrasqueiro & Macas Nunes, 2008), experiencing more business diversification (Yang & Chen, 2009), having greater financial resources (Arora & Gambardella, 1990), and diversifying risk efficiently (Ghosh, 2001; Bossone & Lee, 2004).

The size effect paradox has inspired many more researchers to seek explanations on the issue (see for example, Horowitz *et al.*, 2000; Abbrose & Linneman, 2001; Kim & Burnie, 2002; Audia & Greve, 2006). Using a sample of companies listed on NYSE, AMEX, and NASDAQ, Horowitz *et al.* (2000) report inconsistent relationship between size and realized return over the period 1980–1996. Based on three types of empirical tests, they suggest that size effect varies over time, leading them to debate on the robustness of prior researches. Some literature argues that the time-varying nature of the firm size effect is probably driven by the economic fundamental (Brown, Kleidon & Marsh, 1983; Hirschey & Spencer, 1992; Bhardway & Brooks, 1993). In line with this argument, based on US data from 1976 to 1995, Kim and Burnie (2002) document a significant size effect during economic expansions but not in the period of economic contractions.

#### 2.1.3.2 Fisher's Effect

Fisher's effect theory which is established by Fisher (1930) illustrates the relationship between inflation and both nominal and real interest rates in a perfect economic situation. This economic theory states that the nominal interest rates indicate all the available information about the forecasted levels of the inflation rate as a proxy for the purchasing power of money. Therefore, expected inflation and nominal interest rate move up and down together with an equal amount over the long run, thereby leaving the real interest rate remain unchanged. This evidence is further supported by other researchers (see for example, Reilly, Johnson & Smith, 1971; Boudoukh & Richardson, 1993; Graham, 1996; Choudhry, 2001; Patra & Posshakwale, 2006; Kaliva, 2008; Oprea, 2014; Zainal, 2014).

It appears that, this notion is widely regarded as one of the cornerstones in economic literature and commonly applied in explaining nominal and real rate of returns on any kind of assets. If this hypothesis holds true, it also implies a positive relationship between inflation and stock returns (Chen, Roll & Ross, 1986; McElroy & Burmeister, 1988; Young, Ng, Lane & Parker, 1991; Boudoukh & Richardson, 1993; Graham, 1996; Choudhry, 2001; Spyrou, 2004; Patra & Posshakwale, 2006; Kaliva, 2008; Oprea, 2014; Zainal, 2014). For that reason, these studies are in agreement with the notion that common stock could serve as a good potential hedge against inflation.

Ever since Fisher (1930) imparts the idea of Fisher's effect, the investigations on its presence in developed (Bodie 1976; Jaffee & Mandelker 1976; Fama & Schwert, 1977; Chen *et al.*, 1986; Boudoukh & Richardson, 1993; Jensen, 2009) and emerging markets (Wongbampo & Sharma, 2002; Khazali & Pyun, 2004; Geetha, Chong, Mohidin & Vivin, 2011; Zainal, 2014) have been theoretically and empirically discussed. In spite of the general acceptance of this economic theory, some previous studies document a negative impact of inflation on aggregate stock returns (Nelson, 1975; Bodie 1976; Jaffee & Mandelker 1976; Fama & Schwert, 1977; Jensen, 2009; Wongbampo & Sharma, 2002; Khazali & Pyun, 2004; Geetha *et al*., 2011). Due to the mixed results, a number of attempts to search for the answers have emerged in the literature. One of the theories which could explain the reverse Fisher's effect is known as Fama's (1981) proxy hypothesis. It is hypothesises that inflation could perform as a proxy for economic activities in the market. An increase in inflation rate would lessen the real economic activity; hence, this phenomenon would lead to a reduction in corporate performance.

## 2.2 Empirical Evidence Concerning Corporate Risk-taking Behaviour in Relation to Performance

Financial economists, academics and practitioners have long been interested in contemporaneous risk-return relationship. The traditional prediction of risk and return will be positively correlated in an efficient market arises principally from a risk-averse reaction of rational economic agents. Risk-averse behaviour assumes that, rational economic agents would not undertake a high-risk decision unless they will be compensated with high expected returns. Conventionally, this behaviour is believed to be well-matched in an efficient market environment whereby, securities are valued with the intention that their expected return will offset investors for their expected risk.

Evidently, a considerable body of researches published before 1980's documented a significant positive risk-return association as postulated by traditional school of thought. To mention a few, Conrad and Plotkin (1968) focus on studying 783 US companies which representing 59 industries for the period 1950 to 1965 and find a significant positive association between risk and return. Similarly, Fisher and Hall (1969), Cootner and Holland (1970) and Hurdle (1974) who examine 11 industries over a 15-year period (1950-1964), 39 industries over a 15-year period (1946-1960) and 85 industries over 10-year period (1960-1969) respectively, also derive results that verify significant positive risk-return relationship for both firm and industry level in the US. Another investigation on US-based industry by Armour and Teece (1978), however document an insignificant negative relationship in 28 firms from petroleum industry. In contrast, study on the same issue in Germany by Neumann, Bobel and Haid (1979) records a significant positive association for the whole sample of 334 West German industrial stock companies. Interestingly, when the sample is separated according to big and small companies, significant positive and insignificant negative association is found respectively.

In spite of CAPM theory hypothesizes that high risk actions bring in high average returns, strategic management organisation researchers have uncovered evidence that accounting measures of financial return and risk are often negatively related. Employing mean-variance approach and content analysis measures, Bowman (1980) pioneer the management scholars to challenge the long held view that “there is no free lunch”. Bowman (1980) points out the theoretical and empirical contradictions between corporate risk-return relationship and the traditional assumption of positive risk-return relationship and risk-averse behaviour derived from modern financial portfolio theory. By empirically examine the within-industry return on equity and the variance of return on equity risk-return relationships in each of 85 US industries over the period 1968 to 1976, Bowman (1980) unveils that 56 companies experience a negative risk return relationship, 21 of the sample experience a positive relationship while the remaining show no correlation between the two variables. Since most of the good performing firms experience less annual returns variation than the poor performing firms, he suggests that risk seeking behaviour dominate other risk preference at the industry level.

The opposite findings of the risk-return relationship conventionally advanced in CAPM theory has been termed as “risk-return paradox” (Bowman, 1980:24) for strategic management. This risk-return paradox expresses that decision makers are not willing to take higher risk and at the same time they expect higher returns. From his point of view, this paradox could be elucidated by employing the conception of corporate strategy. He maintains that a proper-planned approach on investment could concurrently intensify returns and moderate income variability. Bowman suggests that behavioural perspective could offer a platform for possible rationalization on the paradoxical patterns observed in corporate risk-return studies.

Since Bowman (1980) unveils that risk and return are negatively correlated across companies within most industries, a wide stream of studies have been conducted by management scholars, to extensively explore the risk seeking behaviour of economic agents by employing behavioural theory. A number of these seminal papers are in agreement with Bowman’s theory (Bowman, 1982, 1984; Fiegenbaum & Thomas, 1988; Bromiley, 1991a, 1991b; Wiseman & Bromiley, 1991) while there are some studies that provide evidence of mixed results (Bettis, 1981; Fiegenbaum & Thomas, 1985, 1986) as well as no significant relationships (Oviatt & Bauerschmidt, 1991) between the two variables. Bowman’s (1980) discovery of the negatively correlated results has continued to induce strategy scholars in the current decade to conduct studies and provide clearer explanation on the risk-return relationship (Lehner, 2000; Deephouse & Wiseman, 2000; Wang, Barney & Reuer, 2003; Miller & Chen, 2003, 2004; Fiegenbaum & Thomas, 2004; Andersen, et al. 2007; Maurer, 2008).

The complex risk-return relationships revealed in Bowman's (1980) has been subsequently justified in Bowman's paper (1982). In this research he records a significant negative correlation between risk and return for underperforming firms within industries. Bowman (1982, 1984) contends that firms’ risk preference probably will give a direction on the pattern of risk-return and therefore more distressed firms may incline to consume greater risks in the hope that they can recover from failure. Hence the rationalization behind the negative relationship between risk and return are: firstly, firms suffering below-median returns may aggressively search for risky operations to magnify returns while firms that are enjoying above-median returns tend to stay away from risky operations that could harm their existing reputations; secondly, competent firm-level strategic supervisory may perhaps proficiently enhance firm's return along with lessen variability of its performance (Bowman, 1982).

Bettis (1981), Bettis and Hall (1982) and Bettis and Mahajan (1985) broaden and substantiate Bowman's theory of risk-return paradoxical relations by taking into consideration diversification strategy and industry characteristics as intervening variables. Based on the sample of US companies, they find that a number of companies were competent to concurrently lower risk and enhance profit. Explicitly, their finding shows that a stronger negative association is expected to exist for related diversified firms than unrelated diversified firms. In other words, unrelated diversified firms are linked with lower prosperity than related diversified firms.

Furthermore, Fiegenbaum and Thomas (1985) undertake a research based on seven industries in the US within stable and unstable economic conditions over the period 1960 to 1979. By using accounting-based measure of risk, they discover a positive risk-return relation during stable economic condition in the 1960s but negative association in a less stable period around 1970s. Another research by Fiegenbaum and Thomas (1986) which based on a larger number of industries within the same window periods of study, support their previous finding. Based on accounting data, these studies confirm economic condition does matter in determining risk-return relationships. However, when market-based risk measure is employed, the relationship appeared insignificant (Fiegenbaum & Thomas, 1986). This result shows that risk measures also do matter in determining risk-return relationships. This view is supported by other researchers (March & Shapira, 1987; Aaker & Jacobson, 1987; Ruefli, 1990; Danielson *et al.*, 2005). In their subsequent research, Fiegenbaum and Thomas (1988) apply prospect theory of Kahneman and Tversky (1979) to explain the pattern of risk and return. In line with Bowman's (1982, 1984) contention, Fiegenbaum and Thomas (1988) also reveal that firms with lower than the industry median returns tend to be risk takers which aggregately has caused the negative association between risk and return. In contrast, firms with higher than the industry median returns portray risk-averse behaviour and consequently caused positive association between the variables.

Research on dynamic influence of prior risk-taking (prior performance) on subsequent performance (subsequent risk-taking) is also extensively covered in the strategic management literature (Bowman, 1984; Fiegenbaum & Thomas, 1988; Bromiley, 1991a, 1991b; March & Shapira, 1992; Miller & Leiblein, 1996; Teece, Pisano & Shuen, 1997; Bromiley, Miller & Rau, 2001; Greeve, 2003; Coval & Shumway, 2005; Massa & Simonov, 2005; Ackert *et al.*, 2006; Maurer (2008); Frino *et al.*, 2008; Denrell, 2008; Li *et al.*, 2014). Founded on Cyert and March's (1963) behavioural theory of the firm (BToF) and the prospect theory of Kahneman and Tervesky (1979), these previous studies are of one aim, to correctly model the relationship between risk and return by taking into consideration the lag structure of the regressor. By applying a content analysis of 26 US-based companies' annual reports over the period of 1972 to 1981, Bowman (1984) fail to, report any significant impact of risk-taking on subsequent performance. Based on the analysis of 288 US-based companies over the period 1976 to1987, Bromiley (1991a) however reports that future performance is negatively influenced by prior risk-taking behaviour. Meanwhile, the work of Miller and Leiblein (1996) and Maurer (2008) reveal the existence of significantly positive impact of prior risk-taking on subsequent performance. Their argument is in line with Teece *et al.* (1997) who claim that decision makers tend to engage in risk-averse behaviour. They are guided by the past risk taking indicator as a benchmark for seeking reliable investment opportunities. More certain accounting returns are expected in order to offset the additional risks which are taken in the past.

Furthermore, Bowman (1984), Bromiley (1991) and Coval and Shumway (2005) report the existence of negative influence of performance on subsequent risk-taking. Based on enterprises in China, Li *et al*. (2014) support the notion that poor performers are more likely than high performers to pursue risky projects in the future. One of the well-known cognitive biases which could explain the risk tolerance amongst market participants is Tversky and Kahneman's (1981) risky choice framing effect. The concept of risky choice framing effect suggests that market participants tend to pursue (avoid) risky investments as past performance is framed as losses (gains) (Kahneman & Tversky, 1984). In line with the contention of BToF and prospect theory, the perception of losses and gains relative to certain level of reference point leads to diverse risk tolerances. Singh and Bhowal (2010) regard the phenomenon of framing effect as one of the common irrational decision making.

On the other hand, Thaler and Johnson (1990) shows the evidence of positive impact of performance on the subsequent risk-taking which is known as the house-money effect. The house-money effect suggests that market participants have the tendency to pursue risky investments after experiencing gains (Massa & Simonov, 2005; Ackert *et* *al*., 2006; Frino *et al*., 2008). The proponents of Thaler and Johnson's (1990) house-money effect believe that market participants are affected by another form of cognitive bias which is known as mental accounting. Psychologically, they split capital and profits into two different mental accounts. They generally preserve their capital as it is regarded as hard-earned money. However, at the same time they are willing to take more risk by reinvesting the profits to expand their portfolio as they are not emotionally attached to the money which is not yet perceived as their personal wealth.

More than a decade after Bowman (1980) sparked the debate on paradoxical negative risk-return relationship, under different research theme, Fama and French (1992) find an insignificant relationship between risk and return. Based on US stock returns data, Fama and French (1992) find that firm's beta is not able to predict returns in the 1963-1990 period, especially after controlling for size and book to market value ratio. Their findings lead to another research stream in financial economics, known as "the death of beta". The contention of the death of beta is supported by Fama and French (1996), Strong and Xu (1997), Ferson and Harvey (1994), and Jagannathan *et al*. (1998). However, Clare *et al*. (1998) and Chou *et al*. (2000) document a significant positive relationship between beta and return in the setting of UK and Japan markets respectively. Nevertheless, Blitz and Van Vliet (2007) document a negative relationship between risk and return in US, Europe and Japan. This is further supported by the study of Fletcher (2000) in eighteen developed European countries, Hodoshima *et al*. (2000) in Japan, and Tang and Shum (2007) in both Korea and Taiwan where they find a significant negative relationship between beta and return during the period of bullish market. However they document a significant positive relationship in bearish market conditions.

Overall, the fundamental question concerning risk-return relationship controversy and its related issues remain unanswered. Thus far, the empirical results vary substantially across studies. These unresolved outcomes have continuously called for further research, thus keeping this research stream alive. Some of the findings show that the choice of method for measuring risk could affect the sign of the risk and return relationship (Fiegenbaum & Thomas, 1986; March & Shapira, 1987; Aaker & Jacobson, 1987; Ruefli, 1990; Danielson *et al*., 2005). In addition, the choice of data (Ruefli, 1990), period of observation (Cool & Schendel, 1987) and the condition of the market environment where the research has been undertaken (Agusman, Monroe, Gasbarro & Zumwalt, 2008) are also a matter of concern that might affect the relationship.

## 2.3 Market-Based and Accounting-Based Performance Measures

Two common types of corporate performance measures are market-based (market returns such as total returns index) and accounting-based variables (accounting returns such as return on equity and return on assets). Previous studies show that investors and economists are more concerned with market-based data and believe that this source of performance measure is more appropriate to be applied (Ullmann, 1985; Woo, Willard & Daellenbach, 1992). Among other advantages of using market-based performance measure is that, it takes into consideration the opportunity costs and time value of money (Fisher & McGowan, 1983; Chen & Lee, 1995). Hence market-based measure captures information available to investors (Deeds, Decarolis & Coombs,

1998) and reflects the market perception of the expected future performance of the companies (Dubofsky & Varadarajan, 1987; Wisner & Eakins, 1994). In addition, market-based measure is less influenced by company-specific financial reporting rules and managerial manipulation (McGuire, Sundgren & Schneeweis, 1988).

Nevertheless, there are other market participants who find accounting-based data to be useful because it conveys value-relevant and timely information (Lev & Ohlson, 1983; Hassel, Nilsson & Nyquist, 2005). Even though accounting return data has been criticised as insufficiently signifying genuine economic values because of its possibility of being manipulated by managers (Fisher & McGowan, 1983; Salamon, 1985; Johnson & Kaplan, 1987), it is still acceptable and widely applied in many context (Maines & Wahlen, 2006) by various users in decision making (Giner & Reverte, 1999; Truica & Trandafir, 2009). In particular, Giner and Reverte (2006) propose the usefulness of accounting-based data as fundamental information for market participants to capture equity risk as measured by cost of equity capital which is commonly used in equity valuation.

Given the debate over the most appropriate measure of corporate performance, this study uses both accounting-based and market-based measures to investigate the relationships between risk and return. This is because both performance measures concentrate on different aspect of performance (McGuire *et al*., 1988, Richard & Wei, 2010). Hutchinson and Gul (2004) argue that accounting-based measure can be used to measure the historical performance of a company. This internal measure reflects the result of managers' decisions and therefore is preferable to be applied for corporate governance analysis (Hutchinson & Gul, 2004). However, market-based measure is more conditional on market factors which are out of management control (Elitzur & Yaari, 1995). This external measure reflects the current state of a company as well as the investors' expectations of a company's future performance.

## 2.4 Empirical Evidence Relating to the Standard Risk Measure

Ever since Modern Portfolio Theory (MPT) was introduced by Markowitz (1952, 1959), standard deviation of returns is commonly taught as a standard risk measure in most financial textbooks. The statistical concept of standard deviation is to capture dispersion around the mean return. The larger the dispersion shows the more uncertainties involve, hence the higher the risk of an investment need to be considered. Generally, the procedure for calculating standard deviation and its statistical concept are relatively easy and straightforward to be theoretically and practically applied (Brief & Owen, 1969). Theoretically, the application of this risk measure is commonly supported by many prominent scholars especially in the field of financial economics. They perceived this standard risk measure as the most accepted optimization framework for modern investment management. This approach suggests that part of the total risk known as unsystematic risk can be reduced through the process of diversification. What is left need to be accepted by investors is known as systematic risk which is measured by beta (β). Practically, this traditional risk measure also has been widely adopted by practitioners in the financial and capital markets as a means to evaluate total investment risk and to select an optimal portfolio.

The main underlying assumptions of using standard deviation of returns as a straightforward measure of risk are mainly based on several judgments about the markets and investors. Firstly, investment returns are normally distributed in which investors weigh the probability of negative returns equally against positive returns. This assumption simplifies the assessment of uncertainty which enables a combination of downside and upside volatility in one measure. Secondly, on average, investors are assumed rational in making decision and tend to demonstrate risk-averse behaviour. Being a rational investor in nature, one tends to minimize the risk for any level of expected return. This assumption suggests that additional return must compensate investor for assuming additional risk. Thirdly, in relation to the first and second assumptions, the market is always perceived as efficient. In an efficient market, all investors have the opportunity to access the same information at the same time. Based on that assumption, it is supposed that all investors have accurate conception about possible risk and returns.

## 2.5 Empirical Evidence Relating to the Downside Risk Measures

Within the investment context, the conceptualisation of downside risk appeared in the early 1950s as documented in Roy (1952) and Markowitz (1959). Since then, a few research works probing into this issue could be seen. Among other early proponents of downside risk are Lanzilotti (1958), Swalm (1966), Mao (1970), Bawa (1975), Hogan and Warren (1974), and Fishburn (1977). Other outstanding proponents are Miller and Leiblein (1996), Grootveld and Hallerbach (1999), Estrada (2002, 2004, 2006, 2007), Swisher and Kasten (2005), Ang, Chen and Xing (2006), Maurer (2008), Veld and Veld-Merkoulova (2008), Lee, Reed and Robinson (2008), Tee (2009), and Beach (2007, 2011). These researchers are in agreement that downside risk is more consistent with actual behaviour of investors in investment settings. Although the popularity of downside risk among investors has expanded, there is relatively a limited number of researches in this area (Pavabutr, 2003; Ang, Chen *et al.*, 2006).

Moreover, Estrada (2006) and Tee (2009) note that downside risk measure has only become increasingly accepted and used by both academia and practitioners in the last several years.

Estrada (2006) and Tee (2009) argue that as investors are more concerned with the risk of lower return and as computer technology has been well-advanced, there is no excuse in neglecting downside risk measures. Nawrocki (1999) put a clear stand on the importance of replacing variance-based measures of risk with downside risk measures. He claims that the application of downside risk measures as an investment portfolio tools enable market participants to deal with the complexity phenomenon in the financial markets. His rationale on this matter is in line with the concern of prior scholars (Lanzilotti, 1958; Markowitz, 1959; Swalm, 1966; Mao, 1970; Hogan & Warren, 1974) on the possibility of non-normal distribution of securities return and on capturing the actual market participants' intuitive perception of risk.

Beach (2007) emphasises Markowitz's (1959) notion on the influence of normality distribution of returns on the validity of variance-based measures of risk and downside risk measures. In the case of normal distribution, both standard risk and downside risk are accepted as good measures of risk. However, only the downside risk stands as an appropriate risk measure if the distributions are asymmetrically distributed. Some researchers are in agreement that downside risk measures are more accurately reflect the non-symmetrical distribution of asset returns (Stevenson, 2001; Estrada, 2001; Solomons & Grootveld, 2003; Nawrocki, 2003; Coleman & Mansour, 2005). Since non-symmetrical distribution of asset returns is a common feature in emerging market environment (Hwang & Pederson, 2002; Pavabutr, 2003), downside risk measures are deemed to be applicable to this market setting (Harvey, 2000; Estrada, 2000, 2002, 2004, 2007; Beach, 2011; Alles, 2013).

Among other reliable measures of downside risk in the context of emerging markets are below-mean semi-variance and a product of its square root known as below-mean semi-deviation (Estrada, 2002, 2004, 2007). Below-mean semi-variance computes variance using the returns below the mean return. Beach (2011) reveals that below-mean semi-variance is more suitable for emerging markets as compared to developed markets due to the different form of underlying returns distribution. An alternative term for below-mean semi-variance is half variance (Nawrocki, 1999). Meanwhile, Estrada (2002) discovers that below-mean semi-deviation presents a more practical risk measure than standard risk measure in explaining risk or variability in the cross-section of emerging markets' security returns. By using this risk measure, Estrada (2002) significantly supports the positive relationship between risk and return.

In his subsequent research, Estrada (2004, 2013) verifies that below-mean semi-variance and below-mean semi-deviation offer a strong foundation for asset pricing models in emerging markets setting. This is because, these risk measures have flexible benchmarks and therefore making them effective tools to capture investors real concerns on risk. As downside risk provides a good measure of risk for equities or portfolios, it is not uncommon to observe even the Dow Jones Indexes use this approach to measure risk attribute in the markets. In addition, Estrada (2002, 2004, 2007) proposes that the application of the related concepts of below-mean semi-variance and below-mean semi-deviation is able to come up with a new version of behavioural model, which is known as downside-risk behaviour. Apparently, downside-risk behaviour displayed by investors is found to be highly correlated with expected utility (Estrada, 2002, 2004). These evidences show that the credibility of downside-risk behaviour is at par with the standard mean-variance behaviour in estimating expected utility.

## 2.6 Empirical Evidence Relating to the Influence of Company-specific Characteristics on Corporate Performance and Risk-taking Behaviour

This section discusses the influence of company-specific characteristics on corporate performance and risk-taking behaviour. Based on previous literature, several company-specific characteristics are identified as independent variables for this research. They are company size, company age, aspiration level, financial slack and leverage. The last two variables are discussed from the perspective of corporate governance mechanisms.

### 2.6.1 Company Size

A series of studies have been concentrated on developing the models that directly relate company size to risk and return. Among others are Stekler (1964), Samuels and Smyth (1968), Ball (1978), Banz (1981), Reinganum (1981), Chan and Chen (1988, 1991), Fama and French (1992), Berk (1995, 1997, 2000), Horowitz *et al.* (2000) and Chaibi *et al.* (2014) which are conducted in the developed market. In addition, other studies on this topic are carried out in various countries such as Japan (Audia & Greve, 2006), Malaysia (Mohd Ali, 2006; Tuan, Lee & Ismail, 2013), Portugal (Vieira, 2014), US (Zhang, 2006; Chou, Huang, Lin & Hsu, 2009), UK (Clubb & Naffi, 2007), both developed and developing countries (De Moor & Sercu, 2007), Germany (Amel-Zadeh, 2011), Nigeria (Muritala, 2012) and Tanzania (Kipesha, 2013).

Based on accounting-based data of US manufacturing companies from 1947-1958, Stekler (1964) documents an inverse relationship between company size and variability of profitability. This inverse relationship is supported by Samuels and Smyth (1968) who investigated a cross-section of firms in the UK from 1954-1963. Results from these accounting-based researches suggest that large companies produce average but stable profits, whereas, smaller ones are more likely to bring in higher but more variable profits. Adopting market-based data, Banz (1981), Reinganum (1981), Fama and French (1992), De Moor and Sercu (2007) and Amel-Zadeh (2011) provide support to findings adopting accounting-based data. Hence both accounting-based and market-based researches are in agreement that, on average, small companies are riskier than larger ones. The riskiness of small size companies are reflected in higher volatility of their accounting profits and stock returns as compared to larger companies. The riskiness of small size company is also exhibited in many other forms such as lack of marketing resources (Brush, 1992), suffer from borrowing constraints (Martinelli, 1997) and lower likelihood of survival (Agarwal & Audretsch, 2001).

Since both accounting-based and market-based data show that smaller companies are fundamentally riskier than larger companies, investors of smaller companies deserve to expect higher expected returns (Roll, 1981; Chan & Chen, 1991). The rationale behind this notion is that investors want to be rewarded for extra risk taken by investing in riskier companies (Perez-Quiros & Timmermann, 2000; Liu, 2006). Justification for being rewarded is not baseless since small companies are two to four times riskier than large companies in the eyes of investors (Dhawan, 2001). Over a longer period of time, the collective judgement made by investors on the riskiness of smaller company leads to inverse relationship between size of companies and return

(Chan & Chen, 1988; Fama & French, 1992; Amel-Zadeh, 2011). The observation of this inverse relationship is labelled as size effect or alternatively known as small firm effect. This issue is first revealed by Banz (1981) and Reinganum (1981).

On the other hand, previous studies also provide evidence that the size effect may have disappeared after its discovery in early 1980s (Horowitz *et al.*, 2000; Amihud, 2002). In addition, based on US equity REITs, Abbrose and Linneman (2001) reveal that firm profitability increases with company size but at a decreasing rate. Using data from Japanese shipbuilding industry, Audia and Greve (2006) document that small companies are incline to reduce risk-taking in response to decreases in performance. From the perspective of family businesses in Portugal, Vieira (2014) also documents a positive relationship between systematic risk and firm size. Their findings contradict to the contention that small companies are prone to take risks. The argument given by Audia and Greve (2006) and Vieira (2014) is that small companies have to focus on survival and avoid the threat of failure. On the contrary, large companies are projecting risk seeking behaviour as their performance had decreases. This risk seeking behaviour shows that large companies are more aggressive in achieving their target performance (Balabanis & Katiskea (2003). Baghat, Bolton and Lu (2015) which based on US financial institution's data support the positive impact of size on risk-taking behaviour. A more recent finding by Tuan *et al.* (2013), which utilised the Malaysia’s insurance industry documents a positive link between firm size and underwriting risk. These studies argue that the implementation of too-big-to-fail policy encourages irresponsible risk-taking by larger financial firms.

There are variations on how company size is defined (Scott, 1981). For example, Banz (1981), Reinganum (1981), Fama and French (1992), and De Moor and Sercu, (2007) use market capitalization or also known as market value of equity. The market capitalization is by far the most commonly and increasingly used measure of firm size (Sehgal & Tripathi, 2005). This market measure of size provides better estimates of the market value and the going concern value of firm (Fremgen, 1968). Apart from market-based measure, there is a number of non-market proxies have been applied to measure firm size. Thus far, the most common non-market proxy of firm size in financial studies is the natural log of total assets (Faccio, Lang & Young, 2001; Beck, Demirguc-Kunt & Maksimovic, 2005; Muritala, 2012; Kipesha, 2013).

### 2.6.2 Company Age

Another variable that has received a lot of attention is the company age. Company age is normally perceived as an indication of a company's experience and learning process which are accumulated as time passes (Jovanovic, 1982; Page 1984; Getz, 1997). It plays an important role as an indicator of a company's reputation (Diamond, 1989; Horner, 2002) because it captures the sustainability and endurance of the company (Audretsch & Thurik, 2000; Sonmez, 2013). Another important features projected in company age are flexibility towards changes (Barron, West & Hannan, 1994; Baum, 1996), capacity to grow (Evans, 1987; Huergo & Jaumandreu, 2004), and more mature and well established (Buysschaert, Deloof & Jegers, 2005).

Based on company's passive learning process model proposed by Jovanovic (1982), the younger companies are conscious about uncertainties of their efficiency and competency in the market. Therefore they are forced to be more innovative in searching for ways to upgrade their efficiency level (Jovanovic, 1982; Audretsch, Klomp, Santarelli & Thurik, 2004; Cormier, Ledoux & Magnan, 2011). Some previous studies claim that younger companies have several positive features such as the ability to learn faster and retain flexibility in their operation (Autio, Sapienza & Almeida, 2000; Fok, Chang & Lee, 2004). Furthermore, due to having relatively less rigid routine, norms and standards, younger companies could be more creative in their operation (Kleinknecht, 1996; Muller & Zimmermann, 2009; Bartram, Brown & Stulz, 2012) and consequently grow faster (Dunne & Hughes, 1994; Glancey, 1998; Huergo & Jaumandreu, 2004). Unfortunately, their eagerness and confidence to grow faster within limited strategic resources (Romanelli, 1989; Tsai, 2001; Knight & Cavusgil, 2005) might cause them to be exposed to greater survival risk especially at early stage of expansion (Jovanovic, 1982; Evans, 1987; Mead & Liedholm, 1998; Sonmez, 2013). These findings are in line with the contention that younger companies are inclined to be riskier than older ones.

On the contrary, older companies are perceived as more skilful and experienced than younger companies. Skills and experience accumulated by older companies (Getz, 1997; Henderson & Benner, 2001) should make the companies more cost efficient and therefore, more competitive in the market (Alon, 2004). By staying competitive at the same time holding a significant market share gives a great reputation to older companies (Horner, 2002). Reputation is often highlighted as among other intangible assets that is hard to create within a short period (Dierickx & Cool, 1989; Barney, 1991). Ritter (1991) and Cobham (1999) are in agreement that reputation can be built on a long history of survival. Older company is also a good indicator for stability (Davis, Haltiwanger, Jarmin & Miranda, 2006). This is because well matured company is usually associated with well diversified company, thus add value to the company (De Motta, 2003; Gomes & Livdan, 2004). By having greater constructive firm-level characteristics from various aspects alongside the ability to integrate all the strategic resources including tangible and intangible assets as well as business knowledge, older companies have greater opportunities to strategically pursue innovative and riskier projects (Walls & Dyer, 1996; Zahra, Nielsen & Bogner, 1999; Zahra & George, 2002). From another perspective, even though older company is normally associated as well-diversified company, it is also known as less flexible in making rapid adjustment (Sorensen & Stuart, 2000). Hence, it is more inclined to stay away from being innovative and taking greater risk (Balabanis & Katiskea, 2003; Sathe, 2003). This feature is supported by Majundar's (1997) findings that older company is more likely to have rigid administration process and more bureaucracy.

### 2.6.3 Aspiration Level

The discussion on aspiration issue pertinent to organisational risk-taking behaviour is essential (Lant, 1992; Greve 1998) and has been primarily guided by behavioural theory of the firm (Cyert & March, 1963) and prospect theory (Kahneman & Tversky, 1979). Both theories propose that aspiration issue exists if organisational decision makers are prepared to be risk-seekers (risk-averse) when they perceive that their organisation fails (able) to achieve certain targeted performance level (Cyert & March, 1963; Kahneman & Tversky, 1979; March, 1988; Greve 2003; Di Lorenzo 2012).

Researchers have highlighted several arguments on aspiration issue in organisation (Lant & Montgomery, 1987; Lopes, 1987; Bromiley, 1991; Audia & Greve, 2006;

Shinkle, 2011). The first argument is that organisational decision makers give attention to determine the relevant organisational aspiration level as a benchmark to compare their company's performance. Second, aspiration level has been described as the borderline between perceived failure and success. Failure or low performance (success or high performance) is inferred from performance level below (above) the aspiration level. Third, aspiration level is essential factor in shaping an organisational strategic behaviour. The magnitude of organisational strategic behaviour is influenced by attainment discrepancy. Fourth, decision makers have more interest to overcome the failure in achieving the targeted performance of their company. Nevertheless, they give less attention to extend the existing achievement if their company is already well performed. Due to this prediction, underperforming company is more incline to undertake risky action while performing company tends to keep its current actions and reluctant to engage in any risky strategy (Denrell, 2008). Accordingly, organisational change occurs more frequently when performance is below the aspiration level (Greve, 1998).

Many researchers are in agreement with the prediction of risk-averse behaviour among performing companies (Bromiley *et al.*, 2001; Nickel & Rodriquez, 2002). However, the prediction of risk-seeking behaviour among underperforming companies is a debatable issue (Staw *et al.*, 1981; Lopes, 1987; March & Shapira, 1987; Wiseman & Bromiley, 1991; Sitkin and Pablo, 1992; McNamara & Bromiley, 1997; Lin *et al.*, 2012). The outstanding viewpoint that challenge the prediction of risk-seeking behaviour among low performing companies is postulated in threat-rigidity hypothesis which is proposed by Staw *et al.* (1981). The threat-rigidity hypothesis which is derived from experimental studies suggests that, on average, low performance companies are inclined to avoid taking risky actions. This is because they perceive that their performance below the aspiration level is hard to rebound. Therefore, it is perceived as a threat to their survival. This evidence is further supported by other researchers (see for example, Dutton & Jackson, 1987; March & Shapira, 1987; McNamara & Bromiley, 1997; Lant & Hurley, 1999; Audia & Greve, 2006). They are in agreement that companies which are threatened by bankruptcy will become rigid and focus more on survival by lowering risk-taking. Lant and Hurley (1999) suggest that the threat-rigidity responses actually take place even when performance is just below the aspiration level. In a more recent study, Lin *et al*. (2012) emphasize that as the performance discrepancy gap experienced by the company widened, the less likely the company to pursue risky investment.

According to Greve (1998), the most commonly used proxy for aspiration level are historical aspiration level and social aspiration factor. The historical aspiration level is a company-specific level, based upon the historical performance of the same company, generally being the previous performance level (Bromiley, 1991a; Lant, 1992; Miller & Leiblein, 1996; Lee, 1997; Palmer & Wiseman, 1999). The social aspiration level is imposed upon the performance of the companies of the same industry; the most commonly used measure in previous works being the mean or median performance of the industry (e.g., Fiegenbaum & Thomas 1988; Fiegenbaum 1990; Jegers 1991; Bromiley 1991a; Miller & Leiblein 1996). Based on an experimental setting, Audia and Brion (2007) find that the management of the company gives greater concern on historical aspiration level to evaluate the current performance of the company. This is because the process of gathering related information to form a historical aspiration level is easier than to form a social aspiration level. The information on company’s own performance history is within the reach of a company's management. Therefore, evaluation of the current state of company's performance is relatively simpler and less time consuming. Company can consider this as an advantage and opportunity to efficiently create and implement a new strategy or alter the existing activities in response to its performance feedback (Cyert & March, 1963). This is inline with behavioural theory of the firm that views company as a goal-directed entity that seeks for simple but reliable decision rules (Chen & Miller, 2007).

### 2.6.4 Financial Slack

Financial slack refers to the availability of internal funds in a company beyond what is needed to meet current operating requirements (Myers & Majluf, 1984; Bruner, 1988; Smith & Kim, 1994; Nohria & Gulati, 1997; McMahon, 2006). Most previous researchers have discussed financial slacks using similar concepts, but different terminologies. Bourgeois and Singh (1983) classify types of financial slack in terms of ease of deployment. The first type is available slack which means extra resource that is readily available for immediate deployment by management. The second type is recoverable slack which means its usage is limitedly under the discretion of management. The third type is potential slack which needs some discretion of investors and creditors before its usage. Singh (1986) classifies slack as absorbed (which sometimes referred as recoverable slack) and unabsorbed slacks (which sometimes referred as available slack). While Sharfman *et al*. (1988) classify financial slack as high discretion and low discretion slack, Fang and Wang (2008) and Zhong (2013) classify slack as sharing resources, existing resources and new resources.

Among these terminologies, the one that is proposed by Bourgeois and Singh (1983) is the most widely used (Cheng & Kesner, 1997).

The role of financial slack resources in organisation has long been discussed by organisation theorists, such as, Barnard (1938), March and Simon (1958) and Cyert and March (1963). The underlying idea of financial slack resources is that, there will be a room for any organisation to have extra resources because no organisations can one-hundred percent optimise its operations (Cyert & March, 1963). The extra resources provide financial flexibility to a company and permit the company to take advantage of investment opportunities without having to issue new stocks (Stein, 1989). Many scholars are in agreement with the impact of financial slack on performance of a company. However, the question whether the impact is positive or negative remains unanswered. Hunter and Schmidt (1990) argue that the ambiguity in financial slack-performance relationship is due to the application of methodological inconsistency across the studies. Since there is inconclusive debate on the financial slack-performance relationship, the direction of relationship cannot be conceptualised.

The issue on financial slack-performance relationship in the developed markets has been investigated from the perspective of behavioural theory of the firm and agency theory. The proponents of behavioural theory of the firm and agency theory posit contradictory hypothesis on the influence of financial slack on firm's performance (Daniel, Lohrke, Fornaciari & Turner, 2004). From the perspective of behavioural theory of the firm, financial slack is excess resource that can be utilized to absorb variation in external business environment and tackle problems that may threaten company's survival (Sharfman *et al.*, 1988). In addition, financial slack resource can be used to take advantage of environmental opportunities and pursue innovative activities (Cyert & March, 1963; Lewis, 2013; Sang, Hyuksoo & Hinh, 2014). Therefore, organisational decision makers need to be proactive in order to facilitate environmental change (Cheng & Kesner, 1997). These arguments support the positive effect of financial slack on performance of a company (Cyert & March, 1963; Pfeffer & Salancik, 1978). In line with this contention, many researchers argue that financial slack is necessary to ensure the long-run survival of a company (Singh, 1986; Hambrick & D'Aaveni, 1988; Su *et al*., 2009; Lee, 2011).

In contrast, from the perspective of corporate governance issue, agency theorists typically argue that without effective monitoring of management, financial slack provides extra costs and inefficiency to the company and thus harm its performance (Jensen & Meckling, 1976; Fama, 1980; Jensen, 1986). This is because organisational decision makers who are described as self-centred agents would have a tendency to waste the extra financial resources for the purpose of seeking their own interest at the expense of shareholders. Therefore, many scholars are in agreement that financial slack should be reduced to minimize the possibility of mismanagement which can cause performance to decline (Davis & Stout, 1992; Phan & Hill, 1995; Steensma & Corley, 2000).

### 2.6.5 Leverage

Leverage refers to decision made by the management to have certain amount of debt relative to equity financing. Practically, the leveraging decision is accomplished after a careful analysis is done by a group of management. The leveraging decision reflects to what extent the management is keen to be more or less averse to pursue borrowing and the willingness of the debtors to offer lending. Ultimately, over-leveraged, under-leveraged or ideal-leveraged position gives impact on its own respect to the management, investors as well as debtors. From the perspective of corporate finance, the degree of financial leverage is a form of governance mechanism that often considered as an effective device of monitoring and disciplining managers (Jensen, 1986, 1993; Stulz, 1988, 1990; Hart & Moore, 1995; Hart, 1998; Zwiebel, 1996). In an imperfect market, increase in debt financing may indicate the rise of willingness of managers to be monitored by lenders (Ross, 1977; Flannery, 1986). However to secure the willingness of managers is not costless. The usage of debt financing can generate agency costs of debt associated to risk-shifting problem caused by the divergence of interest between shareholders and debt holders (Jensen & Meckling, 1976; Myers, 1977; Jensen, 1986). Other consequences of debt financing are bankruptcy problem (Altman, 1993) and liquidation problem (Grossman & Hart, 1982). Though the irrelevance proposition proposed by Modigliani and Miller (1958) suggests that capital structure has no influence on firm's value and its future performance, a number of theoretical works argue that in the real world, debt financing has an impact on both the riskiness and profitability of firms (Bos & Fetherston, 1993; Lubatkin & Chatterjee, 1994).

There are arguments that leverage has an advantage as a means of imposing firm's fixed obligation and reducing the availability of its free cash as well as discouraging overinvestment of the free cash by managers (Jensen, 1986; Stulz, 1990; Hart, 1995; Harvey, Lins & Roper, 2004) who are characterized as self-centered and opportunist agents (Rajan and Winton, 1995; Stulz, 2000). Failure to satisfy debt covenants will expose the firm to the threat of bankruptcy cost (Altman, 1993), liquidation problems

(Grossman & Hart, 1982), and result in manager's replacement (Jensen, 1989). Therefore, enforcing leverage commitment could motivate managers to work harder, consume less perks (Ross, 1977; Jensen 1986) and alter their operating decisions for promising business activities (Harris & Raviv, 1991). This implies that, the bonding agreement between a firm and its lenders could be a means in monitoring on self-centered managers and aligning the interest of managers, shareholders as well as debtholders (Harris & Raviv, 1991) which ultimately can lead to firm's performance improvement (Ross, 1977; Jensen, 1986). A number of studies provide empirical evidence supporting this positive relationship between the usage of debt financing and firm's performance (Heinkel, 1982; Champion, 1999; Campello, 2006; Berger & Bonaccorsi di Patti, 2006; Franck *et al*., 2010). On the other hand, there are also evidences on negative impacts between leverage and corporate performance (Amit & Livnat, 1988; Agrawal & Knoeber, 1996; Fama & French, 2002; Nissim & Penman, 2003; George & Hwang, 2007; Kapopoulos & Lazaretou, 2007; Penman, Richardson & Tuna, 2007; Acheampong, Agalega & Shibu, 2014). The pecking order theory of capital structure states that a well-performed company is more likely to reduce the usage of debt financing and increase the utilization of internally generated funds (Myers & Majluf, 1984). In other words, well-performed company employs less amount of leverage.

Financial leverage could also affect managerial risk-taking. Some researchers propose that high leverage increases managers' temptation to take excessive risks as part of risk shifting investment strategy (Jensen & Meckling, 1976; Barnea, Haugen & Senbet, 1985; Fan & Wong, 2002). This is because the cost of debt is fixed and therefore does not reflect the risk of its usage. In addition, Wiseman and Catanach

(1997) argue that greater debt financing leads managers to invest in riskier projects that promise larger return. From the perspective of managers who own company's shares, high leverage also encourages them to undertake overly risky projects to increase return (Stiglitz & Weiss, 1981). In this regard, high leverage is associated with increase in risk-taking behaviour which ultimately leads to superior performance (Jensen, 1986; Mikkelson, Partch & Shah, 1997; Markman, Balkin & Schjoedt, 2001; Bitar, 2004).

However, there is a competing contention highlighted in another strand of studies. Cai and Zhang (2011) document that high financial leverage leads to reduction in risk-taking by managers. This is especially true in the case of self-centered managers associate risky investment with the threat of liquidation, bankruptcy cost and agency cost which will induce a personal loss to them (Ross, 1977; Warner, 1977; Chung, 1989). In addition, an increase in the usage of debt financing will offer ample room for debt-holders to impose certain restrictions to prevent risky investment in order to secure their fixed return (Florackis, 2008). Debtholders' influence through debt covenants will hinder managerial ability to manage firm effectively (Simerly & Li, 2000) and might jeopardise a firm's long-term survival (Jensen, 1986).

Apart from these leverage related costs can mitigate overinvestment problem, it can also aggravate the underinvestment problem (Myer, 1977; Stulz, 1990). In the case of underinvestment problem, self-centered managers tend to forego value-increasing risky projects since the benefits would accrue to debtholders (Myers, 1977). This contention has been supported by Balakrisnan and Fox (1993). The increase in managerial risk aversion due to the increase in debt financing will lead to decreasing in firm performance (Cai & Zhang, 2011). Among other studies that emphasize on negative relationship between leverage and performance are Amit and Livnat (1988), Agrawal and Knoeber (1996), George and Hwang (2007), Kapopoulos and Lazaretou (2007), and Penman *et al*. (2007).

In summary, the issue of capital structure and its relationship with firm's performance and risk-taking behaviour has remained a puzzle. Most of the literature is based on the functioning of firms in developed capital market. However, little is known in emerging countries which capital market is deemed as less efficient. It can be argued that the variation in measuring leverage, performance and risks would cause different results (Jahmani & Ansari, 2006; Aras, Aybars & Kutlu, 2010). To date, the application of appropriate measure of leverage has been a debatable issue (Chipeta, Wolmarans & Vermaak, 2012). However, they argue that the appropriate measures of leverage depend on the objective of the study. Since this study focuses only on Malaysia, the use of leverage data stated in the balance sheet is sufficient (Chipeta *et al.*, 2012). Apart from able to represent the effect of past financing (Rajan & Zingales, 1995), using balance sheet data also acknowledge inter firm comparisons within the same macro-economic framework (Schmukler & Vesperoni, 2006). This research will only apply debt to equity ratio as a measure of leverage.

## 2.7 Empirical Evidence on the Influence of Macroeconomic Variables on Equity Markets

This section discusses the impact of macroeconomic variables on equity markets. Generally, macroeconomic conditions are central to financial decision making in equity markets (Friedman, 1988; Hess & Lee, 1999; Flannery & Protopapadakis, 2002; Tangjitprom, 2012). There is an empirical question within the field of finance and economics whether macroeconomic conditions of an economy play an important role as the main source of systematic risk in equity market (Campbell, 1996; Al-Qaisi, 2011). Such question apparently challenge one of the core elements maintained in the traditional capital asset pricing model (CAPM) advanced by Sharpe (1963;1964), Litner (1965), Mossin (1966) and Black (1972), that market risk is the only systematic risk factor that determine a company's return. There are a number of macroeconomic factors that could explain return as well as risk in capital markets (Roll & Ross, 1980; Chen *et al*., 1986; Mei, 1993; Wu, 2003).

Most of the studies on the impact of macroeconomic variables on equity market have been carried out in the United States (Ross, 1976; Roll & Ross, 1980, 1984; Fama, 1981; Schwert, 1981, 1989, 1990; Pearce & Roley, 1985; McElroy, Burmeister & Wall, 1985; Chen, *et al*., 1986; Vassalou, 2003). Further evidence on the systematic influence of multiple macroeconomic variables on equity markets could also be seen in other developed countries such as the UK (Beenstock & Chan, 1988; Poon & Taylor, 1991; Cheng, 1995; Clare & Thomas, 1994; Priestley, 1996; Gunsel & Cukur, 2007), Italy (Roma & Schlitzer, 1996; Panetta, 2002) and Japan (Elton & Gruber, 1988; Hamao, 1988; Brown & Otsuki, 1990; Choi, Hiraki & Takezawa, 1998; Azeez & Yonezawa, 2006; Nguyen, 2007). Some of the most popular macroeconomic variables in explaining returns and risks of stocks in the developed market are inflation, interest rate, GDP, money supply, and exchange rates.

The general idea that systematic risk may be comprised of several risk premiums rather than just a single risk premium was initially sparked by Arbitrage Pricing Theory (APT) proposed by Ross (1976). By using factor analytic method, this alternative asset pricing theory suggested that there exists a linear relationship between asset's expected return and a set of non-correlated market wide factors (n-factors). The APT is relatively more operational than the single factor model, CAPM, because it allows several market wide factors to be considered as a source of systematic risk. This multifactor model does not explicitly identify the market wide factors, leaving flexibility for factors to be empirically researched. Evidently, its theoretical groundwork which is based on efficient market has attracted widespread attention and given rise to a large body of empirical work to provide direct economic insight on such issue.

Roll and Ross (1980, 1984) are among the first to investigate specifically on the APT n-factors. They found that unanticipated changes in industrial production, inflation, default risk premium on bonds and the term structure of interest rates influenced the stock market returns. A more refined empirical investigation on multi-dimensional risk factors was advanced in Chen *et al*. (1986). Based on investigation at the market level, they agree that macroeconomic factors identified in Roll and Ross (1980, 1984) have a strong systematic effect on stock market returns. However, they suggest that the effect of these serially uncorrelated variables may diverge in terms of magnitude and persistence. Their work has sparked additional interest amongst researchers to look further on the macroeconomic determinants of stock market returns and its volatility from the perspective of emerging markets. Having distinguished features from those of developed markets especially from the perspectives of political and economic structures (Bilson, Brailsford & Hooper, 2001), market openness (Goetzman & Jorion, 1999), market efficiency (Ojah & Karemera, 1999; Lim, Brooks

& Kim, 2008) as well as corporate risk and return profiles (Harvey, 1995b), makes emerging markets a feasible place to be explored.

Generally, a set of macroeconomic factors can be divided into domestic macroeconomic factors and global macroeconomic factors. Examples of domestic macroeconomic factors include money supply, local GDP, local inflation rate and local interest rate. Whereas, examples of global macroeconomic factors include world GDP, world inflation rate and world interest rate. The influence of domestic and global macroeconomic factors on any markets depends on the state of market openness (Guesmi & Nguyen, 2011). Empirical studies of asset pricing models suggest that the more segmented (integrated) the market, the more sensitive it is towards the domestic (global) factors (Sharpe, 1964; Litner, 1965; Bodurtha, Kim & Lee, 1995; Serra, 2000). Berkaert and Harvey (1995) and Goetzman and Jorion (1999) suggest that emerging countries to some extent are segmented from global equity market. In more recent study, Bekaert, Harvey, Lundblad and Siegel (2011) document that the level of segmentation remains significant in emerging markets. Therefore, domestic macroeconomic variables appear to be more dominant as a primary source of systematic risk (Harvey, 1995a, 1995b; Campbell, 1995). Harvey's comprehensive analyses of the influence of economic factors over the period 1976-1992 in twenty-one emerging stock markets reveal that domestic factors explain more than half of the expected volatility of returns for emerging markets. This result shows that global economic factors do not play sufficient role in explaining the scenario of emerging capital markets.

A number of studies such as Erb, Harvey and Viskanta (1995, 1996) and Bekaert, Erb and Harvey (1997) also find evidence that emerging market returns are linked to domestic economic factors. Supporting evidences for this stance are also documented in Berkaert and Harvey (2000), Serra (2000), Bilson *et al.* (2001), Pasquariello (2008) and Mandilaras and Popper (2009). Particularly, Bilson *et al.* (2001) document that emerging market is partially segmented and less responsive to the world market index. Even though many claim that expected returns in emerging markets are more likely to be affected by local rather than global risk factors, some find that the magnitude of influence varies within the market (Rizwan & Khan, 2007) and across the markets horizons (Fifield *et al*., 2002). This is typically due to the degree of segmented market varies across markets and across time (Bekaert & Harvey, 1995; Bekaert & Harvey, 2000; Carrieri, Errunza & Hogan, 2007; Guesmi & Nguyen, 2011; Bekaert et al., 2011). These findings reflect the uniqueness of emerging markets' characteristics, domestic rigidity and international segmentation (Choi & Doukas, 1998) which offers an interesting area of research and an opportunity for new insight.

In the context of Asian emerging markets, the process of market liberalization before 1997 financial crisis led Malaysian equity market to become more integrated with global market. However, in other studies, it is found that the market was segmented after the financial crisis (Lin, 2006; Abd Karim & Ahmad, 2011). By using time series approaches of co-integration and vector auto-regressive, Ibrahim and Wan Yusof (2001) examine Malaysian data for the period January 1977 to August 1998. They find that the Malaysian equity market is driven more by domestic sources of risk as if the market’s openness stayed unchanged regardless of liberalization or financial crisis. This finding denies the common assumption on the dominance of global factors in emerging markets in the wake of borderless world. Hence, global macroeconomic variables have been dropped from this research model. In this study, three local microeconomic variables that theoretically have significant effect on stock market are chosen, namely, inflation rate, money supply growth and GDP growth. These local factors are regarded as common variables representing domestic real and money market.

Inflation rate represents an average change in the prices of goods and services or monetary purchasing power over a certain period of time. The extent to which inflation rate affects corporate risk-taking and profitability depends on the ability of corporate decision makers to accurately anticipate the movement of future inflation and do the necessary adjustment on interest rates and profit margins (Bourke, 1989; Ilter, 2012) and accommodate the real value of depreciation deduction (Feldstein, 1981; Gravelle, 2011) in the related financial statements according to the level of forecasted inflation. Ilter (2012) claims that financial statements are easily affected by any changes in the inflation rates where a small change in inflation rates would affect business profits.

Fisher’s effect theory is one of the major theories discussing the impact of inflation on corporate performance. Fisher’s effect theory which is established by Fisher (1930) suggests that a moderate inflation rate has a positive effect on returns. The theory states that in a perfect economic condition, the asset returns move one-for-one with forecasted inflation over the long-run (Reilly *et al.*, 1971; Boudoukh & Richardson, 1993; Graham, 1996; Choudhry, 2001; Patra & Posshakwale, 2006; Kaliva, 2008;

Oprea, 2014; Zainal, 2014). These studies are in agreement with the notion that common stock is a good potential hedge against inflation. Theoretically, inflation-hedge mechanism offers a protection against inflation risk whereby the increase of the real value in assets must be not less than the loss caused by the increasing price level (Reilly *et al.*, 1971; Anari & Kolari, 2001).

However, some previous studies document a reverse impact of inflation on performance (Nelson, 1976; Bodie 1976; Jaffee & Mandelker 1976; Fama & Schwert, 1977). Ever since these early studies reject the effect of Fisher, a number of attempts to search for the answers have emerged in the literature. From perspective of proxy effect promoted by Fama (1981), the implication of the quantity theory of money and money-demand theory can best explain the existence of inverse relationship between inflation and performance. Fama's proxy effect (1981) hypothesises that an increase in inflation rate would reduce the real economic activity (which reflected in reduction of money demand). Meanwhile a decrease in real economic activity would reduce corporate performance (which reflected in reduction of equity prices).

Apart from that, the relationship between inflation and volatility has long been of interest to researchers. The Fama's (1981) proxy hypothesis maintains that inflation could act as a proxy for economic activities in the market. Higher (lower) inflation rates are associated with greater (less) inflation uncertainty and stock returns variability which could potentially cause greater (less) distortions in the economic activities. As the level of inflation in the economy increases, investors would demand a higher risk premium. Consequently, this would depress investment and output which could likely slow down the economic development and future earnings

(Friedman, 1977; Clark, 1997). These chain impacts have been studied directly or indirectly by many researchers. Further evidences by Huizinga (1993) and Zion, Spiegel and Yagil (1993) show that volatility of inflation has a negative effect on investment as well as production process of the corporate sector. The distortion in forming an optimal investment allocation would lead to stock price decline (Veronesi, 1999), hence, increases the returns variability (Fama & Schwert, 1977; Kearny & Daly, 1998; Engle & Rangel, 2005; Saryal, 2007). On the other hand, Holland (1993) and Fischer (2013) claim an increase in inflation rate leads to an increase in interest rates and economic instability leading a decrease in new projects investment with returns below the discount rates.

Money supply (M2) which is comprised of currency in circulation, demand deposit, time deposit and saving deposit can be considered as one of the most influential macroeconomic policy implemented by the central bank. This monetary policy is frequently implemented by central bank for the purpose of making an adjustment on the real economic activity so as the desired level of economic performance is achieved. Previous studies argue that the changes in real economic activity due to monetary policy have positive impact on stock market (Friedman, 1988; Mukherjee & Naka, 1995; Maysami & Koh, 2000; Ewing, 2001). Their justification for the positive relationship is that a surplus flow of money in the market due to an increase in the aggregate money supply would lead to an increase demand for quoted securities, resulting in higher securities prices. On the other hand, Bodie (1976), Fama (1981), Geske and Roll (1983) and Pearce and Roley (1985) among others, argue that an excessive increase in money supply would lead to a rise in inflation. As a result, discount rate would appreciate and ultimately would lead to a reduction in stock returns.

There are many studies have been conducted to examine the relationship between GDP growth and stock market volatility (Shiller, 1981; Schwert, 1989; Hansen & Jagannathan, 1991; Kim & Nelson, 1999; McConnell & Perez-Quiros, 2000; Campbell, Lettau, Malkiel & Xu, 2001; Stock & Watson, 2002; 2003; Engle & Rangel, 2005; Nguyen, 2007; Eling & Marek, 2011; Kumar & Tamimi, 2011; Zakaria & Shamsuddin, 2012). Some of them claim that stock market volatility is relatively high during years with relatively low GDP growth (Eling & Marek, 2011; Kumar & Tamimi, 2011). Similarly, Engle and Rangel (2005) argue that GDP growth is one of the explanatory variables that cause an increase in unconditional stock market volatility. In contrast, Zakaria and Shamsuddin (2012) find little support on the existence of GDP growth-market volatility. Nguyen (2007) suggests that corporate risk-taking behaviour in domestic oriented industries is more sensitive to GDP growth.

## 2.8 Chapter Summary

Empirical findings from previous literature on the risk-return relationship from both financial and strategic management stream of research are mixed and inconclusive. Some evidence derived from accounting and market based data support the theoretical prediction of a positive risk-return trade-off, but other evidence suggests a strong negative relation. Yet another strand of the literature document no as well as unstable relationships. Mixed and inconclusive results are also documented in terms of the direction of causal risk-return interaction. Due to the inconsistencies in results, this study is executed to crystallize the risk-return relationship from the perspective of Malaysian stock market. Table 2.1, Table 2.2, Table 2.3, Table 2.4 and Table 2.5 summarise the findings from related empirical researches on risk-return relationship, causal interaction between risk and return, empirical evidence on standard risk measures and empirical evidence on downside risk measures respectively.

Table 2.1

*Risk and Return Relationship: Studies by Financial Economics Researchers*

| **Researcher (s)** | **Types of Data** | **Place of Study** | **Major Findings** |
|---|---|---|---|
| Black (1972) | Market-based data | US market | Documented a positive relationship between risk and return. |
| | Market-based data | US market | Documented a positive relationship between risk and return. |
| Blitz and van Vliet (2007) | Market-based data | US, European and Japanese markets | Documented a negative relationship between risk and return. |
| | Market-based data | US market | Documented beta as an important risk factor in periods of declining markets. |
| Choi and Fu (2005) | Market-based data | New Zealand market | Documented the beta-return relationship was significantly positive in the condition of bearish market but negative in the bullish market. |
| Chou *et al.* (2000) | Market-based data | Japanese market | Documented positive relationship between beta and return in the setting of Japan. |
| Clare *et al.* (1998) | Market-based data | UK market | Verify significant positive risk-return relations in the UK settings |
| Fama and French (1992), Ferson and Harvey (1994); Fama and French (1996) | Market-based data | US market | Documented flat or no relationship between stock's betas and actual returns (known as the death of beta) |
| Fisher and Hall (1969); Hurdle (1974) | Accounting-based data | US market | Verify significant positive risk-return relationship for both firm and industry level in the US settings. Support the traditional assumption of risk-averse reaction of rational economic agent. |
| Fletcher (2000) | Market-based data | 18 developed markets | Documented the beta-return relationship was significantly positive in the condition of bear market but negative in the bull market. |

Table 2.1 (Continued)

| Researcher (s) | Types of Data | Place of Study | Major Findings |
|---|---|---|---|
| Harvey (1995); Estrada (2000) | Accounting-based data | 20 Emerging markets; 28 Emerging markets | Revealed flat relationship between stock's betas and actual returns in the emerging markets settings. |
| Hodoshima *et al.* (2000) | Market-based data | Japanese Market | Documented the beta-return relationship was significantly positive in the condition of bear market but negative in the bull market |
| Jagannathan *et al*. (1998) | Market-based data | Japanese Market | Documented flat relationship between stock's betas and actual returns |
| Sanda *et al*. (1999) | Market-based data | Malaysian market | Unveiled insignificant relationship between return and beta in the Malaysia market settings. |
| Sharpe (1964) | Market-based data | US market | Documented a positive relationship between risk and return. |
| Lintner (1965) | Market-based data | US market | Documented a positive relationship between risk and return. |
| Strong and Xu (1997) | Market-based data | UK market | Documented flat relationship between stock's betas and actual returns |
| Tang and Shum (2007) | Market-based data | Korean and Taiwan markets | Documented the beta-return relationship was significantly positive in the condition of bear market but negative in the bull market. |
| Tang and Shum (2006) | Market-based data | Hong Kong market | Revealed significant positive unsystematic risk premium during bear market but no reward for unsystematic risk during bull market. |
| Tang and Shum (2004) | Market-based data | Singaporean market | Documented the beta-return relationship was significantly positive in the condition of bear market but negative in the bull market. |

Table 2.2

*Risk and Return Relationship: Studies by Industrial Organisation Economics and Strategic Management Researchers*

| Researcher (s) | Types of Data | Place of Study | Major Findings |
|---|---|---|---|
| Bowman (1980); Bowman (1982); Bowman (1984); Fiegenbaum and Thomas (1985); Fiegenbaum and Thomas (1986); Fiegenbaum and Thomas (1988); Bromiley (1991); Wiseman and Bromiley (1991); Andersen *et al*. ( 2007) | Accounting-based data | US market | Documented negative relationship between corporate risk and return for all or a group of companies. The evidence that support negative relationship between accounting risk and return is generally grouped under research theme of "Bowman's paradox", to signify Bowman's (1980) first discovery. Promote risk seeking behavior of economic agents. |
| Denrell (2008) | Accounting-based data | US market | Introducing model of adaptive risk preferences<br>A company tends to search for alternative action if its performance falls below aspiration level. Meanwhile, it tends to keep their current actions if things are going relatively well |
| Conrad and Plotkin (1968); Cootner and Holland (1970) | Accounting-based data | US market | Verify significant positive risk-return relationship for both firm and industry level in the US settings. Support the traditional assumption of risk-averse reaction of rational economic agent. |
| Armour and Teece (1978) | Accounting-based data | US market | Documented insignificant negative risk-return relationship in 28 firms from petroleum industry |
| Oviatt and Bauerschmidt (1991) | Accounting-based data | US market | Unveiled flat relationship between the risk and return |
| Li *et al*. (2014) | Accounting-based data | China market | Both performance and past risk-taking have negative influence on corporate risk. |

Table 2.3

*Previous Studies on Causal Interaction between Risk and Return*

| **Researcher (s)** | **Place of Study** | **Major Findings** |
| --- | --- | --- |
| Bowman (1984) | US market | Reported the existence of negative impact of performance on the subsequent risk-taking and no influence of risk-taking on future performance. |
| Bromiley (1991) | US market | Confirmed the findings of Bowman (1984) on the existence of negative influence of performance on the subsequent risk-taking. However, documented that future performance was negatively influenced by prior risk-taking. |
| Miller and Bromiley (1990); Wiseman and Bromiley (1996) | US market | Documented that future performance was negatively influenced by prior risk-taking. |
| Teece *et al.* (1997) | US market | Documented that future performance was positively influenced by prior risk-taking. |
| Miller and Leiblein (1996) and Maurer (2007) | US market and French market respectively | Confirmed the findings of Bowman (1984) on the existence of negative influence of performance on the subsequent risk-taking. However, found positive evidence on influence of prior risk-taking on the future performance. |

Table 2.4:
*Related Empirical Evidence on the Standard Deviation Risk Measures*

| Researcher (s) | Place of study | Major Findings |
|---|---|---|
| Markowitz (1952) | US market | Modern portfolio theory (MPT) quantifies risk as the standard deviation about an asset's expected return. |
| Brief and Owen, 1969 | US-based companies | The concept of standard deviation as a risk measure is easy to understand and easy to be applied. |
| Merton (1973) | US market | |
| Lehmann et al. 1996 | | Standard deviation is an appropriate risk measure if the data has a normal distribution. |
| Evans (2004) | US market | Standard deviation is one of the most popular risk measure amongst investors |
| Altman and Bland (2005) | | the standard deviation is a valid measure of variability regardless of distribution |

Table 2.5:

*Related Empirical Evidence on the Downside Risk Measures*

| Researcher (s) | Place of study | Major Findings |
|---|---|---|
| Ang and Chua (1979) | US market | Strongly proof that the below-target semi-variance is superior to the below-mean semi-variance. |
| Alles (2013) | Asian Markets | |
| Beach (2011) | 23 developed markets & 21 emerging markets | Semi variance and downside beta play important role in explaining return. |
| Estrada (2007) | Emerging and developed market | Downside beta explains almost 50% of the cross-sectional variability of returns for both developed and emerging markets and almost 55% of cross-sectional return variability for emerging markets |
| Estrada (2000) | 28 emerging markets | Below-mean semi deviation presented a more practical measure of risk in emerging markets.<br>By applying below-mean semi deviation as a measure of downside risk at the market level in emerging markets, risk and return were positively and significantly related.<br>Investors were more concerned with the risk of lower return. |
| Estrada (2001); Estrada (2002), Harvey (2000) and Zhang and Wihlborg (2004) | Emerging markets | By applying below-mean semi deviation as a measure of downside risk at the market level in emerging markets, risk and return were positively and significantly related. |
| Estrada (2006) | US market | Measures of downside risk have become increasingly accepted and used by both academia and practitioners.<br>Investors were more concerned with the risk of lower return. |

Table 2.5 (Continued)

| **Researcher (s)** | **Place of study** | **Major Findings** |
|---|---|---|
| Grootveld and Hallerbach (1999) | US market | The popularity of downside risk among investors has expanded. |
| Lee, Phoon and Wong (2006) | Asian markets | Downside risk is more appropriate risk measure and investors are keen to have downside protection. |
| Lee, Reed and Robinson (2008) | Australian market | Downside risk is more consistent with how investors individually perceive risk. |
| Mao (1970) | US market | Investors are more concern about downside loss. |
| Salomons and Grootveld (2003) | Emerging and developed market | Emerging markets experienced greater downside risk than developed market. |
| Shapira (1995) and Miller and Leiblein (1996) | US market | On average managers perceive risk more in terms of downside loss. |
| Swisher and Kasten (2005) | US market | Support the recommendation of downside risk measures due to the superiority of the tools in offering better measurement of investment risk. |
| Tee (2009) | UK market | Downside risk is more consistent with actual behaviour of investors in investment settings. |
| Veld and Veld-Merkoulova (2008) | Dutch market | Even though investors applied more than one risk measure, downside risk measure was the most popular. Most of investors were inclined to employ below-target semi-variance as risk measures. |

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.0 Introduction

This chapter focuses on answering the objectives of this study. It is organized as follows. It begins with an explanation of data sources and sample selection of this study. The second sub-section presents the research framework. The selected variables depicted in the theoretical framework are based on existing theories and empirical studies on the relationship between corporate risk and performance. It also presents the development of hypotheses for this study. The third sub-section explains the research design employed. First, it covers the clarification on panel data structure and the preparation of dataset. Then, it followed by presenting the general models specification and choosing the appropriate statistical estimation approaches. It also includes the specification of specific models to answer all research objectives. The details measurements of variables with their respective source of reference are also included in this sub-section. The last sub-section summarizes the chapter.

## 3.1 Data

This sub-section discusses sources of data and systematic structure for collecting, as well as selecting data so that desired information can be properly obtained.

### 3.1.1 Data Sources

All data for this study are extracted from Datastream. This database is claimed as one of the established providers of accounting data on firms and the market value of equity as well as macroeconomic indicators (Lara, Osma & Albonoz Noguer, 2006).

The purpose of relying on single source of database is to ensure consistency of extracted data. The uniformity of the data is expected to result in unbiased analysis. However, this study acknowledges that there is no perfect database system which guarantees that all the needed data are available. McKnight *et al.* (2007) observe that the chances to totally avoid missing data problems are impossible especially in the context of secondary data. Even though there are many methods for handling missing data, McKnight *et al.* (2007) agree that there is no ideal means. From Raykov and Marcoulides (2008) point of view, there is actually no technique to replace the missing data with any alternative values. In line with their school of thought, this study settles on using whatever data available in hands.

### 3.1.2 Sample Selection

The empirical test of this study is based on a sampling frame of all companies in all non-financial sectors listed on the Main Market of Bursa Malaysia. This study covers an observation period of nine years (2004 to 2012) on panel data basis. The sample data is constructed according to the following sample selection criteria:

a) Only public listed companies are selected due to the accessibility of related information. However, companies categorized under financial sector are excluded from the sample for the reasons that they are highly governed by certain rules and procedures imposed by regulatory bodies such as Bank Negara Malaysia and Ministry of Finance. These companies are also excluded because they are typically highly levered (Rajan & Zingales, 1995), which make them incomparable with non-financial companies. Furthermore, previous studies indicate that both sectors employ different nature of investment strategy (Gugler, Mueller & Yurtoglu, 2003; Norvaisiene, Stankeviciene & Krusinskas, 2008).

b) All non-financial companies that have been listed after year 1999 are included. This first stage of data screening is done in order to meet the requirement for corporate risk calculation based on five years rolling data (e.g. 2000-2004; 2001-2005 up to 2008-2012). The application of this criterion results in a sample of 605 selected companies. Both active (391 companies) and dead (214 companies) companies are considered to avoid survivorship bias.

c) The second stage of data screening is done by excluding companies which delisted before 2004. The elimination is meant for having five year time-series observation for each company. Based on this screening process, the dataset is reduced to 531 companies (388 active companies and 143 dead companies). This final sample represents panel data sets of 4779 firm-year observations for nine years (2004-2012).

### 3.2 Research Framework

The theoretical views and literatures discussed in chapter two motivate the development of corporate risk and performance model for this study. The theoretical framework for relationship between corporate risk and performance is presented in Figure 3.1.

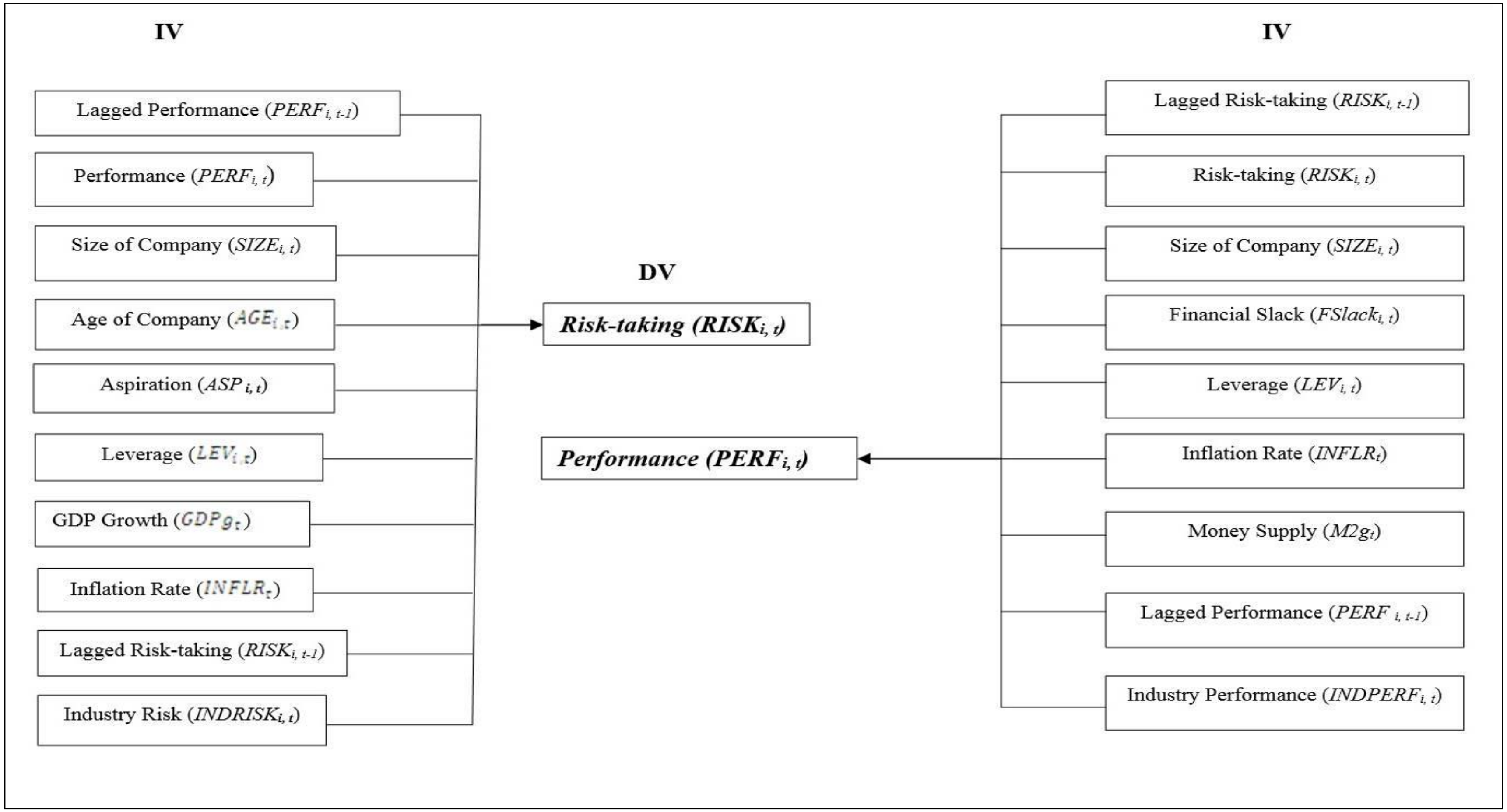


*Figure 3.1*
*Research Framework*

The theoretical framework depicted in Figure 3.1 is the structure used to analyse the effect of corporate risk and other factors on corporate performance and the effect of corporate performance and other factors on corporate risk after controlling for some relevant variables. The motivation of this research is due to unclear bidirectional relationship between corporate risk and corporate performance. The model that is applied in this research is based on an integration of behavioural model of the firm, prospect theory and agency theory. Following these theories and other relevant theoretical concepts, the current model includes seven basic variables: risk, performance, size of company, age of company, aspirations (or target), financial slack, and leverage. Apart from these variables, macro-economic factors specifically inflation rate, the growth of money supply (M2) and the growth of GDP are also incorporated in the research model. In order to integrate industry-wide effect, other external environmental factors such as industry risk and industry performance are included in the model. Lagged dependent variables are added in the models to control for the effect of past behaviour on present behaviour.

This study does not control for the minimal economic impact of USA sub-prime financial crisis (2007-2008) and European sovereign debt crisis (2010-2012) on the Malaysian financial markets in general and stock market in particular. The ability to absorb these external shocks is attributable mainly to the flexibility of Malaysian macroeconomic policies which leads to sound domestic macroeconomic fundamentals, adequacy of financial markets liquidity and resilient structure of banking systems (Zainal Abidin & Rasiah, 2009; Ibrahim, 2010, Samsi *et al.*, 2012).

### 3.2.1 Dependent Variables

The dependent variables used in this study are corporate risk *(RISK)* and corporate performance *(PERF)* as shown in the research framework.

#### 3.2.1.1. Corporate Performance

This study uses both accounting return data and stock market return data as the sources for performance measures. Analysis using accounting-based data presents a historical performance of a company, whereas, analysis using market-based data reflects future performance. Previous studies indicate that both sources of information are not perfect but they have their own quality of performance indicator (Hirschey & Wicherm, 1984; Merchant, 2006). Therefore, the usage of "backward looking" accounting information and "forward looking" market information are expected to complement and serve as imperfect substitute to each other (Das, Hanouna & Sarin, 2009).

Even though there are various accounting-based measures of performance, this study will limit itself to focusing on annual return on equity (ROE) and return on asset (ROA). From the perspective of DuPont identity, ROA is part of ROE. Without financial leverage, ROE is equivalent to ROA. ROA reflects the effectiveness of management team at utilizing company's overall asset base to generate earnings before leverage. Whereas, ROE portrays how well management utilises the mixture of debt and equity to create shareholders' wealth. Due to clarity and simplicity reasons, these measures are well accepted by analysts, financial managers and shareholders (Rappaport, 1986; Camilleri, 2005; Camilleri, 2008; Gaul & Palvia, 2013) and frequently found in the risk-return relationship literature (Nickel & Rodriguez, 2002).

As for market-based measure, a monthly total return index (TRI) is utilised to calculate annual TRI. Comparatively, the TRI is more accurate than price index since this market-based performance measure includes dividends, interest, rights offerings and other distributions realized over a given period of time.

#### 3.2.1.2 Corporate Risk

For decades, there have been continuous discussions about how risk should be defined and measured by financial economist and practitioners in the financial markets. This is because different market players have different perspectives on risk. Hence, they probably adopt different investment strategies in realizing their investment objective. However, the most commonly used definition of risk in corporate finance is the uncertainty of future earnings. The complexity of investors' reactions towards risk and rapid change in the financial markets environment requires further research on the utilization of different proxies for measuring risk. In line with the current research needs, this research applies both standard deviation as an ordinary risk measure and below-mean semi-variance as an alternative way of measuring risk. Both risk measures have distinctive definition and assumptions (Cheng & Wolverton, 2001; Cheng, 2001) and represent different dimensions of risk (Miller & Bromiley, 1990).

Standard deviation of returns is the first formal definition of risk which was introduced by Harry Markowitz in 1952. The introduction of this risk measure is regarded as the foundation of Modern Portfolio Theory (MPT) and denoted as the beginning of quantitative risk management. Since then the application of standard deviation is expounded by Markowitz and his proponents and explained in most of the textbooks in finance. Generally, the extensive exposure of standard deviation concept influences the behaviour of investors in making investment decisions. While the Markowitz's method of measuring risk is sound in theory and relatively straightforward, there is however, an ongoing debate in the financial literature on how the standard deviation is conceptualized as a risk measure. It is undeniable that standard deviation is qualified as an appropriate risk measure if its assumptions are fulfilled. However many opponents argue that none of the fundamental assumptions about markets and investor instilled in MPT are realistic in the actual world of investment (Grootveld & Hallerbach, 1999; Estrada, 2003; Lee *et al*., 2006; Veld & Veld-Merkoulova, 2007).

A number of studies have demonstrated that investment returns are not normally distributed (Fama & Roll, 1968; Jansen & de Vries, 1991). This scenario is especially true in emerging markets (Harvey, 1995a, 1995b; Susmel, 2001; Stevenson, 2001; Hwang & Pederson, 2002; Pavabutr, 2003). Furthermore, the method of standard deviation assesses risk by combining downside and upside volatility in one measure is not reasonable. This method shows that it only measures the average deviation from the mean. Thus, it fails to capture the extreme risks in the tails of the distribution. Apart from that, behaviourists always argue that investors often act in irrational ways in making investment decisions (Bodie, Kane & Marcus, 2007). Their inclination to be irrational investors is subjected to cognitive bias and is influenced by their emotions (Campbell & Sharpe, 2007). Moreover, their preference towards risk is also influenced by their age and wealth (Riddles, 2001). Thus, they might have a tendency to become a risk-averse at one time or become indifference in taking risk or otherwise love to take risk in another time and the variations in their risk tolerance are depending on the changes of their goals in making an investment plan (Bodie *et al.*, 2007). The presence of irrational investors who have various preferences towards risk contributes to inefficient markets. These scenarios are absolutely opposite to the proposition which has been instilled in MPT.

Due to the deficiencies of the assumptions applied, the capacity of standard deviation as an outstanding risk measurement is doubtful. Failure to account for risk effectively will undeniably lead to inappropriate investment decisions. Since a considerable number of study, to name a few, Harvey (1995), Susmel (2001), Stevenson (2001), Hwang and Pederson (2002) and Pavabutr (2003) document that emerging market returns are not normally distributed, this study also considers below-mean semi-deviation as a downside risk measure. The universal concept about downside risk is that the left-hand side of a return distribution involves risk while the right-hand side contains better investment opportunities. The application of this risk measure is in line with Moa's (1970) findings wherein investors are more concerned about the probability of return being lower than a target rate of return. There are several measures of downside risk proposed in the literature. For the purpose of this study, below-mean semi-deviation which is also known as below means risk measure is employed because it offers a more practical measure of capturing risk in emerging markets (Estrada, 2000).

### 3.2.2 Dependent Variable and Hypotheses Development

Since this study analyses the causal relationship between corporate risk-taking and performance, both variables appear as dependent variables in one equation and treated as independent variables in another equation. The investigation of the risk and return relationship based on contemporaneous year is commonly discussed in financial economics literature by the proponents of CAPM theory (Lintner, 1965; Black, 1972; Black *et al*., 1972; Fama & MacBeth,1973; Kothari *et al*., 1995; Clare *et al*., 1998; Chou *et al*., 2000) and the proponents of the death of beta (Ferson & Harvey, 1994; Fama & French, 1996; Jagannathan *et al*., 1998; Vos & Smith, 2003; Blitz *et al*., 2013).

Meanwhile the dynamic influence of prior risk-taking (prior performance) on subsequent performance (subsequent risk-taking) are commonly covered in the strategic management literature. Founded on behavioural theory of the firm (BToF) and the prospect theory, scholars argue that the inclusion of lag structure for corporate risk-taking as a regressor is important in order to correctly timing the delayed effects of causal risk-return relationship. It is expected that allowing for the lag structure can effectively capture the gradual causal interaction between risk and return within different window period of investigation. The proponents of behavioural theory of the firm (BToF) and the prospect theory support the existence of negative impact of performance on the subsequent risk-taking (Bowman, 1984; Bromiley, 1991a; Miller and Leiblein, 1996; Coval & Shumway, 2005; Maurer, 2008). They claim that poor performers are more likely than high performers to engage in risky projects. On the other hand, the proponents of house-money effect maintain the existence of positive impact of performance on the subsequent risk-taking (Massa & Simonov, 2005; Ackert *et al*., 2006; Frino *et al*., 2008). They suggest that market participants have the tendency to pursue (avoid) risky investments after experiencing gains (losses).

Routed from previous studies, it is hypothesised that:

***H1a:*** *Prior risk-taking* ($RISK_{i,t-1}$) *has an influence on subsequent performance* ($PERF_{i,t}$).

***H1b:*** *Prior performance* ($PERF_{i,t-1}$) *has an influence on risk-taking* ($RISK_{i,t}$).

The investigation of the risk-return relationship based on contemporaneous year is commonly discussed in previous literature either from the perspective of financial economics, industrial organization economics or strategic management (Hurdle, 1974; Bettis & Hall, 1982; Oviatt and Bauerschmidt, 1991; Whitelaw, 1994; Ang, Chen, *et al.* 2006; Bollerslev and Zhou, 2006; Banerjee , Doran & Peterson, 2007). However these researches provide inconclusive results on the impact of contemporaneous risk on contemporaneous performance. Oviatt and Bauerschmidt (1991) and Bollerslev and Zhou (2006) document an insignificant relationship. Hurdle (1974) reports significant positive relationship whereas Bettis and Hall (1982), Whitelaw (1994), Ang, Chen, *et al.* (2006) and Banerjee *et al.* (2007) find a negative relationship. Meanwhile the proponents of Bowman's (1980) paradox argue that contemporaneous performance has a negative impact of corporate risk taking (Falkenstein, 2012; Li, Yang & Zhang, 2014; Varghese, 2014). According to Brandt and Kang (2004), the negative (positive) impact is emerges when the conditional (unconditional) correlation between average performance and its volatility is tested. Therefore, it is hypothesised that:

***H2a:*** *Contemporaneous risk-taking* ($RISK_{i,t}$) *has an influence on contemporaneous performance* ($PERF_{i,t}$).

***H2b:*** *Contemporaneous performance* ($PERF_{i,t}$) *has an influence on Contemporaneous risk-taking* ($RISK_{i,t}$).

Table 3.1 and 3.2 summarise the impact of independent variables on dependent variables. The tables also highlight theories and common assumptions related to the variables.

### 3.2.3 Independent Variable Measures and Hypotheses Development

This section discusses the independent variables which include several organisational and macroeconomic factors. Company size, company age, company's aspirations, and leverage are categorised as organisational factors while annual inflation rate and money supply (M2) are the identified macroeconomic factors. Additionally, this sub-section also discusses hypotheses development based on the previous empirical studies as well as related theories.

#### 3.2.3.1 Company Size

Size of a company is measured by using natural logarithm of total assets (Faccio *et al.*, 2001; Beck *et al.*, 2005; Muritala, 2012; Kipesha, 2013) as well as natural logarithm of market capitalisation (Banz, 1981; Reinganum, 1981; Fama &French, 1992; De Moor & Sercu, 2007; Amel-Zadeh, 2011). Based on previous literature, it can be concluded that there is no conclusive findings on the impact of company size on corporate risk-taking and performance. Proponents of size effect phenomenon uphold a negative relationship between company size and risk-taking behaviour (Stekler, 1964; Samuels & Smyth, 1968; Banz, 1981; Reinganum, 1981; Fama & French, 1992; De Moor & Sercu, 2007; Amel-Zadeh, 2011). The size effect is in line with assumptions related to risk-return relationship upheld in behavioural theory of the firm (Cyert & March, 1963). Since on average small companies are riskier than large ones, small companies are rewarded with high returns (Banz, 1981;

Table 3.1

*Previous Studies on the Impact of Risk-taking Behavior and Other Factors on Performance and Related Theories*

| Variables | Theories/Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $RISK_{i,t}$ | CAPM<br>***Positive influence of risk on return***<br>Behavioral Theory of the Firm (BToF) and Prospect theory (PT)<br>***Negative influence of risk on return*** | **Insignificant** (Armour & Teece, 1978; Oviatt & Bauerschmidt, 1991; Fama & French, 1992; Strong & Xu, 1997; Ferson & Harvey, 1994; Jaganathan *et al.*, 1998; Bollerslev & Zhou, 2006)<br>**Positive** (Conrad & Plotkin, 1968; Fisher & Hall, 1969; Cootner & Holland, 1970; Hurdle, 1974; Bobel & Haid, 1979; Clare *et al.*, 1998; Chou *et al.,* 2000)<br>**Negative** (Bowman, 1980; Bettis & Hall,1982, Whitelaw, 1994; Ang, Hodrick, Xing & Zhang, 2006; Banerjee, Doran & Peterson,, 2007; Blitz & Van Vliet, 2007) |
| $RISK_{i,t-1}$ | Behavioral Theory of the Firm (BToF)<br>Prospect theory (PT)<br>***Negative influence of risk on return*** | **No relationship** (Bowman, 1984)<br>**Negative** (Miller & Bromiley, 1990; Bromiley, 1991; Wiseman & Bromiley, 1996)<br>**Positive** (Miller & Leiblein, 1996; Maurer, 2007) |
| $PERF_{i,t-1}$ | Performance Persistence<br>***Past performance reflects future performance*** | **Positive** in both turbulent and growth period (Deephouse and Wiseman, 2000) |
| $SIZE_{i,t}$ | Size effect<br>***Negative relationship between size and return*** | **Negative** (Banz, 1981; Reinganum, 1981; Roll, 1981; Merton, 1987; Chan & Chen, 1988; Chan & Chen, 1991; Fama & French, 1992; Berk, 1995; Berk, 1997; Perez-Quiros & Timmermann, 2000; Liu, 2006; Clubb & Naffi, 2007; De Moor & Sercu, 2007; Zhang, 2006; Amel-Zadeh, 2011)<br>**Positive** (Chang & Thomas, 1989; Mukherji, Dhatt & Kim, 1997; Dimson & Marsh, 1999; Horowitz, Loughran & Savin, 2000; Dimson, Marsh & Staunton, 2002; Schwert, 2003; Mohd Ali, 2006)<br>**No relationship** (Berk, 1996)<br>**No consistent relationship** (Amihud, 2002; Horowitz, Loughran & Savin, 2000) |

Table 3.1 (Continued)

| Variables | Theories/Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $LEV_{i,t}$ | Capital Structure: Irrelevance Theory<br>***Capital structure has no influence on firm's value***<br>Agency Theory (Free Cash Flow Hypothesis):<br>***Positive relationship between leverage and return***<br>Pecking Order Theory<br>***Negative relationship between leverage and return*** | **No relation** (Modigliani & Miller, 1958)<br>**Positive** (Heinkel, 1982; Jensen, 1986; Harris & Raviv, 1991; Champion, 1999; Campello, 2006; Berger & Bonaccorsi di Patti, 2006; Franck *et al*., 2010)<br>**Negative** (Amit & Livnat, 1988; Agrawal & Knoeber, 1996; George & Hwang, 2007; Kapopoulos & Lazaretou, 2007; Penman, Richardson & Tuna, 2007; Cai & Zhang, 2011) |
| $FSlack_{i,t-1}$ | Behavioral Theory of the Firm (BToF):<br>***Slack is positively related to performance of a company***<br>***Current Ratio has positive effects on return***<br>Agency Theory<br>***Slack is negatively related to performance of a company*** | **Positive (**Singh, 1986; Hamberick & D'Aaveni, 1988; Zhong et al., 2009; Zhong, 2013; Lee, 2011; Harrison & Coombs, 2012**)**<br>**Negative** (Jensen & Meckling, 1976; Fama, 1980; Jensen, 1986; Davis & Stout, 1992; Phan & Hill, 1995; Steensma & Corley, 2000).<br>**Positive within a specified range of performance , but negative beyond a specified range of performance** (Bourgeois, 1981) |
| $INDPERF_t$ | Industry Effect<br>***There is a relationship between industry performance and corporate performance*** | **Positive** (Bromiley, 1991)<br>**Positive** in the growth period (Deephouse and Wiseman, 2000) |

Table 3.1 (Continued)

| Variables | Theories/Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $INFLR_t$ | Fisher's Effect Hypothesis<br>***Inflation has a positive effect on returns*** | **Positive** (Chen *et al.*, 1986; McElroy & Burmeister, 1988; Young *et al.*, 1991; Boudoukh & Richardson,1993; Graham, 1996; Choudhry, 2001; Spyrou, 2004; Patra & Posshakwale, 2006; Kaliva, 2008; Oprea, 2014; Zainal, 2014)<br>**Negative** (Bodie,1976; Jaffe & Mandelker,1976; Fama & Schwert, 1977; Fama, 1981; Schwert,1981; Geske & Roll, 1983; Gultekin, 1983; Pearce & Roley, 1985; Ferson & Harvey, 1991; Bottazzi & Corradi, 1991; Balduzzi & Robotti, 2001; Chopin & Zhong, 2001) |
| $M2g_t$ | Financial Economic Theory<br>***There is a relationship between M2 and performance*** | **Positive** (Friedman, 1988; Mukherjee & Naka, 1995; Maysami & Koh, 2000; Ewing, 2001)<br>**Negative** (Bodie, 1976; Fama, 1981; Geske & Roll, 1983; Pearce & Roley, 1985) |

Table 3.2

*Previous Studies on the Impact of Performance and Other Factors on Risk-taking Behavior and Related Theories*

| Variables | Theories / Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $PERF_{i,t}$ | Bowman's Paradox<br>***Negative influence of return on risk*** | **Negative** (Bowman, 1980; Falkenstein, 2012; Li, Yang & Zhang, 2014; Varghese & Chattopadhyay, 2014)<br>**Conditional correlation between average return and volatility is negative** (Brandt & Kang, 2004)<br>**Unconditional correlation between average return and volatility is positive** (Brandt & Kang, 2004) |
| $PERF_{i,t-1}$ | Behavioral Theory of the Firm (BToF)<br>Prospect Theory<br>***Poor performers are more likely than high performers to engage in risky projects (Negative influence of return on future risk)***<br>House-money Effect and BAM<br>***Positive influence of return on future risk***<br>***Framing effect*** | **Negative** (Kahneman & Tversky, 1979; Bowman, 1984; Bromiley, 1991; Miller and Leiblein, 1996; Coval & Shumway, 2005; Maurer, 2007)<br>**Positive** (Thaler & Johnson, 1990; Massa & Simonov, 2005; Ackert *et al.*, 2006; Frino *et al.*, 2008) |
| $RISK_{i,t-1}$ | BToF and Prospect theory (PT)<br>***Negative relationship between prior risk-taking and future risk-taking*** | **Positive** (Bromiley, 1991)<br>**Positive** in both turbulent and growth period (Deephouse & Wiseman, 2000)<br>**Negative**; past risk-taking behaviour is a better predictor than past performance of future risk-taking behaviour (Daniel & Wermers, 2000; ; Li, Yang & Zhang, 2014) |

Table 3.2 (Continued)

| Variables | Theories / Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $SIZE_{i,t}$ | Size Effect<br>***Negative relationship between size and risk*** | **Positive** (Balabanis & Katiskea, 2003; Audia & Greve, 2006; Baghat, Bolton & Lu, 2012; Tuan, Lee & Ismail, 2013).<br>**Negative** (Stekler, 1964; Samuels & Smyth, 1968; Banz, 1981; Reinganum, 1981; Fama & French, 1992; Dhawan, 2001;<br>De Moor & Sercu, 2007; Amel-Zadeh, 2011) |
| $LEV_{i,t}$ | Agency Theory and Leverage Effect<br>***Leverage and risk are positively related*** | **Positive** (Black, 1976; Ross, 1977; Stiglitz & Weiss, 1981; Christie, 1982; Jensen, 1986; Mikkelson, Partch & Shah, 1997; Wiseman & Catanach, 1997;<br>Markman, Balkin & Schjoedt, 2001; Bitar, 2004)<br>**Negative** (Myers, 1977; Balakrisnan & Fox, 1993; Cai & Zhang, 2011) |
| $INDRISK_{t}$ | Industry Effect<br>***There is a relationship between industry risk and corporate risk-taking behaviour*** | **Positive** in the turbulent period (Deephouse and Wiseman, 2000) |
| $INFLR_{t}$ | Fisher's Effect Hypothesis<br>***Inflation and risk are positively related*** | **Positive** (Friedman, 1977; Schwert, 1981; Chen, Roll & Ross, 1986; Clark, 1997)<br>**Negative** (Huizinga, 1993; Zion, Spiegel & Yagil,1993) |
| $AGE_{i,t}$ | Learning Process Model<br>***Negative relationship between company age and risk-taking*** | **Negative** (Jovanovic, 1982; Balabanis & Katiskea, 2003; Sathe, 2003; Zahra, 2005; Leko-Simic & Horvat, 2006;<br>Cormier, Ledoux & Magnan, 2011)<br>**Positive** (Walls & Dyer, 1996; Zahra *et al.*, 1999; Zahra & George, 2002) |

Table 3.2 (Continued)

| Variables | Theories / Common Assumptions | Relationship Sign Based on Previous Studies |
|---|---|---|
| $ASP_{i,t}$ | Behavioral Theory of the Firm (BToF) | **Risk-averse behaviour among performing companies** (Cyert & March, 1963; Kahneman & Tversky, 1979; Bromiley et al., 2001; Nickel & Rodriquez, 2002) |
| | Prospect theory (PT)<br>***Risk- averse when performance is above an aspiration level and Risk-seeking when performance is below an aspiration level.*** | **Risk-seeking behaviour among underperforming companies** (Cyert & March, 1963; Kahneman & Tversky, 1979)<br>**Risk-averse behaviour among underperforming companies** (Staw, Sandelands & Dutton, 1981; Lopes, 1987; March & Shapira, 1987; Wiseman & Bromiley, 1991; Sitkin and Pablo, 1992; McNamara & Bromiley, 1997; Lant & Hurley, 1999; Audia & Greve, 2006; Lin, You & Huang, 2012) |
| | Threat-Rigidity Hypothesis<br>***Risk-averse when performance is below an aspiration level.*** | |
| $GDPg_t$ | Financial Economic Theory | **Positive** (Engle & Range, 2005) |
| | ***GDP and risk are negatively related*** | **Negative** (Eling & Marek, 2011; Kumar & Tamimi, 2011) |

Reinganum, 1981; Fama & French, 1992; De Moor & Sercu, 2007; Amel-Zadeh, 2011) On the other hand, findings from other studies (see for example, Chang & Thomas; 1989; Mukherji *et al.*, 1997; Dimson & Marsh, 1999; Horowitz *et al.*, 2000; Abbrose & Linneman, 2001; Dimson *et al.*, 2002; Kim & Burnie, 2002; Schwert, 2003; Audia & Greve, 2006; Mohd Ali, 2006; Baghat, *et al.*, 2015) are not in agreement with the contention related to the size effect.

Drawing from the above literature, it can be concluded that the influence of company size on risk-taking behaviour as well as on performance could be hypothesised as follows:

***H3a:*** *Performance ($PERF_{i,t}$) has a relationship with company size ($SIZE_{i,t}$).*

***H3b:*** *Risk-taking behaviour ($RISK_{i,t}$) has a relationship with company size ($SIZE_{i,t}$).*

#### 3.2.3.2 Age of the Company

Age of a company refers to the number of years the company has been listed. Previous literature report that a company age reflects its experience (Jovanovic, 1982; Page 1984; Getz, 1997), reputation (Diamond, 1989; Horner, 2002), flexibility towards changes (Barron *et al.*, 1994; Baum, 1996), capacity to grow (Evans, 1987; Huergo & Jaumandreu, 2004) and survival (Audretsch & Thurik, 2000). These features are found to be important in influencing corporate risk-taking behaviour. However, previous studies have not offered a conclusive relationship between age of a company and risk-taking behaviour. From one perspective, in spite of facing greater business uncertainty (Arrow, 1962; Alti, 2003) and less capital (Berger & Udell, 1998), younger firm is eager to enhance its growth (Dunne & Hughes, 1994; Glancey, 1998; Huergo & Jaumandreu, 2004) by aggressively pursuing innovative projects

(Kleinknecht, 1996; Muller & Zimmermann, 2009; Bartram *et al.*, 2012). Another point of view maintain that older and established company has the courage to engage in innovative and riskier projects as it has the ability to integrate all the positive qualities of being older in the market (Walls & Dyer, 1996; Zahra *et al.*, 1999; Zahra & George, 2002). On the other hand, it is also expected that as a company become more established, it will become more comfortable within its level of achievement. Hence, it is more inclined not to overly expose to risky activities (Balabanis & Katiskea, 2003; Sathe, 2003; Leko-Simic & Horvat, 2006).

Drawing on ideas from the above statements, the following hypothesis is postulated:

***H4:*** *Company age ($AGE_{i,t}$) has a relationship with risk ($RISK_{i,t}$).*

#### 3.2.3.3 Aspirations Level

An aspiration level is used as a benchmark or target in the evaluation process. Reference-based model (Cyert & March, 1963; Kahneman & Tversky, 1979) predicts that decision makers are prone to avoid taking risky projects when their performance is above an aspiration level and tend to pursue risky projects when performance is below an aspiration level. Most of the studies which uphold this theoretical standpoint are in agreement with the risk-averse behaviour amongst high-performers (Bromiley, *et al*., 2001; Nickel & Rodriquez, 2002). However, there are studies (Staw *et al.*, 1981; Lopes, 1987; March & Shapira, 1987; Wiseman & Bromiley, 1991; Sitkin and Pablo, 1992; McNamara & Bromiley, 1997; Lant & Hurley, 1999; Audia & Greve, 2006; Lin *et al*., 2012) that provide evidence of risk-aversion behaviour when performance is below the aspiration level. The argument on this evidence is postulated in threat-rigidity hypothesis which originally promoted by Staw *et al.*

(1981). This incompatible prediction is highlighted by Audia and Greve (2006) and Lin *et al*. (2012).

Based on the inconclusive literature discussed above, it is hypothesised that:

***H5:*** *Aspiration level ($ASP_{i,t}$) has an influence on risk-taking behaviour ($RISK_{i,t}$).*

#### 3.2.3.4 Financial Slack

Drawing on different theoretical perspectives, previous studies on financial slack-performance relationship have reported inconclusive results (Daniel *et al*., 2004). According to behavioural theory of the firm, slack is positively related to performance of a company. The common argument is that, organisational decision makers have an incentive to efficiently use the financial slack as a useful tool to facilitate the rapid change of economic environment. Their proactive behaviour ultimately will lead to performance improvement. This argument is further supported by many researchers (see for example; Singh, 1986; Hamberick & D'Aaveni, 1988; Lee, 2011; Harrison & Coombs, 2012). In contrast, proponents of agency theory uphold a negative financial slack-performance relationship (Jensen & Meckling, 1976; Fama, 1980; Jensen, 1986). This theory views financial slack as unnecessary costs to company. Due to the existence of opportunist decision makers and the absence of an appropriate monitoring mechanism, financial slack can be easily manipulated for the best interest of the decision makers. This irresponsible behaviour will ultimately jeopardise the performance of a company. Among other researches that are in agreement with a negative financial slack-performance relationship are Davis and Stout (1992), Phan and Hill (1995), and Steensma and Corley (2000). Besides the two contrasting views, Bourgeois (1981) acknowledge both competing perspectives.

Following Latham and Braun (2008), Harrison and Coombs (2012) and Lewis (2013), this research will only consider available slack which is measured by current ratio. This form of slacks is widely accepted in the literature due to its convenience and objectivity (Bromiley, 1991a; Cheng & Kesner, 1997; Greve, 2003; Chiu & Liaw, 2009; Harrison & Coombs, 2012) in measuring a company's ability to take strategic actions in a dynamic environment (Latham & Braun, 2008) and its plausible association with organisational adaptiveness (Nohria & Gulati, 1991).

Based on competing hypotheses drawn by behavioural theory of the firm and agency theory, it is hypothesised that:

***H6:*** *There is a relationship between financial slacks ($FSlack_{i,t}$) and performance ($PERF_{i,t}$).*

#### 3.2.3.5 Leverage

The literature on the influence of leverage on corporate risk-taking behaviour and performance has produced a mixed result. From the perspective of agency theory, some literature argues that, imposing high leverage would encourage corporate decision makers to invest in riskier projects which promise larger returns (Black, 1976; Stiglitz & Weiss, 1981; Mikkelson, Partch & Shah, 1997; Wiseman & Catanach, 1997; Markman, Balkin & Schjoedt, 2001; Bitar, 2004). This contention is in line with Jensen's (1986) free cash flow hypothesis. Jensen (1986) hypothesized that leverage can reduce the company's free cash flow problem. Leverage could induce disciplining and monitoring on self-centered managers and ultimately can lead to an increase in shareholders' wealth (Jensen, 1986; Harris & Raviv, 1991). A number of papers support the positive relationship between leverage and performance, to name a few, Campello (2006), Berger and Bonaccorsi di Patti (2006), and Franck *et al.* (2010). However, another strand of studies report that high leverage leads to decreasing in managerial risk-taking behaviour (Balakrisnan & Fox, 1993; Cai & Zhang, 2011). In this regard, from the perspective of pecking order theory, many studies argue that high leverage is associated with decrease in corporate performance (Amit & Livnat, 1988; Penman *et al.*, 1992; Agrawal & Knoeber, 1996; Fama & French, 2002; Nissim & Penman, 2003; George & Hwang, 2007; Kapopoulos & Lazaretou, 2007; Penman *et al.*, 2007; Acheampong *et al.*, 2014).

Since previous literature provides debatable results on the impact of leverage on risk as well as on performance, it is hypothesised that:

***H7a:*** *There is a relationship between leverage ($LEV_{i,t}$) and performance ($PERF_{i,t}$).*

***H7b:*** *There is a relationship between leverage ($LEV_{i,t}$) and risk ($RISK_{i,t}$).*

**3.2.3.6 Inflation Rate**

Chen *et al.* (1986), McElroy and Burmeister (1988) and Young *et al.* (1991) document that expected inflation rate is an important variable of the stock market. Fisher’s effect proposes that inflation has a positive effect on returns. Supporting evidences on Fisher’s effect are documented in Boudoukh and Richardson (1993), Graham (1996), Choudhry (2001), Patra and Posshakwale (2006), Kaliva (2008) Oprea (2014) and Zainal (2014). However, Bodie (1976), Jaffe and Mandelker (1976), Fama and Schwert (1977), Fama (1981), Schwert (1981), Geske and Roll (1983), Gultekin (1983), Pearce and Roley (1985), Ferson and Harvey (1991), Bottazzi and Corradi (1991), Balduzzi and Robotti (2001) and Chopin and Zhong (2001) document a negative impact of inflation on aggregate stock returns. One of the theories which could explain the reverse Fisher's effect is known as Fama's (1981) proxy hypothesis.

Apart from that, the relationship between inflation and volatility of corporate performance has long been of interest to researchers. Even though several studies show that inflation has weak impact on the volatility of stock market performance (Kaul, 1987; Schwert, 1989; Davis & Kutan; 2003), other researchers document a strong predictive power of inflation on stock market volatility (Holland, 1993; Engle & Rangel, 2005; Saryal, 2007; Fischer, 2013). A significant reverse impact of inflation on volatility of performance is documented in Holland (1993) and Fischer (2013). While other previous studies reveal positive relationship between the two variables (Fama & Schwert, 1977; Kearny & Daly, 1998; Engle & Rangel, 2005; Saryal, 2007).

Rooted from the above literature, the following hypotheses are postulated:

***H9a:*** *There is a relationship between inflation ($INFLR_t$) and performance ($PERF_{i,t}$).*

***H9b:*** *Inflation ($INFLR_t$) has an influence on risk-taking ($RISK_{i,t}$).*

#### 3.2.3.7 Money Supply

In light of monetary policy, many studies have found significant impact on returns as well as risk in the equity market. By examining the relationship between monetary policy and the stock market, Bilson *et al.* (2001) and Ewing (2001) find that monetary variables were significant predictors of stock returns. This is consistent with the findings of Friedman (1988), Mukherjee and Naka (1995) and Maysami and Koh (2000) who discover the existence of a significant positive relationship between money supply and stock prices. Among other explanation for this positive relationship is that, availability of excess liquidity due to an increase in the aggregate money supply would lead to an increase demand for quoted securities, resulting in higher securities prices. In contrast to the positive relationship, Bodie (1976), Fama (1981), Geske and Roll (1983) and Pearce and Roley (1985) argue that money supply is negatively related to stock returns. Excessive growth in money supply would lead to a rise in inflation. Hence, discount rate may increase and ultimately, this economic phenomenon would reduce the stock prices.

Therefore, the next hypothesis would be:

***H10:*** *There is a relationship between the growth of money supply ($M2g_t$) and performance ($PERF_{i,t}$).*

#### 3.2.3.8 GDP Growth

Other than inflation and money supply, financial economic theory suggested that volatility of real activity (proxied by GDP) is also related to stock market volatility (Shiller, 1981; Schwert, 1989; Hansen & Jagannathan, 1991; Kim & Nelson, 1999; McConnell & Perez-Quiros, 2000; Campbell *et al.*, 2001; Stock & Watson, 2002; 2003; Nguyen, 2007; Campbell, Premachandra, Bhabra, Tang & Watson, 2008; Eling & Marek, 2011; Kumar & Tamimi, 2011). Based on data from 35 United Kingdom and German insurance companies from the year 1997 to 2010, Eling and Marek (2011) report a strong negative effect of real activity on stock return's volatility. The negative relationship is also observed in Indian stock market for the period from 1996 through 2007 (Kumar & Tamimi, 2011). However, Engle and Range (2005) document a positive relationship between real activity and stock market volatility. Within the same research interest, Nguyen (2007) claims that corporate risk-taking behaviour in domestic oriented industries is more sensitive to GDP growth.

Therefore, the next hypothesis would be:

***H11:*** *GDP growth (*$GDPg_t$*) has an influence on risk-taking behaviour (*$RISK_{i,t}$*).*

### 3.2.4 Control Variable

For the purpose of controlling firm-level effects as well as industry-wide effects, lagged dependent variables (i.e. $RISK_{t-1}$ and $PERF_{t-1}$) and contemporaneous industry risk ($INDRISK_{i,t}$) and contemporaneous industry performance ($INDPERF_{i,t}$) are integrated into the risk-return models. Previous studies suggest that even though these variables are not specifically considered in any related theory, empirically they have an impact on risk and return relationship (Bowman, 1980; Schmalensee, 1985; Rumelt, 1991; Miller & Leiblein, 1996; Wiseman & Bromiley 1996); Deephouse & Wiseman; 2000; Banko, Conover & Jensen, 2006; Lin, 2011).

## 3.3 Research Design

This sub-section begins with explaining data structure and follows by choosing the appropriate statistical estimation approach for accounting as well as market-based data. In addition, it provides information on model specification and methods to answer all research objectives.

### 3.3.1 Data Structure

This study deals with panel data structure. The application of this multi-dimensional data set offers several advantages over conventional cross-sectional data sets

(Blundell & Bond, 1998; Hsiao, 2007). By pooling a set of repeated time-series observations (*T*) on multiple entities, i.e. companies (*N*), more number of total observations (*NT*) can be captured. A huge number of informative data points can promote more degrees of freedom, reduce multi-collinearity among continuous independent variables and consequently, enhancing the precision of econometric estimates. The above mentioned qualities allow the dynamic nature of bidirectional relationship between risk and return to be effectively analysed.

The panel dataset is created using MS-Excel 2007. The preparation of dataset starts with storing the ready-used data and raw data related to the selected variables into Excel spreadsheets. The calculation of standard deviation as well as below-mean semi-deviation based on five-year rolling period was performed using this software. Outliers are screened and adjusted using 3-sigma method. This winsorization process is applied in order to avoid data losses. Once the panel dataset is completely ready, it is transferred into econometric software (Stata) version 12.0 where analysis for this research is applied using multiple regression equation. Multicollinearity test between independent variables using the pairwise Pearson's correlation is applied to all models. Apart from that, variance inflation factor (VIF) is applied to confirm the existence of no serious multicollinearity problem between independent variables.

### 3.3.2 Basic Model Specification and Statistical Method

In this research, the determinants of organisational risk-taking and their impacts on the performance of corporations are modelled based on simultaneous system. This is because a number of past studies claim that risk and return are possibly mutually influenced (Bettis, 1981; Bettis and Hall, 1982; Bowman, 1984; March and Shapira, 1987; Oviatt and Bauerschmidt, 1991). The inclusion of lagged dependent variable as part of the set of regressors in model specifications is considered as the relationship is dynamic relationship in nature. These approaches could offer a clear bidirectional relationship between risk and performance. The relationship is presented in the following two general dynamic empirical models specification while the definitions and measurements for all variables used in the models are presented in Table 3.3.

**General Model A**

$$PERF_{i,t} = \alpha_0 + \alpha_1 RISK_{i,t-1} + \alpha_2 RISK_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERF_{i,t-1} + \alpha_9 INDPERF_{i,t} + e_{i,t} \quad (3.1)$$

**General Model B**

$$RISK_{i,t} = \alpha_0 + \alpha_1 PERF_{i,t-1} + \propto_2 PERF_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASP_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISK_{i,t-1} + \alpha_{910} INDRISK_{i,t} + e_{i,t} \quad (3.2)$$

Where, i = 1,…, *N* represents the company and t = 1,…, *T* represents the time period. The dual-function variable $PERF_{i,t}$ and $RISK_{i,t}$ are company *i*'s performance and risk-taking in year *t* respectively. The company-specific variables $SIZE_{i,t}$ refers to company *i*'s size in year *t*, $FSlack_{i,t}$ is financial slack for the company *i* in year *t*, $LEV_{i,t}$ is company *i*'s debt-to-equity ratio in year *t*, $AGE_{i,t}$ is the age of company *i* in year *t*, and $ASP_{i,t}$ is the minimum performance benchmark targeted by company *i* in year *t*. The macroeconomic conditions $INFLR_t$ denotes the inflation rate in year *t*, $M2g_t$ is the growth of a broader definition of annual money supply in year *t*, and $GDPg_t$ refers to annual GDP growth in year *t*. The industry variables $INDPERF_{i,t}$ and $INDRISK_{i,t}$ are the respective average performance and risks of all companies in the same industry as the sampled company. Time dummies are included in the specification (where appropriate) and some of the variables are transformed into logarithms. It is assumed that the error terms $e_{i,t}$ in equation (3.1) and (3.2) follow a one-way error component model:

$$e_{i,t} = \lambda_i + \nu_{i,t} \tag{3.3}$$

Where $\lambda_i \sim iid\ (0,\sigma^2_\lambda)$ represents the specific effects and $\boldsymbol{\nu}_{it} \sim iid\ (0,\sigma^2_\nu)$ is the error term. They are independent of each other and among themselves.

In order to deal with the dynamic nature of risk-return relationship, the dynamic panel estimation is carried out using generalized method of moments (GMM) estimator. The application of this dynamic panel estimator is preferable due to several reasons. Among others, allowing for lagged dependent variable and unobserved individual-specific effects (the lamda) in the specification may contribute to capturing consistent and unbiased estimates of other parameters, thus leads to more influential model (Lucey & Zhang, 2011). The GMM estimator is claimed as robust in the class of all estimators since this estimation method does not require unnecessary assumptions. For example, there is no requirement for this estimation method to have complete information of the exact distribution of data generating process and the error terms. In developing the GMM estimation, it is commonly assumed that the error terms in the model are uncorrelated with a set of explanatory variables (Anderson & Hsiao, 1981; Arellano & Bond, 1991; Blundell & Bond, 1998). This econometric method efficiently selects the estimator of parameters so that the correlations between error terms and explanatory variables are nearly close to zero.

Table 3.3

*Definitions, Measurements and References for All Variables*

| Variables | Definitions | Measurements | References |
|---|---|---|---|
| PERF | Performance of company *i* as measured by:<br>i) accounting-based measures: Return on Equity (ROE) and Return on Assets (ROA)<br>ii) market-based measures: Annual Stock Return | **ROE =**<br>(Net Income before Preferred Dividends - Preferred Dividend Requirement) / Last Year's Common Equity * 100<br>**ROA =**<br>{Net Income before Preferred Dividends + [(Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate)]}/ (Last Year's Total Assets - Last Year's Custody Securities) * 100<br><br>**Total Return Index (Annual Stock Return) =**<br>[(Market Price Year End + Dividends Per Share) / (Last Year's Market Price-Year End - 1)] *100 | **ROE and ROA:**<br>Audia and Greve (2006); Bromiley (1991); Deephouse and Wiseman (2000); Nash and Sinkey (1997); Oviatt and Bauerschmidt (1991); Palmer and Wiseman (1999); Singh (1986); Wiseman and Bromiley (1991); Wiseman and Bromiley (1996);<br><br>**Annual Stock Return**:<br>Core, Holthausen and Larcker (1999); Dubofsky and Varadarajan (1987);<br>Engel, Gordon and Hayes (2002); Lee and Jang (2007); Wisner and Eakins (1994) |
| STD | Corporate risk as measured by standard deviation | $\text{STD} = \sqrt{\sum_{t=1}^{n} \frac{(x - \bar{x})^2}{n - 1}}$<br>*Where;*<br>$x$ = *Performance value for a particular year*<br>$\overline{x}$ = *mean value of performance measure (Five years performance's rolling data)*<br>$n$ = *Five years of observations* | Markowitz (1952, 1959); Bowman (1980, 1982) |

Table 3.3 (Continued)

| Variables | Definitions | Measurements | References |
|---|---|---|---|
| BMSD | Corporate risk as measured by the square root of below-mean semi variance | Below-mean semi-variance (BMSV) = <br> $\frac{1}{n-1}\sum_{t=1}^{n}(PERFBBR_{i,t} - ASP_{i,t})^2$ <br> *Where* <br> *PERFBBR = Performance of company i (ROE, ROA and Stock Returns) that is less than aspiration level.* <br> *ASP = Aspiration level or minimum benchmark return (mean of past return)* <br> *n = Number of observations below the minimum benchmark return* <br> BMSD = $\sqrt{\text{BMSV}}$ | Beach (2007); Beach (2011); Estrada (2000); Estrada (2001); Estrada (2002); Harvey (2000); Salomons and Grootveld (2003); Zhang and Wihlborg (2004); |
| SIZE | Company Size | $Log\ TA_{i,t}$ <br> *Where* <br> *TA = Total Assets* | **Log Total Asset** <br> Faccio, Lang and Young (2001); Beck, Demirguc-Kunt and Maksimovic (2008). |
| LEV | Debt to Equity Ratio | $\frac{LTD_{i,t}}{SE_{i,t}}$ <br> *Where* <br> *LTD = Long-Term Debt* <br> *SE = Stockholders' Equity* | Deephouse and Wiseman (2000); Palmer and Wiseman (1999); Wiseman and Bromiley (1996) |

Table 3.3 (Continued)

| Variables | Definitions | Measurements | References |
|---|---|---|---|
| INFLR | Annual Inflation Rate | Consumer Price Index<br>(the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services) | Omran and Pointon (2001) |
| INDSTD | Average risks of all companies in the same industry as the sample company (measured by using standard deviation). | $\frac{1}{n}\sum_{i=1}^{n} STD_{i,t}$<br>*Where*<br>*STD = Riskiness of all companies in the same industry as company i.*<br>$n$ = *Number of companies in the same industry*<br>$i$ = *Companies in the same industry as the company under consideration.* | Deephouse and Wiseman (2000) |
| INDBMSD | Average risks of all companies in the same industry as the sample company (measured by using below-mean semi variance). | $\frac{1}{n}\sum_{i=1}^{n} BMSD_{i,t}$<br>*BMSD = Riskiness of all companies in the same industry as company i.*<br>$n$ = *Number of companies in the same industry*<br>$i$ = *Companies in the same industry as the company under consideration.* | |

Table 3.3 (Continued)

| Variables | Definitions | Measurements | References |
|---|---|---|---|
| INDPERF | Average performance of all companies in the same industry as the sampled company. | $\frac{1}{n}\sum_{i=1}^{n} PERF_{i,t}$<br>*Where*<br>*PERF = Performance of all companies in the same industry as company i.*<br>*n = Number of companies in the same industry* | Deephouse and Wiseman (2000); Wiseman and Bromiley (1996); |
| AGE | Company Age | Number of years since company $i$ has been first listed at the beginning of the study period. | Agrawal and Knoeber (1996); Henderson and Benner (2001) |
| ASP | Aspirations level or minimum benchmark of performance (the target) Provide the relative performance of the company over five-year period. | Historical return or mean of past return for five years.<br>$\frac{1}{5}\sum_{t=t-4}^{t} PERF_{i,t}$<br>*Where*<br>*PERF= Performance of company i as defined above.*<br>*n = Number of performance observations of company i* | Bromiley (1991); Lant (1992); Miller and Leiblein (1996); Lee (1997); Palmer and Wiseman (1999) |
| GDPg | Annual Gross Domestic Product (GDP) growth | $\frac{GDP_t}{GDP_{t-1}}$ - 1 | Nguyen (2007) |

Table 3.3 (Continued)

| Variables | Definitions | Measurements | References |
|---|---|---|---|
| FSlack | Current Ratio | Total Current Assets / Total Current Liabilities | Bromiley, 1991; Cheng and Kesner, 1997; Chiu and Liaw, 2009; Deephouse and Wiseman (2000); Haleblian *et al.*, 2012; Latham and Braun, 2008; Nohria & Gulati, 1997; Palmer and Wiseman (1999); Wiseman and Bromiley (1996 ) |
| M2g | A broader definition of Annual Money Supply | $\frac{M2_t}{M2_{t-1}} - 1$ <br> *Where* <br> $M2 = M1$ + *time deposits + saving deposits* <br> $M1$ = *money in circulation and demand deposits of the non-bank private sector* | Bilson, Brailsford and Hooper (2001) |

This research applies one of the most common variations of GMM to estimate the dynamic panel models. The method is known as system-GMM (S-GMM) estimator (Arellano & Bover, 1995; Blundell & Bond, 1998; 2000). This dynamic panel data estimation approach is an extension of the original GMM estimator from Arellano and Bond (1991), which is known as difference-GMM (D-GMM) estimator. The basic principle of the D-GMM is to eliminate the unobserved individual-specific effects by accomplishing first-differenced equations with suitable lagged levels of the dependent and endogenous variables as instruments. However, implementing first differencing lessens the variation in all regressors which leads to weak identification problem and increases the measurement errors. Therefore, the S-GMM is employed.

The S-GMM method combines moment conditions for model in first differences (the transformed equation) with moment conditions for the model in levels (the original equation). This process is done by exploiting lagged variables at levels as instrumental variables in the transformed equation whereas lagged difference variables are used as instruments in the original equation. By estimating regressions in the transformed and original equations simultaneously, the S-GMM is able to difference the instruments while keeping regressors in levels. Hence, this procedure allows the introduction of more instruments, further reduce the finite sample bias and substantially improve the estimation efficiency (Blundell, Bond & Windmeijer, 2000; Windmeijer, 2005; Roodman, 2006; Baltagi, 2008). The consistency and reliability of GMM estimator procedures are tested using two standard diagnostic tests. The over-identifying restriction is tested using the Sargan's (1964) test of misspecification. Meanwhile the Arellano-Bond (1991) tests for first order serial correlation (AR(1)) and second order serial correlation (AR(2)) of the residuals are applied to verify the efficiency of model estimations using GMM approach.

S-GMM estimation procedure is performed in one- and two-step variants. The process starts by calculating the one-step GMM estimates. In the first step, homoskedasticity and independent residuals are assumed. Then, by utilizing the one-step residuals, a more efficient two-step GMM estimator is computed. The two-step S-GMM estimation method is credited as more sophisticated and effective approach since this estimator uses optimal weighting matrices. Furthermore, Windmeijer (2005) proposes a two-step estimator with robust standard errors to correct finite-sample bias. The adjustment is performed by acquiring an estimated variance covariance matrix (VCE) which is robust to heteroskedasticity. This adjustment won't change the point estimates. Only estimated VCE and standard errors are change. By doing the correction of the standard errors of the two-step GMM estimates, this estimator is more competent in dealing with the issues of endogeneity for some of the explanatory variables and omitted variables bias. Most importantly, this method is capable of offering acceptable and consistent estimators under the above mentioned issues.

Apart from that, the static panel estimation which is based on single-period estimator is also considered as a mean to investigate the contemporaneous market-based risk-return relationship. This consideration is in line with the anticipation of Fama's (1970) efficient market hypothesis (EMH) which states that the arrival of new information would be reflected in market-related variables instantaneously. In order to identify the most appropriate model to estimate the results, three competing static formulations, namely pooled OLS, random-effect (or generalized least squares) and fixed-effect models are tested. The pooled OLS assumes that the intercept and slope coefficients are constant across companies and time. On the contrary, both random- and fixed-effect assume that each firm has its own intercept, while restricting the slope to be homogenous.

Basically, there are two basic tests can be applied to select the most appropriate static models. Breusche-Pagan Lagrange multiplier (LM) test is applied to check whether random effect model outperforms the pooled OLS model. The random effect model is more appropriate than pooled OLS if the result shows p-value is less than 0.05. This would mean that there are company-specific effects in the data. Meanwhile, Hausman's specification test is used to determine whether fixed-effect or random effect model is performed best in treating the company-specific effects in the data. The fixed-effect model appears as the favored specification compared to random-effect if the result shows p-value is significant (less than 0.05). A fixed-effect model allows for differences for each individual cross-section in panel data set. Once the most appropriate model is selected, diagnostic tests are applied to check the possibility of facing multi-collinearity, heteroskedasticity as well as serial-correlation problems. Due to the presence of the problems, rectification procedures are then performed.

### 3.3.3 Model to Answer Objective One and Objective Two

In order to answer objective one (two) which is to examine the impact of standard deviation (below-mean semi-deviation deviation) and other determining factors on performance, the first general dynamic empirical model (General Model A) mentioned above is respecified as follows:

**Model 1: To Answer Objective One**

$$PERF_{i,t} = \alpha_0 + \alpha_1 RISKSTD_{i,t-1} + \alpha_2 RISKSTD_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERF_{i,t-1} + \alpha_9 INDPERF_{i,t} + e_{i,t} \quad (3.4)$$

**Model 2: To Answer Objective Two**

$$PERF_{i,t} = \alpha_0 + \alpha_1 RISKBMSV_{i,t-1} + \alpha_2 RISKBMSV_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERF_{i,t-1} + \alpha_9 INDPERF_{i,t} + e_{i,t} \quad (3.5)$$

Since this research applies both accounting-based measures of performance (ROA and ROE) and market-based measures of performance (TRI), model 1 and model 2 are split up into three different sub-models. Sub-models (a) and (b) utilize ROA and return ROE as performance indicator respectively. Meanwhile, sub-model (c) employs TRI as performance indicator. Their respective performance indicator's data set then are employed to produce the proxies for corporate risk-taking ($RISKSTDroa$, $RISKSTDroe$, $RISKSTDtri$, $RISKBMSDroa$, $RISKBMSDroe$ and $RISKBMSDtri$). The standard diagnostic tests of dynamic S-GMM estimator reveal that both sub-models (a) and (b) fulfill the statistical properties whereas, sub-model (c) violate the requirement for dynamic panel data analysis. Therefore, dynamic panel model is preferred for sub-models (a) and (b) and the static panel model is applied to sub-model (c).

### 3.3.4 Model to Answer Objective Three and Objective Four

To achieve research objective three (four) which is investigate the impact of performance and other determining factors on risk-taking behaviour represented by standard deviation (below-mean semi-deviation), the second general dynamic empirical model (General Model B) is restated as follows:

**Model 3: To Answer Objective Three**

$$RISKSTD_{i,t} = \alpha_0 + \alpha_1 PERF_{i,t-1} + \propto_2 PERF_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASP_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISKSTD_{i,t-1} + \alpha_{10} INDSTD_{i,t} + e_{i,t} \quad (3.6)$$

**Model 4: To Answer Objective Four**

$$RISKBMSV_{i,t} = \alpha_0 + \alpha_1 PERF_{i,t-1} + \propto_2 PERF_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASP_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISKBMSV_{i,t-1} + \alpha_{10} INDBMSV_{i,t} + e_{i,t} \quad (3.7)$$

Due to the same reasons as applied in model 1 and model 2, both model 3 and model 4 also employ the dynamic panel model as a meant for analysing the impact of return on risk-taking using accounting-based data. Meanwhile, the static panel model is used as a meant for examining the relationship based on market data.

## 3.4 Chapter Summary

This chapter explains the research methodologies for this study. Generally, financial econometric issues discussed in this study are dynamic in nature whereby the output of the relationship is expected to be realised over time and not immediately. Therefore, the estimation of the coefficients for the models in this study is carried out by using dynamic panel estimation approach from short panel data. One of the most common variations of GMM estimator known as system-GMM (S-GMM) estimator (Arellano & Bover, 1995; Blundell & Bond, 1998, 2000) is applied to reveal the company-specific and macroeconomic factors that influence the relationship between corporate risk and corporate performance. In addition, this study also considers different methods of static panel estimations (namely pooled OLS, random-effect and fixed- effect models) to interpret the results of contemporaneous market-based risk-return relationship. The static panel estimations probably are more appropriate to be employed as EMH expects that the market reacts to new information instantaneously. Equations 3.4 is applied to answer objective 1. Equations 3.5 is applied to answer objective 2. Equations 3.6 is applied to answer objective 3. Equations 3.7 are applied to answer objective 4.

# CHAPTER FOUR

# ANALYSIS OF RESULTS AND DISCUSSIONS

## 4.0 Introduction

This chapter presents data analyses and findings of the empirical tests based on the research process as outlined in chapter three. The first section in this chapter starts with descriptive statistics of continuous variables. Subsequently, the correlations amongst the independent variables for each model are presented. In the following section, all the research models are tested using dynamic panel data analysis, namely the generalized methods of moments (GMM) in order to account for important dynamics issues. Then the standard diagnostic tests are performed to analyze the reliability and consistency of the GMM estimation procedure in determining the most qualified dynamic specifications. The static panel data analysis is then applied for those models that violate the dynamic panel data analysis requirements. Subsequently, research findings are drawn from those dynamic and static specifications. This chapter ends with an overall view of the analyses of results and findings.

## 4.1 Descriptive Statistic of Variables

In this section, the common statistical data analysis, namely the number of observations, mean, standard deviation, minimum and maximum values are used to analyze and interpret the general statistical attributes of the sample and all selected variables. Table 4.1 presents the summary of descriptive statistics for each continuous variable used in the study over the period 2004 to 2012. The findings of descriptive analysis for company-related variables depicted in Table 4.1 represent both the 388 active companies and 143 dead companies categorized under all non-financial sectors. The blend of both active and dead companies is meant to create a survivorship-bias-free data set. The number of research observations depicted in Table 4.1 depends on the availability of the data provided by Datastream. Because of unavailable data through delisting or through use of lagged values for some of the variables, the total number of observation for company specific characteristics is not equal to 4779 company-year data points. However, all the macro-economic variables and industry-related variables have complete data points. The whole data points for these variables are manageable to attain because these data points are based on nine years repeated data.

Since this study analyses the relationship between corporate risk and performance, variables *PERF* and *RISK* perform dual functions. In other words, these variables are applied as dependent variables in one equation and treated as independent variables in another equation. *PERF* appears as the dependent variable in research models 1 and 2 but functions as the independent variable in models 3 and 4. While *RISK* measured by standard deviation (STD) appears as the dependent variable and independent variable in research models 3 and 1 respectively. STD reflects the overall historical volatility of performance or the total risk. It is the square root of variance and captures both the upside-return and downside-risk. The more spread apart the performance is, the greater the deviation. Another *RISK* measured by below-mean semi-deviation (BMSD) functions as the dependent variable in research model 4 and treated as an independent variable in research model 2. BMSD which is the square root of below-mean semi-variance (BMSV) captures an average variation of performance below

Table 4.1

*Descriptive Statistics of Continuous Variables over the Period 2004-2012*

| | Obs (N) | Mean | STD | Min | Max |
|---|---|---|---|---|---|
| **PANEL A: Dual-Function Variables** | | | | | |
| $PERFroa_{i,t}$ (%) | 4109 | 3.33 | 12.36 | -99.90 | 107.70 |
| $PERFroe_{i,t}$ (%) | 3994 | 1.32 | 81.08 | -1854.66 | 1837.05 |
| $PERFtri_{i,t}$ (%) | 4179 | 10.19 | 63.98 | -99.90 | 595.80 |
| $RISKSTDroa_{i,t}$ (%) | 3711 | 5.64 | 7.49 | 0.20 | 58.51 |
| $RISKSTDroe_{i,t}$ (%) | 3503 | 15.36 | 52.53 | 0.21 | 910.03 |
| $RISKSTDtri_{i,t}$ (%) | 4212 | 41.75 | 44.90 | 1.00 | 593.00 |
| $RISKBMSDroa_{i,t}$ (%) | 3711 | 6.95 | 8.86 | 0.18 | 48.89 |
| $RISKBMSDroe_{i,t}$ (%) | 3503 | 20.41 | 76.04 | 0.20 | 1612.77 |
| $RISKBMSDtri_{i,t}$ (%) | 4561 | 45.97 | 32.14 | 0.20 | 277.90 |
| **PANEL B: Strictly Exogenous Variables** | | | | | |
| | **Obs (N)** | **Mean** | **STD** | **Min** | **Max** |
| $AGE_{i,t}$ (Years) | 4281 | 15.37 | 5.40 | 5.00 | 39.00 |
| $SIZE_{i,t}$ (Total Assets in RM'000) | 4134 | 1195697 | 2311269 | 1172 | 11100000 |
| Aspiration (a benchmark) | | | | | |
| $ASPAvgROA_{i,t}$ (%) | 3335 | 3.30 | 7.32 | -28.9 | 35.67 |
| $ASPAvgROE_{i,t}$ (%) | 3132 | 3.15 | 26.21 | -421.18 | 377.30 |
| $ASPAvgTRI_{i,t}$ (%) | 4154 | 9.40 | 27.62 | -92.8 | 163.50 |
| $FSlack_{i,t}$ (%) | 4074 | 2.42 | 2.49 | 0.01 | 12.43 |
| $LEV_{i,t}$ | 4128 | 0.67 | 1.79 | -11.41 | 12.91 |
| $INFLR_t$ (%) | 4779 | 2.50 | 1.37 | 0.60 | 5.40 |
| $M2g_t$ (%) | 4779 | 13.51 | 5.51 | 7.16 | 25.20 |
| $GDPg_t$ (%) | 4779 | 9.58 | 6.93 | -7.42 | 15.72 |
| **PANEL C: Control Variables** | | | | | |
| | **Obs (N)** | **Mean** | **STD** | **Min** | **Max** |
| $INDPERFroa_{i,t}$ (%) | 4779 | 3.82 | 3.52 | -7.18 | 15.80 |
| $INDPERFroe_{i,t}$ (%) | 4779 | 1.30 | 9.81 | -57.41 | 74.33 |
| $INDPERFtri_{i,t}$ (%) | 4779 | 4.56 | 13.89 | -47.00 | 54.90 |
| $INDSTDroa_{i,t}$ (%) | 4779 | 6.04 | 1.92 | 1.46 | 12.11 |
| $INDSTDroe_{i,t}$ (%) | 4779 | 18.96 | 15.26 | 4.49 | 85.79 |
| $INDSTDtri_{i,t}$ (%) | 4779 | 46.20 | 25.21 | 11.00 | 159.00 |
| $INDBMSDroa_{i,t}$ (%) | 4779 | 7.12 | 1.96 | 2.18 | 13.01 |
| $INDBMSDroe_{i,t}$ (%) | 4779 | 24.69 | 25.27 | 3.93 | 141.77 |
| $INDBMSDtri_{i,t}$ (%) | 4779 | 48.22 | 10.37 | 21.6 | 75.70 |
| $PERFroa_{i,t-1}$ (%) | 3726 | 3.24 | 12.58 | -104.28 | 111.95 |
| $PERFroe_{i,t-1}$ (%) | 3612 | 1.45 | 78.23 | -1854.66 | 1837.05 |
| $PERFtri_{i,t-1}$ (%) | 4377 | 14.44 | 66.80 | -99.90 | 614.50 |
| $RISKSTDroa_{i,t-1}$ (%) | 3335 | 5.73 | 7.60 | 0.20 | 59.35 |
| $RISKSTDroe_{i,t-1}$ (%) | 3132 | 15.003 | 48.41 | 0.21 | 949.57 |
| $RISKSTDtri_{i,t-1}$ (%) | 3806 | 42.98 | 46.68 | 1.00 | 621.00 |
| $RISKBMSDroa_{i,t-1}$ (%) | 3335 | 7.10 | 9.06 | 0.18 | 49.48 |
| $RISKBMSDroe_{i,t-1}$ (%) | 3132 | 19.91 | 69.14 | 0.20 | 1684.82 |
| $RISKBMSDtri_{i,t-1}$ (%) | 4115 | 45.36 | 30.36 | 0.40 | 218.50 |

the mean. In other words, this risk method of analysis only estimates the negative fluctuation of asset returns. The lower BMSD is, the less likely a sizeable loss will take place.

The basic features of the above mentioned dual-function variables are depicted in Panel A of Table 4.1. These variables are derived from both accounting-based and market-based data. The first three dual-function variables are corporate performance proxies, namely, $PERFroa_{i,t}$, $PERFroe_{i,t}$ and $PERFtri_{i,t.}$Subsequently, corporate risk-taking proxies, i.e., $RISKSTDroa_{i,t}$, $RISKSTDroe_{i,t}$, $RISKSTDtri_{i,t}$, $RISKBMSDroa_{i,t}$, $RISKBMSDroe_{i,t}$ and, $RISKBMSDtri_{i,t}$ are presented. It can be seen from the descriptive results in Panel A that all dual-function variables have positive mean. The market-based performance measure, $PERFtri_{i,t}$, exhibits the highest mean of 10.19 percent, followed by accounting-based performance measure, $PERFroa_{i,t}$ 3.33 percent and $PERFroe_{i,t}$ 1.32 percent. Apparently, this statistic shows that the selected firms have relatively higher market-based performance as compared to accounting-based performance during the period of study.

However, standard deviation of $PERFroa_{i,t}$ shows a value of 12.36 percent followed by $PERFtri_{i,t}$ with standard deviation value of 63.98 percent. The most volatile performance indicator is $PERFroe_{i,t}$ with a standard deviation value of 81.08 percent. The highest standard deviation for $PERFroe_{i,t}$ is a result of a significant gap between its maximum (1837.05 percent) and minimum value (-1854.66 percent). A combination of both active and dead companies contributes to the significant gap between maximum and minimum value of $PERFroe_{i,t}$. In terms of continuous variables for corporate risk-taking measured by STD and BMSD, it can be seen that variables $RISKSTDtri_{i,t}$ and $RISKBMSDtri_{i,t}$ show the highest mean with a value of 41.75 percent and 45.97 percent respectively. However, the standard deviation of $RISKSTDroe_{i,t}$ and $RISKBMSDroe_{i,t}$ show the highest values of 52.53 percent and 76.04 percent respectively. These results disclose that data points for $RISKSTDroe_{i,t}$ and $RISKBMSDroe_{i,t}$ are more dispersed from their respective average values as compared to other corporate risk-taking proxies. However, proxies for performance and risk-taking cannot be directly compared due to the distinctive assumptions and definition.

Panel B of Table 4.1 depicts basic statistics information about other company-specific variables. The average age of companies (number of years from first listed to 2012) in the dataset is 15 years with a minimum age of 5 years and maximum age of 39 years. The average age shows that most of the sampled companies are well experienced. In terms of size, Panel B shows the average total assets worth RM1.20 billion with a standard deviation of RM2.31 billion. A high standard deviation is observed due to the huge gap between the minimum (RM1.17 million) and maximum (RM11.1 billion) value of total assets. This is because this research considers both active and dead companies in the sample for the purpose of meeting the requirement for survivorship-bias-free assessment.

Besides that, Panel B also displays the basic features of the companies' historical aspiration-driven factors represented as $ASPAvgROA_{i,t}$, $ASPAvgROE_{i,t}$ and $ASPAvgTRI_{i,t}$. The behavioural theory of firm (BTOF) indicates that historical performance of a company has influence on corporate risk-taking behavior. The result shows that the average value of $ASPAvgTRI_{i,t}$ (9.40 percent) is larger than its counterparts with the highest standard deviation of 27.62 percent. In terms of available financial slack ($FSlack_{i,t}$), Panel B reveals that current ratio has a value of 2.42 with minimum and maximum values of 0.01 and 12.43 respectively. This indicates that the amount of current assets is 2.42 times more than the amount of current liabilities. Generally, a higher current ratio means a higher level of liquid resources that can be used to reduce the impact of external threats and a greater opportunity to pursue profitable projects. Panel B also presents descriptive statistics for leverage ($LEV_{i,t}$), which is measured by debt-to-equity ratio. This ratio shows the relative proportion of shareholders' equity and debt used to finance a company's assets. On average, for every ringgit of equity, the companies owe RM0.67 to creditors.

With regard to macroeconomic variables, three widely use measures that are applied in this research are inflation ($INFLR_t$), growth of M2 ($M2g_t$) and growth of GDP ($GDPg_t$). The annual percentage change of consumer price index (CPI) is used to measure inflation. The mean of the $INFLR_t$ is 2.5 percent while the minimum and maximum percentage changes are 0.60 percent and 5.4 percent respectively. The standard deviation of $INFLR_t$ is 1.37 percent. On average, the growth of M2 shows a mean value of 13.51 percent with a standard deviation of 5.51 percent. Another macroeconomic indicator, the growth of GDP is 9.58 percent with a standard deviation of 6.93 percent. The minimum value is -7.42 percent and the maximum value is 15.72 percent. Malaysia experienced higher GDP growth in 2008. However, the global economic and financial crisis that shook the world economy in the closing months of 2008 pulled down the Malaysian economic growth. The impact was intensified in 2009, leads to a negative growth in GDP.

The descriptive statistics of control variables are presented in Panel C of Table 4.1. These variables are $INDPERFroa_{i,t}$, $INDPERFroe_{i,t}$ and $INDPERFtri_{i,t}$which are used as proxies for industrial performance, and $INDSTDroa_{i,t}$, $INDSTDroe_{i,t}$, $INDSTDtri_{i,t}$, $INDBMSDroa_{i,t}$, $INDBMSDroe_{i,t}$ and $INDBMSDtri_{i,t}$ as proxies for industrial risk. All the lagged dependent variables are also applied as control variables. Since the descriptive statistics of the control variables depict in Panel C are the products of variables presented in Panel A, the trend of the mean, standard deviation, minimum and maximum values are almost similar to Panel A. All control variables which are related to market-based data show the highest mean value, while almost all variables related to *ROE* present the highest standard deviation.

## 4.2 Multicollinearity Test between Independent Variables

Multicollinearity refers to the existence of correlation between two independent variables in predictive model. The presence of high multicollinearity misleadingly increases the standard errors of the parameter estimates. As a result, parameters that are significant turn to be insignificant, creating a type II error where failing to reject the null-hypothesis when it is false. Multicollinearity can falsify the analysis of a predictive model. Therefore, it is important to test for the existence of multicollinearity problem among independent variables. One way to analyze multicollinearity is the pairwise Pearson's correlation, developed by Karl Pearson in the 1880's. As a general rule of thumb, multicollinearity problem is suspected if the correlation between two independent variables is above 0.80 (Gujarati, 1995; Hair *et al.*, 2010).

The results of pairwise Pearson's correlation tests for all models (model 1(a,b,c), 2(a,b,c), 3(a,b,c) and 4(a,b,c) are depicted in Appendix 1 to Appendix 4. These tables are presented according to the sequence of the four main research models. Each table is presented in three panels according to the respective three sub-models of the main models. Generally, all models indicate that there is almost no multicollinearity problem arise between independent variables in the predictive models. This is because the pairwise Pearson's correlation indicators for almost all independent variables are less than 0.8. Only a few independent variables have pairwise Pearson's correlation indicators that cross the 0.8 line. Referring to Table 4.2 (which only extracts the esults of sub-model 1(a) and 2(a)), the presence of multicollinearity is suspected between $RISKSTDroa_{i,t-1}$ and $RISKSTDroa_{i,t}$ (0.8668) as well as between $RISKBMSDroa_{i,t-1}$ and $RISKBMSDroa_{i,t}$ (0.8200). Therefore, to confirm the results and check whether there is multicollinearity problem amongst the paired variables, variance inflation factor (VIF) is applied. Hair *et al.* (2010) suggested that VIF of less than 10 would indicate no serious multicollinearity problem. The results of all models in Appendix 2 show that there is no threat of multicollinearity as all variables present VIF below 10. Table 4.3 extracts VIF for model 1(a) and model 2(a) from Appendix 2.

### 4.3 Regression Results and Interpretation

This subsection starts with reporting the results of diagnostic test using dynamic GMM estimations. Subsequently, a discussion of panel estimation of dependent variable to answer objectives one and two is performed. This is then followed by a discussion of regression results to answer objectives three and four.

Table 4.2

*Pearson Correlation Tests between Independent Variables of Study in Model 1a and Model 2a*

| **Panel A: Model 1a** | Independent variables | $RISKSTDroa_{i,t-1}$ | $RISKSTDroa_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFroa_{i,t-1}$ | $INDPERFroa_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKSTDroa_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKSTDroa_{i,t}$ | 0.8668** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.2331** | -0.2591** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0393* | -0.0487** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0673** | -0.0650** | 0.1316** | -0.1656** | 1.0000 | | | | |
| | $INFLR_t$ | 0.0252 | 0.0018 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_t$ | 0.0396* | 0.0481** | -0.0684** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFroa_{i,t-1}$ | -0.1776** | -0.1496** | 0.2195** | 0.1426** | 0.0026 | 0.0147 | -0.0352* | 1.0000 | |
| | $INDPERFroa_{i,t}$ | -0.0515** | -0.0431** | 0.0855** | 0.0533** | 0.0150 | 0.0544** | -0.1770** | 0.0944** | 1.0000 |
| **Panel B: Model 2a** | Independent variables | $RISKBMSDroa_{i,t-}$ | $RISKBMSDroa_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFroa_{i,t-1}$ | $INDPERFroa_{i,t}$ |
| | $RISKBMSDroa_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKBMSDroa_{i,t}$ | 0.8200** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.2689** | -0.2865** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0683** | -0.0771** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0555** | -0.0481** | 0.1316** | -0.1656** | 1.0000 | | | | |
| | $INFLR_t$ | 0.0280 | 0.0089 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_t$ | 0.0415* | 0.0476** | -0.0684** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFroa_{i,t-1}$ | -0.3271** | -0.2787** | 0.2195** | 0.1426** | 0.0026 | 0.0147 | -0.0352* | 1.0000 | |
| | $INDPERFroa_{i,t}$ | -0.0586** | -0.0639** | 0.0855** | 0.0533** | 0.0150 | 0.0544** | -0.1770** | 0.0944** | 1.0000 |

Notes: ** and * indicate the respective 1% and 5% significance level.

Table 4.3

*Variance Inflation Factor (VIF) for Multicollinearity Assumption of Model 1a and Model 2a*

| **Independent variables** | **VIF Model 1a** | **VIF Model 2a** |
|---|---|---|
| $RISKSTDroa_{i,t-1}$ | 3.97 | - |
| $RISKBMSDroa_{i,t-1}$ | - | 3.03 |
| $RISKSTDroa_{i,t}$ | 3.98 | - |
| $RISKBMSDroa_{i,t}$ | - | 3.05 |
| $SIZE_{i,t}$ | 1.10 | 1.13 |
| $FSlack_{i,t}$ | 1.04 | 1.05 |
| $LEV_{i,t}$ | 1.06 | 1.06 |
| $INFLR_t$ | 1.40 | 1.40 |
| $M2g_t$ | 1.43 | 1.43 |
| $INDPERFroa_{i,t}$ | 1.05 | 1.05 |

### 4.3.1 Results of Diagnostic Test

Before presenting the estimated results of the determinants of corporate performance and risk-taking of the Malaysian listed companies, it is important to run the standard diagnostic tests of all models. This is because the reliability and consistency of the GMM estimation procedures depend on the validity of the instruments and the absence of serial correlation in the residuals. The results of diagnostic tests are reported in Table 4.4. Panel A and Panel B report the diagnostic tests for sub-models 1(a,b,c) and 2(a,b,c) in which corporate performance is regressed against corporate risk taking and other determining factors. Meanwhile Panel C and Panel D report the diagnostic tests for sub-models 3(a,b,c) and 4(a,b,c) in which corporate risk taking is regressed against corporate performance and other determining factors.

First, the validity of the instrument is tested by using the Sargan's (1964) test of misspecification. The null hypothesis for Sargan test is that all instruments in the specified model are not redundant and over-identifying restrictions are valid. Therefore, accepting the null hypothesis indicates the validity of the group of instruments and the appropriate model specification. In line with Arellano and Bond (1991) findings, column (1) of Table 4.4 in all panels shows that the one-step S-GMM version of Sargan-tests are sensitive to heteroskedasticity (p-value is less than 0.05), leading to rejection of the validity of instruments for all models. Due to the presence of heteroskedasticity of unknown form, the results of repeated Sargan-test analysis based on two-step GMM (column 2), two-step GMM estimators with robust standard error (column 3), two-step GMM estimators with time dummies (column 4) and two-step S-GMM with time dummies which includes *p* lags of dependent variable (column 5) are then presented.

Table 4.4

*Panel A: Diagnostic Test for Model 1*

| | **One-Step S-GMM (1)** | **Two-Step S-GMM (2)** | **Two-Step S-GMM with Robust SE (3)** | **Two-Step S-GMM with Time Dummies (4)** | **Two-Step S-GMM with Time Dummies and Maxldep (5)** |
|---|---|---|---|---|---|
| **Model 1(a)** | $\boldsymbol{PERFroa_{i,t} = \alpha_0 + \alpha_1 RISKSTDroa_{i,t-1} + \alpha_2 RISKSTDroa_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFroa_{i,t-1} + \alpha_9 INDPERFroa_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 185.19 (0.00) | 52.70 (0.02) | - | 47.37 (0.06) | 44.43 (0.06) |
| 2nd order autocorrelation Test (p-value) | - | 1.26 (0.21) | 1.20 (0.23) | 1.37 (0.17) | 1.34 (0.18) |
| # of lags | - | - | - | - | 5 |
| # of Instruments | 44 | 44 | 44 | 49 | 46 |
| # of Groups | 500 | 500 | 500 | 500 | 500 |
| **Model 1(b)** | $\boldsymbol{PERFroe_{i,t} = \alpha_0 + \alpha_1 RISKSTDroe_{i,t-1} + \alpha_2 RISKSTDroe_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFroe_{i,t-1} + \alpha_9 INDPERFroe_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 816.71 (0.00) | 61.09 (0.003) | - | 55.54 (0.011) | 27.99 (0.08) |
| 2nd order autocorrelation Test (p-value) | - | 1.05 (0.30) | 0.97 (0.33) | 1.05 (0.29) | 0.97 (0.33) |
| # of lags | - | - | - | - | 2 |
| # of Instruments | 44 | 44 | 44 | 49 | 34 |
| # of Groups | 479 | 479 | 479 | 479 | 479 |
| **Model 1(c)** | $\boldsymbol{PERFtri_{i,t} = \alpha_0 + \alpha_1 RISKSTDtri_{i,t-1} + \alpha_2 RISKSTDtri_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFtri_{i,t-1} + \alpha_9 INDPERFtri_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 131.56 (0.00) | 129.47 (0.00) | - | 96.50 (0.00) | 64.54 (0.00) |
| 2nd order autocorrelation Test (p-value) | - | -2.99 (0.003) | -2.63 (0.01) | -2.43 (0.02) | -3.22 (0.001) |
| # of lags | - | - | - | - | 2 |
| # of Instruments | 44 | 44 | 44 | 49 | 34 |
| # of Groups | 514 | 514 | 514 | 514 | 514 |

Table 4.4 (continued)

*Panel B: Diagnostic Test for Model 2*

| | One-Step S-GMM (1) | Two-Step S-GMM (2) | Two-Step S-GMM with Robust SE (3) | Two-Step S-GMM with Time Dummies (4) | Two-Step S-GMM with Time Dummies and Maxldep (5) |
|---|---|---|---|---|---|
| **Model 2(a)** | $\boldsymbol{PERFroa_{i,t} = \alpha_0 + \alpha_1 RISKBMSDroa_{i,t-1} + \alpha_2 RISKBMSDroa_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFroa_{i,t-1} + \alpha_9 INDPERFroa_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 173.70 (0.00) | 59.35 (0.004) | - | 54.22 (0.02) | 26.86 (0.11) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | 1.61 (0.11) | 1.53 (0.13) | 1.63 (0.10) | 1.60 (0.11) |
| # of lags | - | - | - | - | 2 |
| # of Instruments | 44 | 44 | 44 | 49 | 34 |
| # of Groups | 500 | 500 | 500 | 500 | 500 |
| **Model 2(b)** | $\boldsymbol{PERFroe_{i,t} = \alpha_0 + \alpha_1 RISKBMSDroe_{i,t-1} + \alpha_2 RISKBMSDroe_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFroe_{i,t-1} + \alpha_9 INDPERFroe_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 468.60 (0.00) | 69.90 (0.0003) | - | 65.43 (0.001) | 32.28 (0.08) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | 1.26 (0.21) | 1.20 (0.23) | 1.27 (0.20) | 1.46 (0.27) |
| # of lags | - | - | - | - | 5 |
| # of Instruments | 44 | 44 | 44 | 49 | 46 |
| # of Groups | 479 | 479 | 479 | 479 | 479 |
| **Model 2(c)** | $\boldsymbol{PERFtri_{i,t} = \alpha_0 + \alpha_1 RISKBMSDtri_{i,t-1} + \alpha_2 RISKBMSDtri_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 FSlack_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INFLR_t + \alpha_7 M2g_t + \alpha_8 PERFtri_{i,t-1} + \alpha_9 INDPERFtri_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions ( p-value) | 256.19 (0.00) | 97.16 (0.00) | - | 77.37 (0.00) | 45.58 (0.001) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | -1.42 (0.15) | -1.17 (0.24) | -0.69 (0.49) | -0.89 (0.37) |
| # of lags | - | - | - | - | 2 |
| # of Instruments | 44 | 44 | 44 | 49 | 34 |
| # of Groups | 518 | 518 | 518 | 518 | 518 |

**Notes:**

Table 4.4 (continued)

*Panel C: Diagnostic Test for Model 3*

| | One-Step S-GMM (1) | Two-Step S-GMM (2) | Two-Step S-GMM with Robust SE (3) | Two-Step S-GMM with Time Dummies (4) | Two-Step S-GMM with Time Dummies and Maxldep (5) |
|---|---|---|---|---|---|
| **Model 3(a)** | $\boldsymbol{RISKSTDroa_{i,t} = \alpha_0 + \alpha_1 PERFroa_{i,t-1} + \propto_2 PERFroa_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASPAvgROA_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISKSTDroa_{i,t-1} + \alpha_{10} INDSTDroa_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions( p-value) | 334.74 (0.00) | 46.19 (0.08) | - | 42.05 (0.13) | 38.56 (0.14) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | -0.53 (0.60) | -0.52 (0.60) | -0.55 (0.58) | -0.59 (0.56) |
| # of lags | - | - | - | - | 5 |
| # of Instruments | 45 | 45 | 45 | 49 | 45 |
| # of Groups | 504 | 504 | 504 | 504 | 504 |
| **Model 3(b)** | $\boldsymbol{RISKSTDroe_{i,t} = \alpha_0 + \alpha_1 PERFroe_{i,t-1} + \propto_2 PERFroe_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASPAvgROE_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISKSTDroe_{i,t-1} + \alpha_{10} INDSTDroe_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions( p-value) | 330.74 (0.00) | 54.60 (0.01) | - | 52.16 (0.02) | 28.59 (0.19) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | 0.73 (0.47) | 0.60 (0.55) | 0.69 (0.50) | 0.58 (0.56) |
| # of lags | - | - | - | - | 3 |
| # of Instruments | 45 | 45 | 45 | 49 | 39 |
| # of Groups | 482 | 482 | 482 | 482 | 482 |
| **Model 3(c)** | $\boldsymbol{RISKSTDtri_{i,t} = \alpha_0 + \alpha_1 PERFtri_{i,t-1} + \propto_2 PERFtri_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 AGE_{i,t} + \alpha_5 ASPAvgTRI_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 INFLR_t + \propto_8 GDPg_t + \alpha_9 RISKSTDtri_{i,t-1} + \alpha_{10} INDSTDtri_{i,t} + e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions (p-value) | 278.83 (0.00) | 92.36 (0.00) | - | 53.26 (0.01) | 50.83 (0.01) |
| $2^{nd}$ order autocorrelation Test (p-value) | - | -0.46 (0.64) | -0.44 (0.66) | -0.99 (0.32) | -1.02 (0.31) |
| # of lags | - | - | - | - | 5 |
| # of Instruments | 45 | 45 | 45 | 49 | 46 |
| # of Groups | 517 | 517 | 517 | 517 | 517 |

Table 4.4 (continued)

*Panel D: Diagnostic Test for Model 4*

| | One-Step S-GMM (1) | Two-Step S-GMM (2) | Two-Step S-GMM with Robust SE (3) | Two-Step S-GMM with Time Dummies (4) | Two-Step S-GMM with Time Dummies and Maxldep (5) |
|---|---|---|---|---|---|
| **Model 4(a)** | $\boldsymbol{RISKBMSDroa_{i,t}} = \alpha_0 + \alpha_1 \boldsymbol{PERF_{i,t-1}} + \alpha_2 \boldsymbol{PERF_{i,t}} + \alpha_3 \boldsymbol{SIZE_{i,t}} + \alpha_4 \boldsymbol{AGE_{i,t}} + \alpha_5 \boldsymbol{ASPAvgROA_{i,t}} + \alpha_6 \boldsymbol{LEV_{i,t}} + \alpha_7 \boldsymbol{INFLR_t} + \propto_8 \boldsymbol{GDPg_t} + \alpha_9 \boldsymbol{RISKBMSDroa_{i,t-1}} + \alpha_{10} \boldsymbol{INDBMSDroa_{i,t}} + \boldsymbol{e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions (p-value) | 288.54 (0.00) | 40.85 (0.19) | - | 41.11 (0.16) | 25.35 (0.12) |
| 2nd order autocorrelation Test (p-value) | - | -1.24 (0.21) | -1.24 (0.21) | -1.22 (0.22) | -1.22 (0.22) |
| # of lags | - | - | - | - | 2 |
| # of Instruments | 45 | 45 | 45 | 49 | 34 |
| # of Groups | 504 | 504 | 504 | 504 | 504 |
| **Model 4(b)** | $\boldsymbol{RISKBMSDroe_{i,t}} = \alpha_0 + \alpha_1 \boldsymbol{PERF_{i,t-1}} + \alpha_2 \boldsymbol{PERF_{i,t}} + \alpha_3 \boldsymbol{SIZE_{i,t}} + \alpha_4 \boldsymbol{AGE_{i,t}} + \alpha_5 \boldsymbol{ASPAvgROE_{i,t}} + \alpha_6 \boldsymbol{LEV_{i,t}} + \alpha_7 \boldsymbol{INFLR_t} + \propto_8 \boldsymbol{GDPg_t} + \alpha_9 \boldsymbol{RISKBMSDroe_{i,t-1}} + \alpha_{10} \boldsymbol{INDBMSDroe_{i,t}} + \boldsymbol{e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions (p-value) | 280.47 (0.00) | 50.98 (0.03) | - | 37.61 (0.27) | 18.97 (0.70) |
| 2nd order autocorrelation Test (p-value) | - | -0.04 (0.97) | -.02 (0.99) | -0.29 (0.77) | -1.28 (0.20) |
| # of lags | - | - | - | - | 3 |
| # of Instruments | 45 | 45 | 45 | 49 | 34 |
| # of Groups | 482 | 482 | 482 | 482 | 482 |
| **Model 4(c)** | $\boldsymbol{RISKBMSDtri_{i,t}} = \alpha_0 + \alpha_1 \boldsymbol{PERF_{i,t-1}} + \alpha_2 \boldsymbol{PERF_{i,t}} + \alpha_3 \boldsymbol{SIZE_{i,t}} + \alpha_4 \boldsymbol{AGE_{i,t}} + \alpha_5 \boldsymbol{ASPAvgTRI_{i,t}} + \alpha_6 \boldsymbol{LEV_{i,t}} + \alpha_7 \boldsymbol{INFLR_t} + \propto_8 \boldsymbol{GDPg_t} + \alpha_9 \boldsymbol{RISKBMSDtri_{i,t-1}} + \alpha_{10} \boldsymbol{INDBMSDtri_{i,t}} + \boldsymbol{e_{i,t}}$ | | | | |
| Sargan test of over-identifying restrictions (p-value) | 307.53 (0.00) | 80.15 (0.00) | - | 76.72 (0.0001) | 74.19 (0.00) |
| 2nd order autocorrelation Test (p-value) | - | 3.41 (0.001) | 3.39 (0.001) | 3.36 (0.001) | 3.30 (0.001) |
| # of lags | - | - | - | - | 5 |
| # of Instruments | 45 | 45 | 45 | 49 | 46 |
| # of Groups | 521 | 521 | 521 | 521 | 521 |

The application of various two-step S-GMM estimations for diagnostic test is meant to have a more thorough assessment so as the best estimation technique is selected. Result shows that the two-step S-GMM with time dummies and *p* lags of dependent variable is regarded as the final estimator. Overall, column (5) for each panel reveals that the Sargan-test for sub-model 1(a,b), 2(a,b), 3(a,b) and 4(a,b) do not reject the entire set of over-identifying restrictions (p-value is greater than 0.05). The higher p-value of the Sargan statistic reflects that the instruments are exogenous and the models are appropriate. Therefore, the results suggest that these sub-models are well specified and the estimators chosen are consistent.

Another important diagnostic test in dynamic panel data estimation is the Arellano-Bond (1991) test for autocorrelation between residuals (AR). This diagnostic test is employed to check on the validity of instruments due to the dynamic nature of data (Arellano & Bond, 1991). The standard assumption in the first-order serial correlation (AR(1)) model is that the residuals for every model in the current period (period *t*) are related to their respective residuals in the previous period (period *t-1*). Meanwhile the second-order serial correlation (AR(2)) model assumes that the residuals in the period *t* depends upon the residual in both period *t-1* and period t-2. Theoretically, if the Arellano-Bond test statistic approaches normal distribution, the test for zero autocorrelation in first difference residuals should (should not) reject the null of no first-order (second-order) serial correlations (Wooldridge, 2002). Comparatively, the test for AR(2) of residuals in the first-differenced equation is more important than the test for AR(1) of residuals (Lilling, 2006). This is because, technically AR(2) test is applied to detect the presence of the first differenced residuals in both period *t-1* and period *t-2* (Roodman, 2009). As the difference residuals in AR(2) incorporate the difference residuals in AR(1) (Roodman, 2009), only the AR(2) outputs are disclosed in Table 4.4. Overall, the results of the diagnostic test AR(2) for sub-models 1 (a,b), 2 (a,b), 3 (a,b) and 4 (a,b) reported in Table 4.4 meet the requirements of accepting no second order serial correlation in the first-difference residuals (all respective p-values are greater than 0.05).

Furthermore, Table 4.4 shows that all models comply with the requirement to keep the number of instruments less than or equal to the number of groups. Based on the above standard dignostic test results, it can be concluded that dynamic GMM is the preferred panel estimator, suggesting that the research estimates for sub-models 1 (a,b), 2 (a,b), 3 (a,b) and 4(a,b) fulfill the statistical properties. Therefore, in order to draw research findings on predictive relation between risk and return, only the estimations of these sub-models based on the two-step S-GMM with time dummies and *p* lags of dependent are discussed in the following sections.

Since all the diagnostic tests show that sub-models 1(c), 2(c), 3(c) and 4(c) violate the requirement for dynamic panel data analysis, the static panel data analysis procedures are then applied as a mean to investigate the contemporaneous risk-return relationship of these sub-models. This consideration is in line with the anticipation of Fama's (1970) efficient market hypothesis (EMH) which states that the arrival of new information would be reflected in market-related variables instantaneously. In order to identify the most appropriate model to estimate the results, three competing static formulations, namely pooled OLS, random-effect (or generalized least squares) and fixed-effect models are tested. The pooled OLS assumes that the intercept and slope coefficients are constant across companies and time. On the contrary, both random-and fixed-effect assume that each firm has its own intercept, while restricting the slope to be homogenous.

Basically, two basic tests is applied to select the most appropriate static models. Breusch-Pagan Lagrange multiplier (LM) test is applied to check whether random effect model outperforms the pooled OLS model. The random effect model is more appropriate than pooled OLS if the result shows p-value of less than 0.05. This would mean that there are company-specific effects in the data. Meanwhile, Hausman's specification test is used to determine whether fixed-effect or random effect model performs better in treating the company-specific effects in the data. The fixed-effect model appears as the favored specification compared to random-effect if the result shows significant p-value (less than 0.05). A fixed-effect model allows for differences for each individual cross-section in panel data set. Once the most appropriate model is selected, diagnostic tests are applied to check the possibility of facing multi-collinearity, heteroskedasticity as well as serial-correlation problems. Due to the presence of the problems, rectification procedures are then performed.

### 4.3.2 Discussion on the First and Second Research Objectives

The discussion of the panel estimation of dependent variables begins with model 1 and model 2. Basically, in these first two models, corporate performance is regressed against corporate risk taking and other determining factors. The discussion based on model 1 is meant to fulfill the first research objective, which is to examine the impact of standard deviation and other determining variables on performance. Meanwhile the discussion based on model 2 is meant to fulfill the second research objective of examining the impact of below-mean semi-deviation and other determining variables on performance. In line with the first research objective, the aim of model 1 is specifically to investigate whether $PERF_{i,t}$ is influenced by $RISKSTD_{i,t-1}$, $RISKSTD_{i,t}$, $SIZE_{i,t}$, $FSlack_{i,t}$, $LEV_{i,t}$, $INFLR_{t}$, $M2g_{t}$, $PERF_{i,t-1}$ and $INDPERF_{i,t}$. All the regressors specified in models 1 and 2 are identical, except that different proxy is used for measuring corporate risk-taking. Therefore, both models share the same hypotheses. The proxy for corporate risk-taking as endogenous regressor applied in the first model is the standard deviation ($RISKSTD$) of five years performance's rolling data. Meanwhile, below-mean semi deviation ($RISKBMSD$) is employed as a proxy for corporate risk-taking in the second model. Based on the discussion on the diagnostic test in the previous section, sub-models 1(a,b) and 2(a,b) have good statistical properties to produce valid estimation of dynamic models. The positive and significant (at the 99 percent confidence level) coefficients of all the lagged dependent variables used as explanatory variables in sub-models 1(a,b) and 2(a,b) in Table 4.5 reaffirm the appropriateness of dynamic GMM application as panel estimator.

Meanwhile sub-models 1(c) and 2(c) are estimated using static panel data analysis. Apparently sub-models 1(c) and 2(c) which are based on market-based data considerably fit the static approach of estimation. The estimation results of 1(c) and 2(c) are presented in Table 4.6. Table 4.7 summarizes the hypotheses testing results for model 1 and model 2 using both dynamic and static panel data analyses.

#### 4.3.2.1 Discussion of Results for Hypotheses H1a and H2a

Basically, this study documents that lagged corporate risk-taking has positive and significant influence on contemporaneous accounting performance regardless of whether corporate risk-taking is measured using standard deviation (STD) or below-mean semi- deviation (BMSD). In reference to sub-model 1(a) of Table 4.5, the coefficient of regressing $PERFroa_{i,t}$ on $RISKSTDroa_{i,t-1}$ is 0.46 (z = 3.51) and it is significant at the 99 percent confidence level. The estimated coefficient implies that a one percentage point increase in $RISKSTDroa_{i,t-1}$ tends to increase the $PERFroa_{i,t}$ by 0.46 percentage point. However in terms of sub-model 1(b), the positive interaction between $PERFroe_{i,t}$ and $RISKSTDroe_{i,t-1}$ is marginally significant at the 90 percent confidence level. This analysis is then executed based on $RISKBMSD_{i,t-1}$ as an alternative proxy for prior corporate risk taking. The reported coefficients for both sub-models 2(a) and 2(b) are statistically positive and significant at the 99 percent confidence level. The coefficients of 0.54 with z = 5.73 for sub-model 2(a) and 0.45 with z = 8.94 for sub- model 2(b) are recorded. The estimated coefficient exhibited in sub-model 2(a) (sub-model 2(b)) suggests that a one percentage point change in $RISKBMSDroa_{i,t-1}$ ($RISKBMSDroe_{i,t-1}$) would increase the $PERFroa_{i,t}$ ($PERFroe_{i,t}$) by 0.54 (0.45) percentage point. Hence the *H1a*, prior risk-taking (*$RISK_{i,t-1}$)* has an influence on subsequent performance *($PERF_{i,t}$)*, is accepted.

The relationship between these two variables is commonly discussed in industrial organisation economics and strategic management. The results imply that corporate decision makers in Malaysia engage in risk-averse behaviour when they expect this behaviour brings in higher returns. In line with the risk-averse preference, managers are sensitive to the past accounting-based risk taking indicators as a basis for matching their response towards securing a safer investment (Teece *et al.*, 1997). Consequently, high accounting returns are expected in order to compensate for taking additional risk in the past. The above argument explains the existence of significantly

Table 4.5

*Dynamic Model: The Impact of Corporate Risk-Taking (measured by STD and BMSD) and Other Determining Factors on Performance based on Two-Step S-GMM with Time Dummies and p Lags of Dependent Variable*

| Specification Reference<br>Corporate Performance Indicator | **MODEL 1(a)**<br>$PERFroa_{i,t}$ | **MODEL 1(b)**<br>$PERFroe_{i,t}$ | **MODEL 2(a)**<br>$PERFroa_{i,t}$ | **MODEL 2(b)**<br>$PERFroe_{i,t}$ |
|---|---|---|---|---|
| Constant | -85.17 (-5.60)*** | -150.66 (-1.80) | -70.99 (-4.17)*** | -104.08 (-2.44) |
| Lagged Corporate Risk-taking | | | | |
| (Model 1: $RISKSTD_{i,t-1}$ ) | 0.46 (3.51)*** | 0.30 (1.76)* | - | - |
| (Model 2: $RISKBMSD_{i,t-1}$) | - | - | 0.54 (5.73)*** | 0.45 (8.94)*** |
| Contemporaneous Corporate Risk-taking | | | | |
| (Model 1 : $RISKSTD_{i,t}$ ) | -0.27 (-1.86)* | -0.90 (-4.35)*** | - | - |
| (Model 2: $RISKBMSD_{i,t}$ ) | - | - | -0.39 (-3.89)*** | -0.84 (-16.84)*** |
| Total Assets ($SIZE_{i,t}$ ) | 6.52 (5.63)*** | 11.02 (1.74)* | 5.40 (4.08)*** | 8.04 (2.47)** |
| Current Ratio ($FSlack_{i,t}$ ) | 0.49 (1.97)** | 3.15 (2.82)*** | 0.64 (2.18)** | 1.78 (1.91)** |
| Debt-to-Equity Ratio ($LEV_{i,t}$ ) | 0.002 (0.63) | 0.06 (3.45)*** | 0.002 (0.67) | 0.02 (1.64) |
| Inflation Rate ($INFLR_t$) | 0.22 (2.95)*** | 1.65 (2.60)*** | 0.16 (2.03)** | 0.78 (2.39)** |
| Lagged Dependent Variable ($PERF_{i,t-1}$ ) | | | | |
| (*Model 1(a) & Model 2(a)*: $PERFroa_{i,t-1}$) | 0.21 (9.97)*** | - | 0.22 (9.24)*** | - |
| (*Model 1(b) & Model 2(b)*: $PERFroe_{i,t-1}$) | - | 0.08 (6.84)*** | - | 0.06 (16.24)*** |
| Industry Performance ($INDPERF_{i,t}$ ) | | | | |
| ($Model\ 1(a)\&\ Model\ 2(a): INDPERFroa_{i,t}$ ) | 0.11 (2.13)** | - | 0.20 (2.82)*** | - |
| ($Model\ 1(b)\&\ Model\ 2(b): INDPERFroe_{i,t}$ ) | - | 0.02 (0.21) | - | 0.01 (0.17) |
| Sargan test of over-identifying restrictions (p-value) | Pass | Pass | Pass | Pass |
| 2nd order autocorrelation Test (p-value) | Pass | Pass | Pass | Pass |
| Firm-year observation | 3141 | 2954 | 3141 | 2954 |
| T | 9 | 9 | 9 | 9 |

**Notes:** (1) Only the final models are reported. ( 2) All the lagged dependent variables used as explanatory variables in sub-models 1(a,b), and 2(a,b) are positive and have highly significant effect (at 99% confidence level), implying that the models are genuinely dynamic. (3) The growth of M2 ($M2g_t$) as one of the independent variables is dropped from the system due to the collinearity problem. (4) *** and ** indicate the respective 1% and 5% significance level.

positive correlation between prior risk-taking and subsequent performance in the Malaysian listed companies. Prior evidence of down-side risk gives positive impact on subsequent accounting-based performance is consistent with Miller and Leiblein (1996) and Maurer (2008). The finding confirms that the effect of risk on returns is not immediate but gradually realized over time. By viewing risk as a threat of shortfalls in performance relative to its average would motivate managers to find strategic ways to improve company's performance in the subsequent period (Miller & Leiblein, 1996; Teece *et al.* (1997).

Based on behavioural theory of the firm (BToF) and prospect theory, the proponents of Bowman's paradox (1980) argue that the attitude of management towards risk and its impact on risk-return relationship might change due to economic situation of a company (Bowman, 1982; Bowman, 1984; Fiegenbaum & Thomas, 1988; Miller & Bromiley, 1990; Bromiley, 1991a, 1991b; Wiseman & Bromiley, 1996). The risk-averse behaviour which leads to positive correlation between risks and returns is observed when a company is well-positioned in the business environment. On the other hand, once a company is poorly positioned, the management dare to pursue risky projects even for lower returns. Hence leads to negative sign of risk-return relationship.

The Sub-models 2(a) and 2(b) which are based on *BMSD* as indicator of risk reveal more consistent results as compared to *STD*. This implies that downside risk plays an important role in explaining accounting returns among listed companies in the Bursa Malaysia. The implication of the result is consistent with previous studies which stated that practically, corporate decision makers and investors in emerging markets are more concerned with the probability of having returns below its average (Harvey, 2000; Estrada, 2007; Beach, 2011, Alles, 2013). Hence, the application of downside risk is suggested to be more appropriate as a risk measure instead of standard mean-variance risk measure (Harvey, 2000; Estrada, 2000, 2001; 2002, 2005; Lee, Phoon & Wong, 2006). This is probably due to the unique characteristics of emerging markets whereby the return is highly volatile (Bekaert & Harvey, 2003) and not normally distributed (Harvey, 1995a; Susmel, 2001; Stevenson, 2001; Hwang & Pederson, 2002; Pavabutr, 2003). For that reasons, the emerging market cannot be treated in the same manner as the developed market (Bekeart & Harvey 1995).

H2a hypothesises that contemporaneous risk-taking *(*$RISK_{i,t}$*)* has an influence on contemporaneous performance *(*$PERF_{i,t}$*)*. Overall, sub-models 1(a,b) and 2(a,b) reveal that contemporaneous corporate performance is negatively affected by contemporaneous corporate risk-taking irrespective of whether corporate risk-taking is measured using standard deviation (STD) or below-mean semi-deviation (BMSD). Sub-model 1(a) reports that the negative relationship is marginally significant at the 90 percent confidence level. However the sub-model 1(b) reports the negative relationship between the two variables is significant at the 99 percent confidence level. The point estimate of contemporaneous corporate risk-taking in the specification 1(b) given in the second column recorded -0.90 (z = -4.35). This result implies that a one percentage point increases of $RISKSTDroe_{i,t}$, decreases the $PERFroe_{i,t}$ by 0.90 percentage point.

Results based on BMSD as summarised in sub-models 2a and 2b are better as compared to those based on STD (1a, 1b). Coefficients for contemporaneous corporate risk-taking for both models 2(a,b) are negative and significant at the 99 percent confidence level with respective coefficients of -0.39 (z = -3.89) and -0.84 (z = -16.84). The estimated coefficient recorded in sub-model 2a (sub-model 2b) indicates that $PERFroa_{i,t}$ ($PERFroe_{i,t}$) decreases by 0.39 (0.84) percentage points if $RISKBMSDroa_{i,t}$ ($RISKBMSDroe_{i,t}$) increases by one percentage point. Generally, the inverse relationship is consistent with previous studies (Bowman, 1980; Bettis & Hall, 1982; Whitelaw, 1994; Ang, Hodrick, Xing & Zhang, 2006; Banerjee *et al.*, 2007).

The results of *H2a* would imply that corporate decision makers might change their attitude towards risk from being risk-averse (based on H1a) to risk-seeking behaviour. The existence of risk-seeking behaviour shows that the Bowman's paradox exists among listed companies in Malaysia. The contemporaneous inverse relationship which indicates that high (low) risks lead to lower (higher) returns is in agreement with the implication of BToF and prospect theory. However, the finding of significantly negative relationship contradicts with the traditional view of positive contemporaneous risk-return relationship proposed in the CAPM theory. This is likely due to the proxy used to measure risk and returns where H2a uses accounting data whereas CAPM utilizes market data.

From the perspective of strategic management literature, the decision makers have the ability to sense internal and environmental change and take on responses to strategically match the changing requirements effectively (Andersen *et al.*, 2007). In line with the standpoint of cognitive influences (Singh, 1986; Sitkin & Pablo, 1992; McNamara & Bromiley, 1999), probably the ability of decision makers to handle related business activities and to secure the profitable investments in the past boosts their confidence to change the risk preference. From the context of risky choice of behaviour at firm level (Oviatt & Bauerschmidt, 1991), it shows that the risk-seeking decision makers in Malaysia are able to adapt the current year projects of the business with high payout potential in a proper manner and thus grab the opportunity to simultaneously secure high profits at a lower risk level.

On the other hand, both sub-models 1(c) and 2(c) show contemporaneous positive relationship between market-based corporate risk-taking and performance. Using fixed-effect estimation as the final model, sub-model 1(c) records a coefficient of 0.70 with t=12.16. For sub-model 2(c) which is based on pooled OLS estimation as the final model, the coefficient of 0.68 with t= 21.86 is recorded. The OLS estimated coefficient implies that $PERFtri_{i,t}$ tends to increase by 0.68 percentage point if $RISKBMSDtri_{i,t}$ increases by one percentage point. The relationships documented in both sub-models are significant at the 99 percent confidence level. The existence of a positive contemporaneous market-based risk-return relationship which is induced by a single period risk-averse reaction of corporate decision makers and overall investors in the Malaysian market supports the implication of CAPM theory. From the perspective of strategic management scholars, the puzzling result of a negative contemporaneous risk-return relationship at the market level (when accounting-based measures are employed into the dynamic models) disappear once the static models relationship is tested using market-based data (Fiegenbaum & Thomas, 1986). Thus, the results support Bowman’s (1980) contention that the paradoxical relationship could be eliminated in stock market through trading strategy (Bowman, 1980).

#### 4.3.2.2 Discussion of Results for the Remaining Hypotheses Designed for Model 1 and Model 2

The discussions of the results for the remaining hypotheses pertain to the influence of company-specific variables and economic factors on the corporate performance. *H3a* hypothesises that performance ($PERF_{i,t}$) has a relationship with company size ($SIZE_{i,t}$). Results of this study which are summarized in Table 4.7 show that *H3a* is supported by all sub-models 1(a,b,c) and 2(a,b,c). All the estimated coefficients of company size on performance are statistically positive and significant. Referring to sub-model 1(a), the coefficient and z-value is 6.52 (z = 5.63), which is significant at the 99 percent confidence level, indicating that one percentage point increase in $SIZE_{i,t}$ would be reflected in 0.0652 percentage point increase in $PERFroa_{i,t}$. The reported coefficient of size in sub-model 1(b) is 11.02 with z = 1.74 and slightly significant at the 90 percent confidence level. In reference to sub-models 2(a) and 2(b), the estimated coefficients are positive and significant at the 99 and 95 percent confidence level respectively. The corresponding coefficients are 5.40 (z = 4.08) and 8.04 (z = 2.47). The results indicate that $PERFroa_{i,t}$ ($PERFroe_{i,t}$) increase by 0.054 (0.0804) percentage point if the total assets denoted as $SIZE_{i,t}$ increases by one percentage point. The static sub-models 1(c) and 2(c) of Table 4.6 also document positive outcomes and they are significant at the 99 percent confidence level. The coefficients and t-values for the respective sub-models are

0.09 (t=12.79) and 0.03 (t= 5.21). The estimated coefficient for pooled OLS model implies that $PERFtri_{i,t}$ tends to increase by 0.0003 percentage point if $SIZE_{i,t}$ increases by one percentage point.

Table 4.6

*Static Model: Contemporaneous Impact of Corporate Risk-Taking (measured by STD and BMSD) and Other Determining Factors on Performance*

| Specification Reference<br>Corporate Performance Indicator | **MODEL 1c (Fixed Effect)** $\boldsymbol{PERFtri_{i,t}}$ | **MODEL 2c (Pooled OLS)** $\boldsymbol{PERFtri_{i,t}}$ |
|---|---|---|
| Constant | -0.96 (-8.95)*** | -0.31 (-3.36)*** |
| Contemporaneous Corporate Risk-taking | | |
| (Model 1c : $RISKSTD_{i,t}$ ) | 0.70 (12.16)*** | - |
| (Model 2c: $RISKBMSD_{i,t}$ ) | - | 0.68 (21.86)*** |
| Total Assets ($SIZE_{i,t}$ ) | 0.09 (12.79)*** | 0.03 (5.21)*** |
| Current Ratio ($FSlack_{i,t}$ ) | 0.02 (6.14)*** | 0.01 (3.74)*** |
| Debt-to-Equity Ratio ($LEV_{i,t}$ ) | -0.00019 (-3.08)*** | -0.00014 (-2.62)*** |
| Inflation Rate ($INFLR_t$) | -0.11 (-21.52)*** | -0.10 (-15.16)*** |
| M2 Growth ($M2g_t$ ) | -0.86 (-5.59)*** | -0.58 (-3.13)*** |
| Industry Performance ($INDPERF_{i,t}$ ) | -0.10 (-1.66) | -0.14 (-1.92) |
| Firm-year observation | 3948 | 3980 |
| T | 9 | 9 |

Notes: (1) Only the final models are reported. (2) For model 1c, the robust standard errors corrected for heteroskedasticity and serial correlation are applied. (3) For model 2c, there is no serial correlation problem (p-value is 0.0789 > 0.005).

Table 4.7

*Hypotheses Testing Results based on the Final Model 1 and Model 2*

| | Hypotheses | Two-Step S-GMM with Time Dummies and Maxldep | | | | Fixed Effect | POLS |
|---|---|---|---|---|---|---|---|
| | | **1(a)** | **1(b)** | **2(a)** | **2(b)** | **1(c)** | **2(c)** |
| H1a | Prior risk-taking ($RISK_{i,t-1}$) has an influence on subsequent performance ($PERF_{i,t}$) | +ve*** Opposed the BToF & PT | +ve* Opposed the BToF & PT | +ve*** Opposed the BToF & PT | +ve*** Opposed the BToF & PT | - | - |
| H2a | Contemporaneous risk-taking ($RISK_{i,t}$) has an influence on contemporaneous performance ($PERF_{i,t}$) | -ve* Supported the BToF & PT | -ve*** Supported the BToF & PT | -ve*** Supported the BToF & PT | -ve*** Supported the BToF & PT | +ve*** Supported the CAPM | +ve*** Supported the CAPM |
| H3a | Performance ($PERF_{i,t}$) has a relationship with company size ($SIZE_{i,t}$). | +ve*** Opposed the Size Effect | +ve* Opposed the Size Effect | +ve*** Opposed the Size Effect | +ve** Opposed the Size Effect | +ve*** Opposed the Size Effect | +ve*** Opposed the Size Effect |
| H6 | There is a relationship between financial slacks ($FSlack_{i,t}$) and performance ($PERF_{i,t}$) | +ve** Supported the BToF/Opposed the AT | +ve*** Supported the BToF/ Opposed the AT | +ve** Supported the BToF/ Opposed the AT | +ve** Supported the BToF/ Opposed the AT | +ve*** Supported the BToF/ Opposed the AT | +ve*** Supported the BToF/ Opposed the AT |
| H7a | There is a relationship between leverage ($LEV_{i,t}$) and performance ($PERF_{i,t}$) | +ve | +ve*** Supported the AT | +ve | +ve | -ve*** Opposed the AT | -ve*** Opposed the AT |
| H9a | There is a relationship between inflation ($INFLR_t$) and performance ($PERF_{i,t}$) | +ve*** Supported the FEH | +ve*** Supported the FEH | +ve** Supported the FEH | +ve** Supported the FEH | -ve*** Opposed the FEH | -ve*** Opposed the FEH |
| H10 | There is a relationship between the growth of money supply ($M2g_t$) and performance ($PERF_{i,t}$) | +ve | - | - | - | -ve*** Supported the FET | -ve*** Supported the FET |

Notes: Agency Theory (AT); Behavioural Theory of the Firm (BToF); Financial Economic Theory (FET); Fisher's Effect Hypothesis (FEH); Prospect Theory (PT)

Overall, the results are consistent with the findings of past studies (Chang & Thomas, 1989; Majumdar, 1997; Mukherji, *et al*., 1997; Dimson *et al*., 2002; Schwert, 2003; Mohd Ali, 2006; Aljifri & Moustafa, 2007; Yang & Chen, 2009; Saliha & Abdessatar, 2011; Muritala, 2012; Kipesha, 2013; Chaibi *et al*., 2014) hence, verifies the importance of size in influencing performance of the Malaysian listed companies. Previous literature provides several possible explanations for the positive impact of firm size on performance which is also known as reversed size effect. First, the practitioners probably take advantage of the potential effect of size anomaly by strategically utilizing arbitrage opportunities which leads to maximizing their excess returns (Schwert, 2003). Meanwhile, Horowitz *et al.* (2000) and Amihud (2002) reveal that the size effect may have disappeared after its discovery in early 1980s. Second, the positive sign also might be due to the ability of the larger companies to operate their business activities more productively as compared to that of the smaller ones (Bos & Kolari; 2005; Kumar, 2004; Van Biesebroeck, 2005; Aljifri & Moustafa, 2007). The efficiency is achieved as a result of the ability of the larger firms to take advantage of economies of scales and dominate the market (Bain, 1954; Kumar, 2004; Serrasqueiro & Macas Nunes, 2008). Other plausible explanations are larger firms may accomplish better business diversification (Yang & Chen, 2009), have greater financial resources (Arora & Gambardella, 1990), employ experienced employees and analysts (Haniffa & Hudaib, 2006), project better reputation in diversifying risk (Ghosh, 2001; Bossone & Lee, 2004) and therefore better performance can be expected. However, the result disagrees with the size effect which proposed a negative relationship between size and return (Banz, 1981; Reinganum, 1981; Amel-Zadeh; 2011).

Discussion of results for hypotheses *H4* and *H5* is covered in the next sub-section as both hypotheses are designed for models 3 and 4. The issue on financial slack-performance relationship is captured in *H6*. It is hypothesized that there is a relationship between financial slack and performance. Generally, there exists a positive and significant (at a range of the 95 to 99 percent confidence level) relationship between the financial slack ( $FSlack_{i,t}$ is measured by current ratio) and performance regardless of whether or not the models are being tested using dynamic or static panel estimations. Sub-models 1(a,b) and 2(a,b) provide coefficients of 0.49 (z = 1.97), 3.15 (z = 2.82), 0.64 (z = 2.18) and 1.78 (z = 1.91) respectively. The estimated effect of financial slack suggests that a one percentage point increases of $FSlack_{i,t}$ is associated with an increase in performance of around 0.49 to 3.15 percentage points. The static sub-models 1(c) and 2(c) also show the same sign with coefficients of 0.02 (t = 6.14) and 0.01 (t = 3.74) respectively. The pooled OLS estimate of financial slack indicates that a one percentage point increases in $FSlack_{i,t}$ would cause an increase 0.01 percentage point in $PERFtri_{i,t}$.

In line with the implication stated in the behavioural theory of the firm (BToF), this result implies that the greater is the financial slack, the better is the performance of companies. This finding is consistent with previous studies (Cyert & March, 1963; Pfeffer & Salanchik, 1978; Nohria & Gulatis, 1997; Daniel *et al.*, 2004; Lee, 2011). Even though there are costs associated with financial slack, the proponents of this theory maintain that financial slack offers the potential to absorb fluctuations in the rapidly changing business environment (Sharfman *et al.*, 1988), facilitates innovative activities (Cyert & March, 1963; Lewis, 2013; Sang *et al.*, 2014), and thus enhances performance (Nohria & Gulatis, 1997; Daniel *et al.*, 2004; Lee, 2011). In line with this argument, financial slack is crucial for the long-run survival of the company (Singh, 1986; Hambrick & D'Aaveni, 1988; Su *et al*., 2009; Lee, 2011).

Based on previous literature, debt or leverage has both positive (agency cost theory) and negative (pecking order theory) effects on corporate performance. Therefore, *H7a* hypothesises that performance ($PERF_{i,t}$) has a relationship with debt-to-equity ratio ($LEV_{i,t}$) as a measure of leverage. With regards to sub-model 1(a) and 2(a), debt-to-equity ratio does not influence ROA. It is as expected since the ratio only expresses debts relative to stockholders' equity. Meanwhile sub-model 1(b) discloses a positive relationship between $LEV_{i,t}$ and accounting-based performance (measured by ROE) and it is significant at the 99 percent confidence level. The point estimate of financial leverage in sub-model 1(b) is 0.06 (z = 3.45), indicating that a one percentage point increase in financial leverage is associated with a rise of $PERFroe_{i,t}$ by 0.06 percentage point. However, the significant relationship between both variables disappears in sub-model 2(b).

The positive relationship recorded in sub-model 1(b) is in agreement with a number of studies (Ross, 1977; Jensen, 1986; Heinkel, 1982; Champion, 1999; Berger & Bonaccorsi di Patti, 2006; Campello, 2006; Berger & Bonaccorsi di Patti, 2006; Franck *et al.*, 2010; Akhtar, Javed, Maryam & Sadia, 2012). The DuPont model has an explanation on this result since the financial leverage (which is debt-to-equity ratio plus one) is one of the three important components of ROE. It is understood that all the related accounting ratios (net profit margin, total asset turnover and debt-to-equity ratio or equity multiplier) encapsulated in the DuPont model can be directly controlled by the corporate management. The result also supports the agency cost theory which shows that ROE is affected not only by net income, but also by the amount of financial leverage that decision makers are willing to take. The preference to increase the financial leverage would give a positive multiplier impact on ROE. Furthermore, Jensen's (1986) free cash flow hypothesis maintains that by taking a higher leverage, it would mean less free cash flow to be misused by managers. Therefore, the higher leverage would be a monitoring mechanism (Heinkel, 1982; Champion, 1999) to ensure the interest of managers and shareholders are well aligned which is to increase shareholders' wealth (Jensen & Meckling, 1976; Ross, 1977; Smith & Warmer, 1979; Jensen, 1986; Harris & Raviv, 1991; Franck *et al.* 2010).

The implication of accounting-based leverage-performance relationship is supposedly crucial for the strategic management of the Malaysian listed companies because the corporate decision makers have more information about the internal affairs than outsiders. By employing reasonable amount of debt financing, it will give rise to interest payments which are tax deductable; thus it is an indication that the management is doing a good job and the firm is in a good financial standing to pay shareholders more for their money (Christensen & Nikolaev, 2012; Carrizosa & Ryan, 2013). Therefore, the statistically positive and significant results based on accounting data might imply that companies in the Malaysian market are not financially over-leveraged. If the organizations are financially over-leveraged, a negative leverage-performance relationship would be observed.

On the other hand, from the perspective of market-based leverage-performance relationship, the estimated coefficients for the static models 1(c) and 2(c) are negative and significant at the 99 percent level. The coefficients and t-values for the respective sub-models are -0.00019 (t=-3.08) and -0.00014 (t=-2.62). The pooled OLS estimate coefficient implies that $PERFtri_{i,t}$ tends to decrease by 0.00014 percentage point if $LEV_{i,t}$ increases by one percentage point. The negative leverage-performance relationship shows that market participants perceive a greater risk of financial distress and this is reflected in the stock returns. It appears that finding of static model which reveals statistically significant negative relationship between financial leverage and market performance contradicts the earlier prediction based on agency cost theory. Nevertheless, the negative relationship between the two variables support the assumptions of Myers and Majluf's (1984) pecking order theory of capital structure, which states that profitable companies prefer internal financing rather than external financing (Guney & Paudyal, 2002).

Furthermore, a considerable amount of literature has attempted to explain on the puzzling issue of negative relationship (Fama & French, 2002; Nissim & Penman, 2003; Penman *et al*., 2007; Sivaprasad & Muradoglu, 2010; George & Hwang, 2007, 2010; Acheampong *et al*., 2014). By performing an accounting decomposition of book-to-market ratio, Penman *et al.* (2007) disclose that the negative relationship between financial leverage and stock performance still exist regardless of whether book or market leverage is applied. From the perspective of investment strategy, investors can enjoy higher returns by considering under-leveraged firms in their investment portfolio (Nissim & Penman, 2003) especially in longer investment horizons (Sivaprasad & Muradoglu, 2010). Fama and French (2002) claim that companies gradually strive towards achieving the optimal level of capital structure by adjusting the costs and benefits associated with financial leverage. George and Hwang (2010) suggest that companies which likely experience high distress costs would choose lower financial leverage to avoid higher default probability, and ultimately lead to higher returns. By using both book and market leverage, Acheampong *et al.* (2014) reveals that the relationship between financial leverage and stock return is statistically significantly negative only at the industrial-level. However the relationship is unpredictable once individual-firm level is tested. Thus, the findings of this study is consistent to the work of Fama and French (2002), Nissim and Penman (2003), Penman *et al.* (2007), and George and Hwang (2010).

Generally, the results of both the dynamic and static models confirm the lack of consensus on the relationship between leverage and corporate performance. The mixed evidence could possibly be due to the nature of the employed data (Titman & Wessels, 1988), different level of selected sample (Acheampong *et al.*, 2014), different proxies applied as financial leverage and performance indicators (Rajan & Zingales, 1995; George & Hwang, 2010), different estimation method applied (Sivaprasad & Muradoglu, 2010) and financial market imperfection (Gomes & Schmid, 2010).

Previous empirical literature reveals mixed effects of inflation on the performance of companies. Therefore, *H9a* hypothesises that there is a relationship between inflation (*INFLR*) and performance (*PERF*). Based on a dynamic panel analysis, sub-models 1(a,b) and 2(a,b) disclose statistically positive and significant relationship at a range of the 95 percent to 99 percent confidence level. The point estimates of inflation in sub-model 1(a) and 1(b) are 0.22 (z=2.95) and 1.65 (z=2.60) respectively. Meanwhile, the coefficients and z-values recorded in sub-models 2(a) and 2(b) are 0.16 (z=2.03) and 0.78 (z=2.39) respectively. The results explain that a one percentage point increase in inflation (proxied by consumer price index) is associated with an improvement in accounting-based performance around 0.16 to 1.65 percentage points.

The positive effect of inflation on assets' returns is in agreement with the Fisher's effect theory which is established by Fisher (1930). Boudoukh and Richardson (1993), Kaliva (2008) and Zainal (2014) among others, support the implication of the theory which states that over the long-run, the asset returns move one-for-one with forecasted inflation. This is because changes in expected inflation will cause an equivalent change in the nominal interest rate, thereby leaving the real interest rate unaffected. Therefore, the theory maintains that a moderate level of changes in expected inflation is acceptable because its presence provides a positive effect on financial activities. This research finding signals that corporate decision makers have enough information to take advantage of the forecasted inflation. Hence, they can react proactively (i.e. deal with suppliers to get a good bargain or transfer the inflation cost to customers) so that inflation would give favourable impacts on accounting profits.

Contrary to the results of the accounting-based dynamic models, the market-based static sub-models 1(c) and 2 (c) disclose statistically negative relationship between inflation and stock return. The coefficients and t-values for sub-model 1(c) and 2(c) are -0.11 (t = -21.52) and -0.10 (t = -15.16) respectively. The pooled OLS estimate coefficient implies that $PERFtri_{i,t}$ tends to decrease by 0.10 percentage point if $INFLR_t$ increases by one percentage point. Results at the market level reveal that the relationships are significant at the 99 percent confidence level. Apparently, the inverse relationship between inflation and market-based performance denies the existence of Fisher's effect in the Malaysian stock market. From the perspective of developed markets, the puzzling significant negative relationship has long been documented regardless of the methods used (Nelson, 1976; Bodie 1976; Jaffee & Mandelker 1976; Fama & Schwert, 1977). Following these early studies, a number of attempts to explain the negative relationship have emerged in the literature. The proxy effect hypothesis promoted by Fama (1981) argues that the inverse relationship has its basis in the money demand and quantity theories. Rising in inflation rates stimulates the reduction in real economic activity and money demand. This condition negatively affects the profits of companies, hence stock prices.

The results of this research imply that common stock is not a good hedge against inflation as proposed by conventional finance theory. Since inflation unfavourably affects the share price, investors might be exposed to high risk during the process of acquiring proceeds for investment purposes. A number of previous studies into the sensitivity of stock price towards inflation in the Malaysian market provide support to the inverse relationship. Wongbampo and Sharma (2002) look into the long term inflation-stock price relationship in five Asian countries including Malaysia and report that there is a negative relationship between stock prices and inflation in all the five Asian countries. With the same research interest, Khazali and Pyun (2004) disclose a short-term negative inflation-stock price relationship in nine countries in Pacific-Basin including Malaysia. Meanwhile, Geetha *et al.* (2011) also document a negative impact of expected inflation on the stock market in Malaysia.

Based on previous literature, *H10* predicts that the growth of money supply has an impact on corporate performance. The results of all dynamic models in Table 4.5

show that the growth of M2 ($M2g_t$) as one of the independent variables is dropped from the system due to the collinearity problem. Meanwhile, as reported in the static or single-period models 1(c) and 2(c), the coefficients and t-values for the growth of money supply are -0.86 (t = -5.59) and -0.58 (t = -3.13) respectively. The estimated effect from pooled OLS regression suggests a one percentage point increase in $M2g_t$ tend to reduce the $PERFtri_{i,t}$ by 0.58 percentage point. The 99 percent confidence level of negative relationship between money supply and stock return supports the empirical results of Bodie (1976), Fama (1981), Geske and Roll (1983) and Pearce and Roley (1985). They argue that excessive growth in money supply tend to drive higher inflation. Consequently, higher inflation may result in higher discount rate and would reduce the stock prices.

Generally, the coefficients of industry performance ($INDPERroa_{i,t}$ and $INDPERroe_{i,t}$) based on dynamic models are positive and significant at the 95 to 99 percent confidence level, with values ranging from 0.03 to 0.20. The results imply that the industry-wide performance is one of the determining factors of accounting performance. Logically, if the industry performs well, companies that belong to the industry would perform well too. However, the static models show insignificant or marginally significant impact of $INDPERtri_{i,t}$ on $PERtri_{i,t}$. This is probably due to the nature of single-period model whereby the contemporaneous impact of $INDPERtri_{i,t}$ on $PERtri_{i,t}$ is less likely relevant.

### 4.3.3 Discussion on the Third and Fourth Research Objectives

In the former section, corporate risk-taking is treated as one of the independent variables that affect corporate performance. On the other hand, in this section, corporate risk-taking is specified as the dependent variable for the tested models. The standard one way direction of risk affecting return is unable to reflect every aspect of corporate risk-return profile. Therefore, the analysis of findings from both perspective of corporate performance and risk taking determinants is important to allow for a better evaluation of causal relation between risk and return.

The discussion of panel estimation on corporate risk-taking based on sub-models 3(a,b,c) and 4(a,b,c) is meant to answer research objectives three and four respectively. With regards to the third model, overall corporate risk taking which is represented by STD is regressed against corporate performance and other determining factors. While in the fourth model, downside corporate risk taking which is represented by BMSD is regressed against corporate performance and other determining factors. The discussion in this section is based on dynamic panel models for accounting returns and static panel models for market returns as summarised in Table 4.8 and Table 4.9 respectively.

#### 4.3.3.1 Discussion of Results for Hypotheses H1b and H2b

Results concerning the impact of prior performance on corporate risk-taking as presented in the dynamic models of Table 4.8 are mixed. Referring to sub-model 3(a), the sign of coefficient indicates that prior ROA has a tendency to positively influence the standard deviation (STD) of ROA but the results fails to present significant relationship at any level. However, when below-mean semi-deviation (BMSD) of ROA was used as a proxy of risk-taking (sub-model 4(a)), prior ROA has a statistically positive and significant impact on corporate risk-taking at the 99 percent confidence level. The reported coefficient values of prior ROA is 0.03 ($z = 2.69$), indicating that a one percentage point increase in prior ROA would increase the corporate risk-taking by 0.03 percentage point. The significant positive relationship apparently challenges the implication stated in the Wiseman and Gomez-Meija's (1998) behavioural agency model of managerial risk-taking. The theory claims that managers who are loss averse tend to engage in lower risk activities since they want to maintain company's future performance good as (or even better than) the past performance. On the contrary, the result shows that the management of a company would increase its involvement in risky projects since its past performance could reflect effective risk and total assets management (Bromiley, 1991a; Sitkin & Pablo, 1992; Simon, Houghton & Savelli, 2003). Hence, past performance could be regrded as one of internal sources of information or track record that the management can rely on, to operationalise profitable corporate risk-taking strategy (Wiseman & Gomez-Meija, 1998). An attempt to pursue risky and profitable projects would increase shareholders' wealth, leading to an alignment of interest between managers and shareholders (Jensen & Meckling, 1976).

Furthermore, the estimated coefficient of regressing standard deviation of ROE on prior ROE recorded in sub-model 3(b) also reveals statistically positive and significant relationship at the 99 percent confidence level. A coefficient of 0.02 ($z = 4.39$) indicates that a one percentage increase in prior ROE would increase the standard deviation of ROE by 0.02 percentage point. Since ROE shows returns to shareholders, it is normally referred to by the existing and prospective investors. The possible reason of the positive impact of past ROE can be partly explained by the house-money effect proposed by Thaler and Johnson (1990). The underlying reason for this effect is that, investors are psychologically bias in seeking more risky

Table 4.8

*Dynamic Model: The Impact of Corporate Performance and Other Determining Factors on Corporate Risk-Taking (Represented by STD and BMSD) based on Two-Step S-GMM with Time Dummies and p Lags of Dependent Variable*

| Specification Reference<br>Corporate Risk-Taking Indicator | **MODEL 3(a)**<br>$RISKSTDroa_{i,t}$ | **MODEL 3(b)**<br>$RISKSTDroe_{i,t}$ | **MODEL 4(a)**<br>$RISKBMSDroa_{i,t}$ | **MODEL 4(b)**<br>$RISKBMSDroe_{i,t}$ |
|---|---|---|---|---|
| Constant | 14.95 (3.63)*** | 52.17 (1.01) | 14.99 (1.47) | -93.44 (-1.25) |
| Lagged Corporate Performance | | | | |
| (*Model 3(a) & Model 4(a)*: $PERFroa_{i,t-1}$) | 0.007 (1.01) | - | 0.03 (2.69)*** | - |
| (*Model 3(b) & Model 4(b)*: $PERFroe_{i,t-1}$) | - | 0.02 (4.39)*** | - | -0.04 (-3.50)*** |
| Contemporaneous Corporate Performance ($PERF_{i,t}$ ) | | | | |
| (*Model 3(a) & Model 4(a)*: $PERFroa_{i,t}$) | -.022 (-0.86) | - | -0.10 (-2.02)** | - |
| (*Model 3(b) & Model 4(b)*: $PERFroe_{i,t}$) | - | -0.05 (-1.11) | - | -0.36 (-5.55)*** |
| Total Assets ($SIZE_{i,t}$ ) | -0.87 (-2.38)** | -2.68 (-0.72) | -1.45 (-2.09)** | -0.08 (-0.02) |
| The number of years the company has been listed ( $AGE_{i,t}$ ) | -0.21 (-1.88) | -0.61 (-0.35) | 0.14 (0.50) | 6.24 (1.96)** |
| Benchmark based on the lagged average of performance | | | | |
| ($Model\ 3(a)\&\ Model\ 4(a)$: $ASPAverageROA_{i,t}$ ) | 0.002 (0.05) | - | 0.24 (2.29)** | - |
| ($Model\ 3(b)\&\ Model\ 4(b)$: $ASPAverageROE_{i,t}$ ) | - | -0.61 (-5.42)*** | - | -0.49 (-5.60)*** |
| Debt-to-Equity Ratio ($LEV_{i,t}$ ) | 0.0006 (0.77) | -0.04 (-4.41)*** | 0.002 (1.38) | -0.03 (-3.32)*** |
| Inflation Rate ($INFLR_t$) | -0.10 (-2.54)** | -0.39 (-0.99) | -0.02 (-0.23) | 1.13 (1.58) |
| Lagged Dependent Variable | | | | |
| ($Model\ 3$: $RISKSTD_{i,t-1}$ ) | 0.95 (42.61)*** | 0.96 (34.95)*** | - | - |
| ($Model\ 4$: $RISKBMSD_{i,t-1}$) | - | - | 0.96 (26.06)*** | 0.84 (16.77)*** |
| Industry Risk-Taking | | | | |
| (Model 3: $INDSTD_{i,t}$) | 0.09 (2.07)** | -0.009 (-0.54) | - | - |
| (Model 4: $INDBMSD_{i,t}$) | - | - | 0.18 (1.83) | 0.007 (0.52) |
| Sargan test of over-identifying restrictions ( p-value) | Pass | Pass | Pass | Pass |
| 2nd order autocorrelation test (p-value) | Pass | Pass | Pass | Pass |
| Firm-year observation | 3176 | 2988 | 3176 | 2988 |
| T | 9 | 9 | 9 | 9 |

**Notes:** (1) Only the final models are reported. ( 2) All the lagged dependent variables used as explanatory variables in sub-models 1(a,b), and 2(a,b) are positive and have highly significant effect (at 99% confidence level), implying that the models are genuinely dynamic. (3) The growth of M2 ($M2g_t$) as one of the independent variables is dropped from the system due to the collinearity problem. (4) *** and ** indicate the respective 1% and 5% significance level.

Table 4.9

*Static Model: Contemporaneous Impact of Corporate performance and Other Determining Factors on Corporate Risk-Taking (measured by STD and BMSD)*

| Specification Reference<br>Corporate Risk-Taking Indicator | **MODEL 3c (Fixed Effect)** $RISKSTDtri_{i,t}$ | **MODEL 4c (Fixed Effect)** $RISKBMSDtri_{i,t}$ |
|---|---|---|
| Constant | 1.07 (10.78)*** | 0.71 (9.03)*** |
| Contemporaneous Corporate Performance ($PERFtri_{i,t}$) | 0.34 (6.90)*** | 0.18 (12.08)*** |
| Total Assets ($SIZE_{i,t}$) | -0.07 (-9.33)*** | -0.03 (-4.44)*** |
| The number of years the company has been listed ($AGE_{i,t}$) | 0.002 (0.84) | -0.0006 (-0.37) |
| Benchmark based on the lagged average of performance ($ASPAverageTRI_{i,t}$) | -0.05 (-1.04) | 0.72 (18.40)*** |
| Debt-to-Equity Ratio ($LEV_{i,t}$) | 0.0002 (2.53)** | 0.0001 (4.03)*** |
| Inflation Rate ($INFLR_t$) | 0.04 (5.61)*** | -0.007 (-2.16)** |
| GDP Growth ($GDPg_t$) | 0.03 (0.19) | -0.18 (-3.20)*** |
| Industry Risk-Taking | | |
| (Model 3c: $INDSTD_{i,t}$) | 0.29 (6.23)*** | - |
| (Model 4c: $INDBMSD_{i,t}$) | - | 0.06 (0.82) |
| Firm-year observation | 3489 | 3516 |
| T | 9 | 9 |

Notes: (1) Only the final models are reported. (2) For model 3(c) and 4(c), the robust standard errors corrected for heteroskedasticity and serial correlation are applied.

investment after they experience a reasonable gain in the past where they are willing to gamble the profits beyond the amount invested by taking high risk projects (Massa & Simonov, 2005; Ackert *et al.*, 2006; Frino *et al.*, 2008). This indicates that the Malaysian managers tend to be overconfident and willing to take risky actions without fear of a loss.

In contrast to the strong positive impact of previous year's ROE on the overall corporate risk-taking discussed earlier on, sub-model 4(b) shows that there is a significantly negative impact of past ROE on the possibility of firms having return below the mean at the 99 percent confidence level. A coefficient of -0.04 (z = -3.50) indicates that a one percentage point increase in prior ROE would reduce the downside risk by 0.04 percentage point. Explanation for the inverse impact of past performance on risk-taking could be derived from the implication of focusing just on the downside risk instead of the total risk as a risk measure. Once firms experienced gains, investors tend to consistently lock their previous performance by strategically intensifying downside risk management. An increase in past ROE stimulates protection and provide cushion from subsequent downside risk. This is in line with the contention that managers are more concerned about managing downside losses relative to upside gains. By taking care of downside risk, it could mitigate the principal-agent problem. The possible explanation mentioned above is in line with the concept of Tversky and Kahneman's (1981) risky choice framing effect which is derived from the prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991, 1992). It is conceptualized that the adjustment of managers' risk tolerance depends on how they psychologically framed the context of past experience as a reference point. Unlike house-money effect, the framing effect states that investors typically prefer to avoid (seek) risky alternatives once they framed past performance information as a positive (negative) outcome. The phenomenon of framing effect is regarded as one of the common irrational decision making (Singh & Bhowal, 2010) which is generally observed in the Asian Market (Tversky & Kahneman, 1981).

The mixed results imply that different proxies of risk and return measures produce different impact of prior performance on corporate risk taking. The possible explanation of the conflicting results depends on the definition and assumption related to the variables (i.e. ROA, ROE). The application of two different dimensions of corporate risk-taking affects the results. This is because standard deviation which refers to the square root of variance is meant to measure the total risk where it captures the movement of performance from both upside and downside perspectives (Fishburn, 1977; Swisher & Kasten, 2005); whereas BMSD which is a proxy for downside risk only measures the volatility of returns below the average performance. This measure is in agreement with the suggestion that risks are mostly associated with negative outcomes (March & Shapira, 1987). Previous research indicates that a downside risk measure is more reliable with how risk is actually perceived by individuals (Miller & Leiblein, 1996; Huffman & Moll, 2012). In the context of emerging markets where the return are not normal, downside risk is considered to be more important (Bekaert *et al.*, 1998; Bekaert & Harvey, 2013). The sign of the coefficient of past performance, either positive or negative, in the corporate risk-taking relationship found in this study supports *H1b* which hypothesises that prior performance has an influence on corporate risk-taking.

Apart from discussing the impact of prior performance on subsequent risk-taking, the contemporaneous impact of performance on risk-taking from the perspective of dynamic model and static model are also considered important to be highlighted in this research. Both sub-models 3(a) and 3(b) of Table 4.8 fail to shed light on Hypothesis H2b which hypothesises that contemporaneous performance *($PERF_{i,t}$)* has an influence on contemporaneous risk-taking *($RISK_{i,t}$)* as the variables are insignificant. Nevertheless, when risk is being measured by BMSD, a significant relationship is observed. The significant negative coefficients associated with the contemporaneous performance ROA in sub-model 4(a) and contemporaneous performance ROE in sub-model 4(b) support the hypothesis. As for sub-model 4(a), the estimated coefficient of -0.10 with a z-value of -2.02 shows that a one percentage point increase in the contemporaneous ROA would reduce the below-mean semi-deviation by 0.10. The coefficient is significant at the 95 percent confidence level. For sub-model 4(b), when the proxy on contemporaneous performance was changed to ROE, the impact on risk-taking by companies is greater where a one percentage increase in the contemporaneous ROE had reduced the below-mean semi-deviation risk by 0.36 percentage point. The coefficient is significant at the 99 percent confidence level. The results of sub-models 4(a) and 4(b) imply that managers will reduce the riskiness of their investments if they believe that performance of their company will be better. The contemporaneous negative correlation between returns and volatility of returns is in line with previous studies (Bowman, 1980; Falkenstein, 2012; Varghese, 2014; Li *et al.*, 2014). Interestingly, the significant impact of new information about returns on the current below-mean semi-deviation risk also reveals that in the context of the Malaysian market, downside risk measure is more reliable with how risk is actually perceived. The results also show that the significant impact of contemporaneous ROE is greater than ROA. Probably, the inclusion of leverage as an equity multiplier in the company's performance measured by ROE would create a larger impact when the companies optimise leverage in their operations.

On the contrary, in reference to the static sub-models 3(c) and 4(c) of Table 4.9, the estimated coefficients of contemporaneous corporate performance are positive and significant at the 99 percent confidence level for both models. The coefficient of 0.34 (t = 6.90) and 0.18 (t = 12.08) for sub-model 3(c) and 4(c) are recorded respectively. The results reveal that contemporaneous corporate risk-taking are positively affected by contemporaneous corporate performance irrespective of whether corporate risk-taking is measured using standard deviation (STD) or below-mean semi-deviation (BMSD). These indicate that investors are sensitive to the current state of corporate performance (Zareei & Siahboumi, 2014). They would perceive a higher contemporaneous corporate performance is associated with a higher risk. However, the significant positive relationship apparently challenges the implication stated in the Bowman's (1980) paradox that low (high) performing firm increases (decreases) corporate risk-taking (Falkenstein, 2012; Li, Yang & Zhang, 2014; Varghese, 2014).

#### 4.3.3.2 The Discussion of the Results for the Remaining Hypotheses Designed for Model 3 and Model 4

From the perspective of accounting-based dynamic model estimation, the firm size (as measured by total assets) coefficient is significant at the 95 percent confidence level when RISKSTDroa and RISKBMSDroa are applied as proxies for corporate risk-taking. Specifically, referring to sub-model 3(a) and 4(a) of Table 4.8, the estimated coefficients and z-values are -0.87 (z= -2.38) and -1.45(-2.09) respectively. The negative estimated coefficient suggest that a one percentage point increase in $SIZE_{i,t}$

would reduce the $RISKSTDroa_{i,t}$ ($RISKBMSDroa_{i,t}$) by 0.0087 (0.0145) percentage point. Meanwhile, from the perspective of market-based static model estimation, the coefficients of -0.07 with z = -9.33 for sub-model 3(c) and -0.03 with z = -4.44 for sub-model 4(c) are recorded and they are significant at the 99 percent confidence level.

Overall, the results supported hypothesis *H3b*, which states that risk-taking behaviour *(RISK)* has a relationship with company size *(SIZE)*. The negative and significant coefficient on firm size for all dependent variables (except $RISKSTDroe$ and $RISKBMSDroe$ ) suggests smaller firms (larger firms) take higher (lower) risk. The inverse relationship is in agreement with the implication stated in the behavioural theory of the firm and prospect theory and supported by Stekler (1964), Samuels and Smyth (1968) and Ballantine, Cleveland and Koeller (1993). One potential explanation is that having less bureaucracy in decision making process allows small firms to respond far more efficiently in grabbing risky opportunities that offer great opportunity of getting higher rewards. Therefore, smaller firms which are still in a fast-growth stage are more flexible in pursuing investment alternatives that have higher risks. On the other hand, larger companies with greater control by a larger number of decision makers normally experience greater bureaucracy. Due to their long decision chains, they are less dynamic in pursuing risky opportunities. Another possible explanation is that, in the context of diversification strategy, larger companies normally have greater capacity of resources to realize a better diversification of risks and ultimately reduce the volatility of their performance.

Hypothesis H4 states that company age (*AGE*) should have an influence on corporate risk-taking behaviour (*RISK*). The significant relationship between age of company and corporate risk-taking is found only in dynamic sub-model 4(b). The estimated coefficient of 6.24 with a z-value of 1.96 shows that a one unit increases in the company age would increase the below-mean semi-deviation by 6.24 units. The positive and significant coefficient effect implies that older companies are more ready to face higher risk which is measured by below-mean semi-deviation. The result is in agreement with a number of researchers (Walls & Dyer, 1996; Zahra *et al.*, 1999; Zahra & George, 2002). Having the ability to assimilate all the advantages of being older in the market such as better strategic resources (Barney, 1991; Walls & Dyer, 1996), better skills and experience (Getz, 1997; Henderson & Benner, 2001), cost efficient and more competitive in the market (Alon, 2004), greater reputation (Horner, 2002), and well diversified company (De Motta, 2003; Gomes & Livdan, 2004) give the strength for them to engage in innovative and riskier projects. On the other hand, the result contradicts to the implication stated in the company's passive learning process model proposed by Jovanovic (1982) which claim that younger companies are inclined to be riskier than older ones. In contrast, results show that this variable is insignificant in explaining corporate risk-taking for both the dynamic and static sub-models 3(a), 3(b), 3(c), 4(a) and 4(c). It is likely that the significant result of sub-model 4(b) is being influenced by below-mean semi-deviation of *ROE* which is highly volatile.

Historical aspiration (based on company's assessment of its own individual past average performance over five-year rolling period) is likely to influence the company's risk taking behaviour. This is because it provides a relative performance goal of an individual company as a benchmark to earn above its own average return and to sustain the competitive advantages over their rivals in the future. The results of this study on the impact of historical aspiration on corporate risk-taking presented in the dynamic models of Table 4.8 and the static model of Table 4.9 are mixed.

Though the estimated coefficient of historical aspiration (measured by the average ROA) in the dynamic sub-model 3(a) is not significant, it does show the inclination of the independent variable to positively influence the total corporate risk-taking. From the perspective of below-mean semi-deviation (BMSD) as a risk measure, the dynamic sub-model 4(a) reports that the historical aspiration has statistically positive and significant (at the 95 percent confidence level) influenced on downside corporate risk-taking. The coefficient and z-value for sub-model 4(a) is 0.24 (z=2.29), indicating that a one percentage point increases (decreases) in $ASPAverageROA_{i,t}$ would be reflected in 0.24 percentage point increase (decrease) in $RISKBMSDroa_{i,t}$.

Meanwhile, the static sub-models 4(c) also document a positive and significant (at the 99 percent confidence level) outcome.  The coefficient and t-value of the historical aspiration (measured by the average TRI) for sub-model 4(c) is 0.72 (t = 18.40). The positive and significant relationship shows in both sub-models is in agreement with the implication of threat-rigidity hypothesis (Staw, Sandelands & Dutton, 1981; Audia & Greve, 2006) which uphold that a company tends to preserve its resources and avoid risky investments ("rigidity") as the company experienced a decline in its average past performance ("threat").  The result of this study implies that decision makers of the Malaysian companies tend to be rigid in judging and pursuing risky project alternatives as they are aware of a decline in their own minimum benchmark of performance (as a proxy for historical aspiration, measured by average ROA and TRI) will be a threat on the chances for the company's survival and better achievement in the future. The threat of a decline in historical aspiration will be more obvious if the management is unable to control the influence of external factors and environmental change (Audia & Greve, 2006).

On the other hand, referring to sub-model 3(b), the sign of coefficient indicates that the aspiration (measured by the average of five years of ROE) has a negative influence on the standard deviation (STD) of ROE. The same sign of relationship between aspiration and below-mean semi-deviation (BMSD) of ROE is also presented in sub-model 4(b). The reported coefficient values of aspiration in the respective sub-models are -0.61 (z = -5.42) and -0.49 (z = -5.60). The estimated coefficient indicates that $RISKSTDroe_{i,t}$ ($RISKBMSDroe_{i,t}$ ) decreases by 0.61 (0.49) percentage points if $ASPAverageROE_{i,t}$ increases by one percentage point. Both coefficient values are significant at the 99 percent confidence level.

The negative relationship is in agreement with the behavioural theory of the firm and prospect theory. The implication of these organizational theories suggest that a company (which made up of individuals including the administrative people and shareholders) tends to be risk averse (risk seeking) as the company experiences an increase (a decrease) in minimum benchmark of *ROE*.  The company continues with the *status quo* where no drastic change in business strategy is needed once a better than average performance has been achieved (Audia, Locke & Smith, 2000; Denrell, 2008). On the other hand, if a company faces lower average performance, higher risk-taking strategies are required to search for new business opportunities which can lead to an increase in performance in the future (Grinyer & McKiernan, 1990; Denrell, 2008).

Referring to the above results, the aspiration level *(ASP)* has an influence on risk-taking behaviour *(RISK)* which supports *H5*. However, the mixed results imply that different proxies for risk and return measures produce different impact of historical aspiration on corporate risk taking within the context of an emerging market like Malaysia. Comparatively, risk measured by *BMSD* consistently shows significant results as compared to *STD*. This would mean that the Malaysian market players are more concern with downside risk. Meanwhile the inclusion (exclusion) of leverage in calculating *ROE* (*ROA*) might have caused the different results in the dynamic sub-models. This is because the existence of high leverage in the capital structure may lead to the rise in *ROE* above *ROA* (Myers, 1977). On the contrary, without leverage both *ROE* and *ROA* would be at par. Furthermore, total asset is more stable as compared to shareholders equity because the former is not influence by retained earnings of a company.

Previous empirical literature also reveals mixed effects of leverage on corporate risk-taking behaviour. Therefore, H7b hypothesises that there is a relationship between leverage (*LEV*) and risk-taking behaviour *(RISK)*. The reported coefficients for both sub-models 3(b) and 4(b) are statistically significant at the one percent level with a negative relationship. The coefficients of -0.04 with z = -4.41 for sub-model 3(b) and -0.03 with z = -3.32 for sub-model 4(b) are recorded. The estimated coefficient exhibited in sub-model 3(b) (sub-model 4(b)) suggests that a one percentage point increases in $LEV_{i,t}$ would decrease the $RISKSTDroe_{i,t}$ ($RISKBMSDroe_{i,t}$) by 0.04 (0.03) percentage point. The existence of a negative leverage to risk-taking relationship from the perspective of dynamic model fails to support the implication of agency theory developed by Jensen and Meckling (1976) which proposes that a higher leverage would induce a company to choose risky projects. The results might suggest that as the Malaysian listed companies experience increase in the level of leverage, the fixed financial commitment is also proportionately increase which theoretically multiplies the consequences of facing the threat of financial distress. As a result, the management would reduce the tendency to pursue risky projects. The inverse relationship is consistent to some previous studies (Balakrisnan & Fox, 1993; Cai & Zhang, 2011; Gilje, 2014).

In contrast, both sub-models 3(c) and 4(c) show a positive relationship between leverage and corporate risk-taking. The coefficient values for the respective sub-models are significant at the five and one percent level. Sub-model 3(c) records a coefficient of 0.0002 with $t = 2.53$ and for sub-model 4(c), the coefficient of 0.0001 with $t = 4.03$ is recorded. The positive leverage to risk-taking relationship supports the implication of Jensen and Meckling's (1976) agency theory as well as free cash flow hypothesis (Jensen, 1986). They claim that debt payment as a fixed obligation could reduce the availability of company's free cash as well as discourage overinvestment of the free cash by managers. There is fairly large literature which is in agreement with the contention that higher leverage would motivate managers who are characterized as self-centered and opportunist agents (Rajan and Winton, 1995; Stulz, 2000) to work harder, consume less perks (Ross, 1977; Jensen 1986) and pursue greater risky projects (Black, 1976; Stiglitz & Weiss, 1981; Christie, 1982; Wiseman & Catanach, 1997; Markman, Balkin & Schjoedt; 2001; Bitar, 2004; Bhatti *et al*., 2010; Shim, 2013). Meanwhile, shareholders who have limited liability are willing to accept the management decision on increasing risky investments, which promise larger returns in the future (Jensen & Meckling, 1976; Stiglitz & Weiss, 1981; Jensen, 1986; Harris & Raviv, 1991; Campello, 2006; Berger & Bonaccorsi di Patti, 2006; Franck *et al*., 2010). However, the reported coefficients for both sub-models 3(a) and 4(a) are statistically insignificant, indicating that debt-to-equity ratio does not influence the variation in profitability measured by *ROA*. The results for both sub-models are expected since this leverage indicator only expresses debts relative to stockholders' equity.

Results concerning the influence of inflation *($INFLR_t$)* on risk-taking *($RISK_{i,t}$)* based on dynamic models mostly are not significant except for sub-model 3(a). The recorded coefficient of -0.10 with z = -2.54 is significant at the 95 percent confidence level. The negative estimated coefficient suggests that a one percentage point increase in $INFLR_t$ would reduce the $RISKSTDroa_{i,t}$ by 0.10 percentage point. Apart from that, the static sub-model 4(c) also shows a negative relationship which is significant at the 95 percent confidence level. The negative relationship implies that low (high) inflation which promotes economic stability (instability) would encourage the Malaysian listed companies to pursue (let go) risky investments. This relationship may be partly attributable to the Fisher's (1930) effect. The theory states that in the long run, a decline in inflation would likely pressurize the nominal risk-free rate downward (Madura, 2010), a situation which may lead to a decrease in discount rate (Mills, 1996). Therefore, as inflation decreases (increases), companies may incline to take up (forgo) risky projects which offer returns above (below) the discount rates. This relationship is evident in Holland (1993) and Fischer (2013). In addition, as low inflation cause lower market interest rate, investors are motivated to borrow money from banks for investment or consumption purposes (Cuthbertson, 1985; Qayyum, 2002).

However, sub-model 3(c) shows a positive impact of $INFLR_t$ on $RISKSTDtri_{i,t}$. The reported coefficient values of $INFLR_t$ is 0.04 (t = 5.61) which is significant at the 99 percent confidence level. The presence of positive relationship is supported by a number of studies (Fama & Schwert, 1977; Kearny & Daly, 1998; Engle & Rangel, 2005; Saryal, 2007). They contend that countries with a high rate of monetary and price inflation experience larger stock market volatilty than those with more stable inflation rate. Furthermore, Fischer (1993) argue that a rise in the inflation rate is expected to decrease the purchasing power of investors, and this would likely lead to a decline in the efficiency of company's resources allocation as well as economic growth. This in turn leads to higher volatility of returns. Therefore, the results exhibited in sub-models 3(a), 3(c) and 4(c) suggest that the hypothesis H9b which states that inflation has an influence on corporate risk-taking is supported.

Previous literature predicts that the growth of GDP which is one of the primary indicators of economic health has an impact on corporate risk-taking. However, due to the collinearity problem, the GDP growth is automatically dropped from the system of dynamic models. From the perspective of static model, the sub-model 4(c) reports that the GDP growth has statistically negative and significant (at the 99 percent confidence level) influence on downside corporate risk-taking where an increase in GDP would reduce the below-mean semi-deviation risk. The result discloses that stock market volatility in the context of the Malaysian market is relatively high (low) as the GDP growth is relatively low (high). The negative impact of GDP growth on corporate risk is in agreement with some previous literature (Eling & Marek, 2011; Kumar & Tamimi, 2011). Generally, an increase in GDP growth reflects a decreasing risk of economic sustainability. This fundamental factor would likely lower the investment risk, thus, causing a stock return volatility to decrease. Hence, the hypothesis H11 which states that GDP growth has an influence on corporate risk-taking is supported.

The dynamic sub-model 3(a) and the static sub-model 3(c) report that the coefficients of industry risk-taking measured by STD are associated positively with corporate risk-taking. The relationship is significant at the 95 to 99 percent confidence level. This indicates that in a competitive market, the risk of one company is influenced by the risk of its industry as they are competing for the same market.

## 4.4 Chapter Summary

This chapter provides the empirical results on the factors contributing to performance and risk-taking in Malaysian listed companies based on panel data structure. In the first section, the basic descriptive analyses of data are used to analyse and interpret the statistical attributes of the continuous variables over the period 2004 to 2012. In order to test the correlations amongst the independent variables for each model, the pairwise Pearson's correlation test is applied. In general, the results show that there is almost no multicollinearity problem arise between independent variables in the predictive models. The results of variance inflation factor confirm that there is no threat of multicollinearity as variables in all models present VIF below 10.

Since financial econometric issues discussed in this study are dynamic by nature, the next section presents dynamic panel data analysis by using generalized method of

Table 4.10

*Hypotheses Testing Results based on the Final Model 3 and Model 4*

| | Hypothesis | Two-Step S-GMM with Time Dummies and Maxldep | | | | Fixed Effect | |
|---|---|---|---|---|---|---|---|
| | | 3(a) | 3(b) | 4(a) | 4(b) | 3(c) | 4(c) |
| H1b | Prior performance *($PERF_{i,t-1}$)* has an influence on risk-taking ($RISK_{i,t}$) | +ve | +ve*** Supported the house-money effect | +ve*** Opposed the behv. Agency model | -ve*** Supported the framing effect | - | - |
| H2b | Contemporaneous performance *($PERF_{i,t}$)* has an influence on Contemporaneous risk-taking *($RISK_{i,t}$)* | -ve | -ve | -ve** Supported the Bowman's Paradox | -ve*** Supported the Bowman's Paradox | +ve*** Opposed the Bowman's Paradox | +ve*** Opposed the Bowman's Paradox |
| H3b | Risk-taking behaviour *(RISK)* has a relationship with company size *(SIZE)*. | -ve** Supported the BToF & PT | -ve | -ve** Supported the BToF & PT | -ve | -ve*** Supported the BToF & PT | -ve*** Supported the BToF & PT |
| H4 | There is a relationship between Company age *(AGE)*and risk *(RISK)* | -ve | -ve | +ve | +ve** Opposed company's passive learning process model | +ve | -ve |

moments (GMM) estimator. The standard diagnostic tests of dynamic System-GMM (S-GMM) estimator reveal that models which are founded on accounting-based data fulfill the statistical properties. However, models which are founded on market-based data violate the requirement for dynamic panel data analysis. Therefore, dynamic panel estimator is preferred for the former category of models and the static panel estimator is applied to the latter category of models. Four research objectives have been achieved by using both dynamic and static models.

The first objective which is to examine the impact of standard deviation (*STD*) and other determining factors on performance is answered by using model 1. Meanwhile model 2 gives answers to the second objective, the impact of below-mean semi-deviation (*BMSD*) and other determining factors on performance. Model 3 provides answers to the third objective which is the impact of performance and other determining factors on risk-taking behaviour represented by *STD*. Finally, the fourth model is meant to answer objective 4, to investigate the impact of performance and other determining factors on risk-taking behaviour represented by *BMSD*. The findings for the first and second objectives are summarised in Table 4.7. Meanwhile, Table 4.10 summarises the findings for the third and fourth objectives. The findings in this chapter add substantive information in relation to risk and return relationship in the Malaysian market. Further discussion on the on the implications of findings, limitations of the study and recommendations for future research are presented in the next chapter.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

## 5.0 Introduction

The final chapter is structured into four sections. It begins with the recapitulation of the main issues of the study in Section 5.1. Subsequently, Sections 5.2 briefly summarizes the findings of the study based on dynamic and static panel regressions. This is followed by Section 5.3 which discusses the implication of the findings in relation to relevant stakeholders. In the last section of this chapter, limitations of the study are highlighted, leading to some recommendations for future research.

## 5.1 Overview of the Study

This study examines factors contributing to performance and risk-taking of the Malaysian listed companies over the period of 2004 to 2012. Previous literature in both financial economics (Hodoshima *et al.*, 2000; Blitz & van Vliet, 2007; Campbell *et al.*, 2010) and the strategic management (McNamara & Bromiley, 1999; Andersen *et al.*, 2007; Henkel, 2009; Li *et al.*, 2014) fields argue that the standard positive risk-return relationship and risk-averse behavior which are well documented in the developed markets especially in the United States do not always represent the reality of other capital markets (Maurer, 2008; Rossi & Timmerman, 2012). Since emerging markets have unique characteristics such as non-normally distributed returns (Stevenson, 2001; Susmel, 2001; Hwang & Pederson, 2002; Pavabutr, 2003) and highly volatile returns (Bekaert & Harvey, 2003), many scholars (Sanda *et al.*, 1999;

Estrada, 2000; Bekaert & Harvey, 2002) agree that this research topic needs to be investigated further.

By taking into account standard deviation (STD) and below-mean semi-deviation (BMSD) as risk measures, using both accounting-based and market-based data, and integrating behavioural theory of the firm, prospect theory and agency theory into the research framework, these efforts will promote better understanding on the issues relating to risk-return relationship. An attempt to analyze factors contributing to performance and risk-taking in the setting of the Malaysian market begins with the application of dynamic panel regression. Based on the Sargan's (1964) and Arellano-Bond (1991) tests, S-GMM is the preferred estimators for accounting-based variables; whereas the static panel data is used for the market-based variables as they fail the statistical properties diagnostic tests.

## 5.2 Summary of Findings

There are four objectives in this study, as follows: (1) The first objective is to examine the impact of STD and other determining factors on performance; (2) The second objective is to investigate the impact of BMSD and other determining factors on performance; (3) The third objective is looking at the impact of performance and other determining factors on risk-taking behaviour represented by STD; and (4) The fourth objective is to investigate the impact of performance and other determining factors on risk-taking behaviour represented by BMSD. Sub-section 5.2.1 and sub-section 5.2.2 summarize the findings for research objectives one and two based on the respective dynamic and static panel regressions. This is followed by a summary of findings for research objectives three and four based on dynamic and static panel regressions in sub-section 5.2.3 and sub-section 5.2.4 respectively.

### 5.2.1 Summary of Findings for Research Objectives One and Two based on Dynamic Panel Regressions

The results of multiple regressions using dynamic panel estimation reveal the existence of significantly positive correlation between lagged corporate risk-taking and performance regardless of whether the STD or BMSD is used to measure corporate risk-taking. This implies that corporate decision makers of the Malaysian listed companies engage in risk-averse behaviour when they expect this behaviour leads to higher returns. The preference of a more certain outcome to less certain is in line with Sharpe's (1964) capital asset pricing model. However, when contemporaneous corporate risk-taking is considered, it is found to be inversely related to performance. These findings are in line with Bowman's paradox (1980) which suggests that the risk preference amongst economic agents is not static but vary in accordance with their past experience. Specifically, managers are cognitively influenced by their competency in handling risky investments in the past; consequently boost confidence in their ability to manage profitable investments.

Generally, BMSD as indicator of risk reveals more consistent results as compared to STD. The finding indicates the importance of downside risk measure in explaining accounting returns among listed companies in the Bursa Malaysia, supporting previous studies which suggest the relevance of downside risks in emerging markets (Harvey, 2000; Estrada, 2007; Beach, 2011, Alles, 2013). Participants in emerging markets place greater concern with the probability of having downside losses, relative to upside gains (Bekaert & Harvey, 2014). This is probably due to the distinctive characteristics of emerging markets whereby the distribution of returns is relatively skewed (Harvey,1995a; Hwang & Pederson, 2002; Pavabutr, 2003) and return is highly volatile (Bekaert & Harvey, 2003). Theoretically, portfolio holders who are highly exposed to downside loss demand greater compensation, in the form of higher expected returns.

The dynamic panel estimation also verifies the importance of $SIZE_{i,t}$ as one of the accounting-based corporate performance determinants. The positive size-performance relationship supports the findings of previous studies (Muritala, 2012; Kipesha, 2013). The result of this study and other studies show that there is a reversal on the size effect as larger companies have economies of scale, greater financial resources, experienced human resources and greater ability to diversify (Bain, 1954; Bos & Kolari; 2005; Yang & Chen, 2009).

Financial slack (measured by current ratio) and leverage (measured by debt-to-equity ratio) are also found to be important determinants of corporate performance. A positive financial slack-performance relationship supports the implication stated in the behavioural theory of the firm. The proponents of this theory states that a reasonable amount of financial slack is crucial to serve as a cushion for possible losses threats caused by external business environment (Sharfman *et al.*, 1988), to take advantage of environmental opportunities and pursue innovative activities (Cyert & March, 1963) and to ensure the long-run survival of a company (Singh, 1986). Meanwhile the positive accounting-based leverage-performance relationship supports the implication stated in agency cost theory (Jensen & Meckling, 1976) and free cash flow hypothesis (Jensen, 1986) where high leverage could encourage managers to consistently work harder, consume less perks and take action in the best interest of shareholders. In such a case, leverage act as a control mechanism to monitor company's performance consistence with Heinkel (1982) and Champion (1999).

In the context of macroeconomic factor as regressors, the positive impact of inflation rate on the accounting-based corporate performance supports the implication stated in the Fisher's effect hypothesis. The theory states that over the long-run, a moderate level of changes in expected inflation will cause an equivalent change in the nominal interest rate, leaving the real interest rate unaffected (Fisher, 1930). The positive inflation-performance relationship shows that by having sufficient information, managers are able to predict the inflation rate and adopt proactive approach in finding ways to improve accounting-based performance.

### 5.2.2 Summary of Findings for Research Objectives One and Two based on Static Panel Regressions

The existence of a positive contemporaneous market-based risk-return relationship in the Malaysian market is reported in the static sub-models regardless of whether corporate risk-taking is proxied by STD or BMSD. The results support the implication of collective risk-averse preferences amongst economic agents as promoted in the CAPM theory. This finding is also in line with the argument made by previous strategic management scholars (Bowman, 1980; Fiegenbaum & Thomas, 1986) which highlights the disappearance of negative contemporaneous risk-return relationship once market-based data is applied.

The impact of size and financial slack on the market-based performance are similar to the results produced by the dynamic sub-models. Therefore the same justifications for the size effect and the role of financial slack which are explained earlier are applied to the static sub-models. However, the negative impact of leverage on market-based performance contradicts the findings on accounting-based performance. The result of this study and other studies suggest that high (low) leverage is associated with a decrease (an increase) in corporate performance (Agrawal & Knoeber, 1996; Fama & French, 2002; George & Hwang, 2007; Acheampong, Agalega & Shibu, 2014). The finding supports the implication stated in the Myers and Majluf's (1984) pecking order theory of capital structure, which maintains that well-performed (under-performed) company employs less (greater) amount of leverage.

The inverse relationship between inflation and market-based performance implies that common stock fails to provide a favorable hedge against inflation. The adverse effect of inflation on share price is in agreement with a number of previous studies (Wongbampo & Sharma, 2002; Khazali & Pyun, 2004; Geetha *et al.*, 2011). Apart from that, money supply has a reverse effect on market-based performance. The presence of negative relationship is supported by a number of studies (Bodie, 1976; Fama, 1981; Geske & Roll, 1983), indicating that an increase in the growth of money supply tend to stimulate higher inflation. Consequently, it may result in higher discount rate and ultimately would reduce the stock prices.

### 5.2.3 Summary of Findings for Research Objectives Three and Four based on Dynamic Panel Regressions

Findings on the gradual impact of prior accounting performance on corporate risk-taking are mixed. The positive and highly significant impact of $PERFroa_{i,t-1}$ ($PERFroe_{i,t-1}$) on $RISKBMSDroa_{i,t}$ ($RISKSTDroe_{i,t}$) is recorded. The result implies that the management tend to pursue risky projects as the company experienced good track record of ROA in the past (Bromiley, 1991a; Sitkin & Pablo, 1992; Simon *et al.*, 2003). In addition, as promoted by Thaler and Johnson's (1990) house-money effect, an increase in the past ROE gives investors the courage to reinvest their investment profits in risky assets without fear of losses (Massa & Simonov, 2005; Ackert *et al.*, 2006; Frino *et al.*, 2008). On the other hand, there exists a negative and highly significant relationship between $PERFroe_{i,t-1}$ and $RISKBMSDroe_{i,t}$. The result supports the Tversky and Kahneman's (1981) risky choice framing effect which uphold that investors typically prefer to avoid (seek) risky alternatives once they framed past performance information as a positive (negative) outcome. The conflicting result is most likely due to the differences in measuring risk and return. The standard deviation is meant to capture both the upside and downside variability of expected returns (Fishburn, 1977; Swisher & Kasten, 2005); whereas, BMSD is just looking at the latter.

Apart from that, the negative contemporaneous impact of accounting performance on downside risk-taking implies that the Malaysian listed companies are motivated to engage in risky projects as they currently experienced lower performance. This risk-taking behavior is meant to optimize returns in the future, hence, offset the lower returns that they have borne. The contemporaneous negative impact of accounting returns on the riskiness of investments is in line with previous studies (Bowman, 1980; Falkenstein, 2012; Varghese, 2014; Li *et al.*, 2014). The significant relationship shows that downside risk measure is more reliable with how risk is actually perceived in an emerging market environment. In addition, the significant impact of contemporaneous ROE is greater than ROA. The DuPont model suggests that the inclusion of leverage as an equity multiplier would create a larger impact when the companies fully utilize leverage in their operations.

Results of dynamic panel regressions also reveal the importance of size, aspiration ($ASPAverageROE_{i,t}$) and leverage as other determining factors of risk-taking. Generally, all these factors are inversely related to corporate risk-taking. The negative relationship between size and risk-taking suggest that smaller companies go for risky investments. This finding supports the implication stated in the behavioural theory of the firm and prospect theory (Stekler, 1964; Samuels & Smyth, 1968; Ballantine *et al.*, 1993). By having less bureaucracy, small companies are able to make immediate investment decisions which are expected to offer better returns in the future. The negative coefficient of $ASPAverageROE_{i,t}$ indicates that a company is inclined to be risk-averse as it experiences an increase in the minimum benchmark of ROE. This means that the company has no intention to drastically change its business strategies once better performance has been achieved (Audia *et al.*, 2000; Denrell, 2008). On the contrary, a company of lower average performance is motivated to identify new business opportunities to increase future performance (Grinyer & McKiernan, 1990; Denrell, 2008). Meanwhile, the existence of a negative relationship between leverage and risk-taking rejects the implication stated in the agency theory and free chash flow hypothesis which claim that a higher leverage would induce a company to choose risky projects. The inverse relationship is in agreement with a number of previous studies (Balakrisnan & Fox, 1993; Cai & Zhang, 2011; Gilje, 2014).

### 5.2.4 Summary of Findings for Research Objectives Three and Four based on Static Panel Regressions

Static panel regressions reveal a significant positive impact of performance on risk regardless of whether corporate risk-taking is measured using STD or BMSD. This implies that investors are sensitive to the current state of corporate performance and perceive a higher performance is associated with a higher risk. However this result challenges the implication stated in the Bowman's (1980) paradox that low (high) performing firm increases (decreases) corporate risk-taking.

The reverse impact of size on corporate risk-taking which is similar to the results of dynamic model is also reported. Hence the suggestion that smaller firm (larger firm) takes higher (lower) risk is also applied in the static model. Generally, there are positive impact of aspiration level and leverage on corporate risk-taking. The positive coefficient of $ASPAverageTRI_{i,t}$ supports the implication stated in the threat-rigidity hypothesis. This infers that the Malaysian companies have a tendency to reduce risky investments as they are aware of a decline in their own minimum benchmark of performance will be a threat on the chances for the companies' survival and better achievement in the future. Meanwhile, the positive coefficient of $LEV_{i,t}$ is in line with previous studies (Black, 1976; Stiglitz & Weiss, 1981) which suggests that higher leverage would increase the riskiness of corporate investment. This result supports the implication stated in the agency theory (Jensen & Meckling, 1976) as well as free cash flow hypothesis (Jensen, 1986) which argue that greater debt financing leads managers to be more diligent in selecting riskier projects that promise higher returns.

Results concerning the influence of inflation *($INFLR_t$)* on risk-taking *($RISK_{i,t}$)* based on market data are mixed. The reported coefficient values of $INFLR$ is positive (negative) when risk is proxied by STD (BMSD). The results show that, risk measures play a significant role in determining the direction of relationship between inflation and risk-taking. Result of static panel regressions also reveals the importance of GDP growth as other determining factor of BMSD risk. The negative impact of GDP growth on corporate risk is in agreement with Eling and Marek (2011) and Kumar and Tamimi (2011).

### 5.3 Implications of Findings

Several implications can be considered as a result of this study. The implications can be divided into methodological and theoretical which would lead to practical implication. One of the methodological contributions is that S-GMM estimator is applied to investigate the dynamic relationship between risk and return variables and the influence of other determining factors on the two parameters within the context of the Malaysian market. This method strengthens the results, thereby increasing the validity and reliability of the findings. S-GMM estimator is claimed as robust in the class of all GMM estimators and its application is in line with the nature of financial issues discussed. The standard diagnostic tests of S-GMM suggest that accounting-based and market-based risk-return models need to be treated differently. Dynamic panel regression which is a multiple-period approach is preferred to analyze accounting-based risk-return relationship, suggesting that the relationship is not immediate, but realized over time due to the historical nature of data. Meanwhile, market-based risk-return model considerably fits with the static or single-period approach of estimation as the market reacts to new information instantaneously. Since accounting-based variables can be directly controlled by corporate management, accounting measures of risk-return relationship is more relevant when managers want to make decisions at the firm-level. On the other hand, market-based variables which are meant to investigate contemporaneous risk-return relationship are more applicable at the level of capital market. It is essential to distinguish the use of different approaches for different groups of variables as it would affect the results of the study as observed in this thesis.

This study also conceptualized and measured risk based on traditional method, standard deviation (STD) and below-mean semi-deviation (BMSD). The inclusion of both risk measures enable this study to capture a more holistic risk-return profiles of companies relative to their counterparts operating in the same economic settings. Generally, the findings of this study show that models which are based on BMSD as indicator of downside risk reveal more consistent results as compared to STD. This implies that market players are more concerned about the probability of return being lower than a target rate of return in Malaysia. This methodological implication leads to practical contribution where the finding will educate all the Malaysian market participants that the application of downside risk is more relevant as a risk measure instead of standard mean-variance risk measure in the context of emerging market. Since downside risk measure is a better reflection of the actual investment behaviour, the Security Commission (SC) is obligated to promote the application of this risk measure amongst stakeholders. Hence, a more fruitful decision could be made by individuals, as well as institutions, pertaining to investment strategies according to their risk preferences. This is in line with SC's statutory function as a security market supervisory body to facilitate market participants with informative investment guidance which ultimately promote the development of securities market in Malaysia.

From the perspective of theoretical contribution, this research integrates a number of underlying theories; behavioural theory of the firm, prospect theory, agency theory and other relevant theories into a research framework. The consideration of several theories in identifying variables and developing research framework allows investigation on the financial issues discussed in this study to be carried out in a broader perspective. Hence, a more comprehensive empirical models applied in this study could provide sufficient information about determining factors of risk-return relationship. From the empirical models, evidence on opposing as well as consistent arguments on the related issues based on different perspectives of theories contributes to comprehensive explanation on risk-return relationship and broadens the existing body of knowledge in the field of corporate finance as well as behavioural finance. Hence, this theoretical contribution could result in practical implication for different parties. For the management of a company, investors and investment consultants, profitable investment strategies in the context of emerging markets could be implemented by having better understanding on the issues relating to risk-return relationship. Both accounting- and market-based findings suggest that investors and investment consultants should focus more on large firms with high financial slack resources as these company-specific characteristics are found to be important determinants of performance. Furthermore, managers should realize the role of financial slack resources in improving the performance and ensuring the long-run survival of a company as maintained by the behavioural theory of the firm.

### 5.4 Limitations of the Study and Suggestions for Future Research

This research has certain limitations which should be taken into consideration for further investigations. The results might be only valid for the period of study from 2004 to 2012. For a greater depth of information, future research may extend the length of study period to capture the profile of risk-return relationship before and after the economic crisis within the past two decades of economic cycle. Evidence from a comprehensive period of study could be useful for market players to adjust their investment strategies according to various economic conditions and ultimately take advantage in creating their wealth. Apart from that, this research excludes financial companies due to the dissimilarity of regulatory constraints, capital structure and accounting rules applied to this group of companies. As a result of the differences in characteristics, the interpretation of this research finding may not be applicable to such companies. In the light of the present study, future research may consider examining the risk-return profile from the perspective of two different groups of sample — financial and non-financial companies. The attempt is meant to disclose a more comprehensive analysis on risk and return where different implications for investment decisions might be recommended to different stakeholders in these two different sectors. Furthermore, the sample of this study is confined to the Malaysian listed companies only. The findings could not be generalized results to all emerging markets as the setting of other countries might be different. Thus, it is recommended that this area of study may be extended to other emerging and developed markets to compare the findings among these countries. Evidence from other markets would provide a clearer picture of the risk-return relationship which could enhance investment decision making among market participations. Finally, future research should also take into account the impact of herding behaviour among investors and professional forecasters on market-based risk-return relationship. This is because the tendency to imitate the trading behaviour of other parties in a collective manner may lead to a situation in which the transaction of stocks are forced to be dealt at uneconomical prices (Christie & Huang, 1995). This issue may intensify the volatility of market returns, which in turn would lead to shift in stocks prices relative to their fundamental values.

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# APPENDICES

## Appendix 1

*Pairwise Pearson Correlation Tests between Independent Variables of Study in Model 1*

| Panel A: Model 1a | Independent variables | $RISKSTDroa_{i,t-1}$ | $RISKSTDroa_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $M2g_{t}$ | $PERFroa_{i,t-1}$ | $INDPERFroa_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKSTDroa_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKSTDroa_{i,t}$ | 0.8668** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.2331** | -0.2391** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0393* | -0.0487** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0673** | -0.0650** | 0.1316** | -0.1656** | 1.0000 | | | | |
| | $INFLR_{t}$ | 0.0252 | 0.0018 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_{t}$ | 0.0396* | 0.0481** | -0.0684** | -0.0243 | 0.0461** | 0.0612** | 1.0000 | | |
| | $PERFroa_{i,t-1}$ | -0.1776** | -0.1496** | 0.2195** | 0.1425** | 0.0026 | 0.0147 | -0.0352* | 1.0000 | |
| | $INDPERFroa_{i,t}$ | -0.0515** | -0.0431** | 0.0855** | 0.0533** | 0.0150 | 0.0644** | -0.1770** | 0.0944** | 1.0000 |

**Appendix 1 (Continued)**

| Panel B: Model 1b | Independent variables | $RISKSTDroe_{i,t-1}$ | $RISKSTDroe_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFroe_{i,t-1}$ | $INDPERFroe_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKSTDroe_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKSTDroe_{i,t}$ | 0.7829** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.0991** | -0.0932** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0842** | -0.0880** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | 0.0297 | 0.0470** | 0.1315** | -0.1656** | 1.0000 | | | | |
| | $INFLR_t$ | -0.0058 | -0.0197 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_t$ | -0.0060 | -0.0064 | -0.0684** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFroe_{i,t-1}$ | 0.2006** | 0.0601** | 0.0540** | 0.0537** | 0.0021 | 0.0226 | 0.0007 | 1.0000 | |
| | $INDPERFroe_{i,t}$ | -0.0333 | -0.0607** | 0.0388* | 0.0502** | 0.0367* | 0.1026** | 0.0802** | 0.0249 | 1.0000 |

**Appendix 1 (Continued)**

| Panel C: Model 1c | Independent variables | $RISKSTDtri_{i,t-1}$ | $RISKSTDtri_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFtri_{i,t-1}$ | $INDPERFtri_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKSTDtri_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKSTDtri_{i,t}$ | 0.1602** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.1872** | -0.1958** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0963** | -0.1100** | -0.0735** | .0000 | | | | | |
| | $LEV_{i,t}$ | -0.0031 | 0.0129 | 0.1316** | -0.1656** | 1.0000 | | | | |
| | $INFLR_t$ | -0.0444** | -0.0054 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_t$ | -0.0921** | -0.0584** | -0.0684** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFtri_{i,t-1}$ | 0.4546** | -0.0521** | 0.0756** | 0.0205 | -0.0150 | 0.0265 | 0.0470** | 1.0000 | |
| | $INDPERFtri_{i,t}$ | 0.0033 | -0.0063 | 0.1260** | 0.0154 | 0.0278 | -0.0697** | 0.1962** | 0.0511** | 1.0000 |

## Appendix 2

*Pairwise Pearson Correlation Tests between Independent Variables of Study in Model 2*

| Panel A: Model 2a | Independent variables | $RISKBMSDroa_{i,t-1}$ | $RISKBMSDroa_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFroa_{i,t-1}$ | $INDPERFroa_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKBMSDroa_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKBMSDroa_{i,t}$ | 0.8200** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.2689** | -0.2865** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0683** | -0.0771** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0555** | -0.0481** | 0.1316** | -0.1556** | 1.0000 | | | | |
| | $INFLR_t$ | 0.0230 | 0.0089 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_t$ | 0.0415* | 0.0476** | -0.0684** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFroa_{i,t-1}$ | -0.3271** | -0.2787** | 0.2195** | 0.1426** | 0.0026 | 0.0147 | -0.0352* | 1.0000 | |
| | $INDPERFroa_{i,t}$ | -0.0586** | -0.0639** | 0.0855** | 0.0533** | 0.0150 | 0.0544** | -0.1770** | 0.0944** | 1.0000 |

**Appendix 2 (Continued)**

| Panel B: Model 2b | Independent variables | $RISKBMSDroe_{i,t-1}$ | $RISKBMSDroe_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $M2g_{t}$ | $PERFroe_{i,t-1}$ | $INDPERFroe_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKBMSDroe_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKBMSDroe_{i,t}$ | 0.7193** | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | -0.0957** | -0.0348** | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0885** | -0.0940** | -0.0735** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | 0.0360* | 0.0500** | 0.1316** | -0.1656** | 1.0000 | | | | |
| | $INFLR_{t}$ | -0.0080 | -0.0130 | 0.0046 | -0.0121 | -0.0014 | 1.0000 | | | |
| | $M2g_{t}$ | -0.0069 | -0.0042 | -0.0604** | -0.0243 | 0.0461** | 0.0512** | 1.0000 | | |
| | $PERFroe_{i,t-1}$ | -0.4939** | -0.1085** | 0.0540** | 0.0537** | -0.0021 | 0.0226 | -0.0007 | 1.0000 | |
| | $INDPERFroe_{i,t}$ | -0.0285 | -0.0578** | 0.0388* | 0.0592** | 0.0367* | 0.1026** | 0.0802** | 0.0249 | 1.0000 |

**Appendix 2 (Continued)**

| Panel C: Model 2c | Independent variables | $RISKBMSDtri_{i,t-1}$ | $RISKBMSDtri_{i,t}$ | $SIZE_{i,t}$ | $FSlack_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $M2g_t$ | $PERFtri_{i,t-1}$ | $INDPERFtri_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | $RISKBMSDtri_{i,t-1}$ | 1.0000 | | | | | | | | |
| | $RISKBMSDtri_{i,t}$ | 0.7664* | 1.0000 | | | | | | | |
| | $SIZE_{i,t}$ | 0.0887* | 0.0722 | 1.0000 | | | | | | |
| | $FSlack_{i,t}$ | -0.0977* | -0.0979 | -0.0747 | 1.0000 | | | | | |
| | $LEV_{i,t}$ | 0.0154 | 0.0060 | 0.1338 | -0.1694 | 1.0000 | | | | |
| | $INFLR_t$ | -0.0385* | -0.1143 | -0.0147 | -0.0176 | 0.0041 | 1.0000 | | | |
| | $M2g_t$ | -0.1924* | -0.1787 | -0.0542 | -0.0274 | 0.0519 | 0.5211 | 1.0000 | | |
| | $PERFtri_{i,t-1}$ | 0.3382* | 0.3284 | 0.1039 | 0.0301 | -0.0391 | 0.0773 | -0.1501 | 1.0000 | |
| | $INDPERFtri_{i,t}$ | 0.1003* | 0.1061 | 0.1804 | 0.0174 | 0.0378 | -0.0066 | 0.0348 | 0.0351 | 1.0000 |

## Appendix 3

*Pearson Correlation Tests between Independent Variables of Study in Model 3*

| Panel A: Model 3a | Independent variables | $PERFroa_{i,t-1}$ | $PERFroa_{i,t}$ | $SIZE_{i,t}$ | $AGE_{i,t}$ | $ASPAvgROA_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $GDPg_t$ | $RISKSTDroa_{i,t-1}$ | $INDSTDroa_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFroa_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFroa_{i,t}$ | 0.4257** | 1.0000 | | | | | | | | |
| | $SIZE_{i,t}$ | 0.2195** | 0.2309** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.1181** | 0.1215** | 0.4104** | 1.0000 | | | | | | |
| | $ASPAvgROA_{i,t}$ | 0.6536** | 0.3970** | 0.3740** | 0.1606** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | 0.0026 | 0.0115 | 0.1016** | 0.0105 | 0.0201 | 1.0000 | | | | |
| | $INFLR_t$ | 0.0147 | 0.0020 | 0.0045 | -0.0544** | -0.0356* | -0.0014 | 1.0000 | | | |
| | $GDPg_t$ | -0.0146 | 0.0062 | -0.0233 | -0.1677** | -0.0328 | 0.0154 | 0.6380* | 1.0000 | | |
| | $RISKSTDroa_{i,t-1}$ | -0.1776** | -0.0930** | -0.2331** | 0.0212 | -0.3285** | -0.0673** | 0.0252 | 0.0196 | 1.0000 | |
| | $INDSTDroa_{i,t}$ | -0.0363* | -0.0617** | -0.0333** | -0.1638** | -0.0954** | 0.0038 | 0.0443* | 0.0830* | 0.0940* | 1.0000 |

**Appendix 3 (Continued)**

| Panel B: Model 3b | Independent variables | $PERFroe_{i,t-1}$ | $PERFroe_{i,t}$ | $SIZE_{i,t}$ | $AGE_{i,t}$ | $ASPAvgROE_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $GDPg_{t}$ | $RISKSTDroe_{i,t-1}$ | $INDSTDroe_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFroe_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFroe_{i,t}$ | 0.0938** | 1.0000 | | | | | | | | |
| | $SIZE_{i,t}$ | 0.0540** | 0.0549** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.0397* | 0.0332* | 0.4104** | 1.0000 | | | | | | |
| | $ASPAvgROE_{i,t}$ | 0.6510** | 0.1367** | 0.2068** | 0.0691** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0021 | 0.0710** | 0.1316** | -0.0135 | -0.0655** | 1.0000 | | | | |
| | $INFLR_{t}$ | 0.0226 | -0.0177 | 0.0046 | -0.0544** | -0.0113 | -0.0014 | 1.0000 | | | |
| | $GDPg_{t}$ | 0.0150 | -0.0076 | -0.0233 | -0.1677** | -0.0133 | 0.0154 | 0.6380** | 1.0000 | | |
| | $RISKSTDroe_{i,t-1}$ | -0.2306** | -0.0331 | -0.0991** | 0.0075 | -0.2918** | 0.0297 | -0.0053 | 0.0104 | 1.0000 | |
| | $INDSTDroe_{i,t}$ | -0.0140 | -0.0556** | -0.0735** | -0.0786** | -0.0436* | 0.0411** | 0.0455** | -0.0536* | 0.0256 | 1.0000 |

**Appendix 3 (Continued)**

| Panel C: Model 3c | Independent variables | $PERFtri_{i,t-1}$ | $PERFtri_{i,t}$ | $SIZE_{i,t}$ | $AGE_{i,t}$ | $ASPAvgTRI_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $GDPg_{t}$ | $RISKSTDtri_{i,t-1}$ | $INDSTI$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFtri_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFtri_{i,t}$ | -0.0740** | 1.0000 | | | | | | | | |
| | $SIZE_{i,t}$ | 0.0756** | 0.0914** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.0583** | 0.0934** | 0.4104** | 1.0000 | | | | | | |
| | $ASPAvgTRI_{i,t}$ | 0.5002** | 0.0407** | 0.2706** | 0.2095** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0150 | -0.0271 | 0.1316** | -0.0135 | -0.0430** | 1.0000 | | | | |
| | $INFLR_{t}$ | 0.0265 | -0.2294** | 0.0046 | -0.0544** | 0.0752** | -0.0014 | 1.0000 | | | |
| | $GDPg_{t}$ | 0.2448** | -0.2782** | -0.0233 | -0.1677** | 0.0795** | 0.0154 | 0.6380** | 1.0000 | | |
| | $RISKSTDtri_{i,t-1}$ | 0.4546** | -0.0860** | -0.1872** | -0.0126 | 0.1812** | -0.0034 | -0.0444** | -0.0072 | 1.0000 | |
| | $INDSTDtri_{i,t}$ | 0.0150 | 0.1110** | 0.0194 | 0.0046** | 0.0420** | 0.0259 | 0.0752** | 0.1037** | 0.0034 | 1.0000 |

## Appendix 4

*Pearson Correlation Tests between Independent Variables of Study in Model 4*

| Panel A: Model 4a | Independent variables | $PERFroa_{i,t-1}$ | $PERFroa_{i,t}$ | $SIZE_{i,t}$ | $AGE_{i,t}$ | $ASPAvgROA_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $GDPg_{t}$ | $RISKBMSDroa_{i,t}$ | $INDBMSDroa_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFroa_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFroa_{i,t}$ | 0.4257** | 1.0000 | | | | | | | | |
| | $SIZE_{i,t}$ | 0.2105** | 0.2309** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.1131** | 0.1215** | 0.4104** | 1.0000 | | | | | | |
| | $ASPAvgROA_{i,t}$ | 0.6536** | 0.3970** | 0.3740** | 0.1606** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | 0.0026 | 0.0115 | 0.1316** | -0.0135 | -0.0201 | 1.0000 | | | | |
| | $INFLR_{t}$ | 0.0147 | 0.0020 | 0.0045 | -0.0544** | -0.0396* | -0.0014 | 1.0000 | | | |
| | $GDPg_{t}$ | -0.0146 | 0.0062 | -0.0233 | -0.1677** | -0.0828 | 0.0164 | 0.6380** | 1.0000 | | |
| | $RISKBMSDroa_{i,t}$ | -0.3271** | -0.1386** | -0.2585** | -0.0253 | -0.5081** | -0.0555** | 0.0280 | 0.0180 | 1.0000 | |
| | $INDBMSDroa_{i,t}$ | -0.0984** | -0.1110** | -0.1458** | -0.3047** | -0.1802** | 0.0071 | 0.1011** | 0.1862** | 0.1339** | 1.0000 |

## Appendix 4 (Continued)

| Panel B: Model 4b | Independent variables | $PERFroe_{i,t-1}$ | $PERFroe_{i,t}$ | $SIZE_{i,t}$ | $AGE_{i,t}$ | $ASPAvgROE_{i,t}$ | $LEV_{i,t}$ | $INFLR_t$ | $GDPg_t$ | $RISKBMSDroe_{i,t}$ | $INDBMSDroe_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFroe_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFroe_{i,t}$ | 0.0938** | 1.0000 | | | | | | | | |
| | $SIZE_{i,t}$ | 0.0540** | 0.0549** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.0397* | 0.0332* | 0.4104** | 1.0000 | | | | | | |
| | $ASPAvgROE_{i,t}$ | 0.6810** | 0.1067** | 0.2000** | 0.0691* | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0021 | 0.0710* | 0.1315** | -0.0135 | -0.0655** | 1.0000 | | | | |
| | $INFLR_t$ | 0.0226 | -0.0177 | 0.0046 | -0.0544* | -0.0113 | -0.0014 | 1.0000 | | | |
| | $GDPg_t$ | 0.0150 | -0.0076 | -0.0233 | -0.1677* | -0.0133 | 0.0154 | 0.6380** | 1.0000 | | |
| | $RISKBMSDroe_{i,t}$ | -0.4939** | -0.0462* | -0.0957** | 0.0060 | -0.5918** | 0.0369* | -0.0080 | 0.0072 | 1.0000 | |
| | $INDBMSDroe_{i,t}$ | -0.0114 | -0.0541** | -0.0713** | -0.0905* | -0.0446* | 0.0392* | 0.0915** | -0.0341* | 0.0190 | 1.0000 |

**Appendix 4 (Continued)**

| Panel C: Model 4c | Independent variables | $PERFtri_{i,t-1}$ | $PERFtri_{i,t}$ | $SIZE_{it}$ | $AGE_{i,t}$ | $ASPAvgTRI_{i,t}$ | $LEV_{i,t}$ | $INFLR_{t}$ | $GDPg_{t}$ | $RISKBMSDtri_{i,t-1}$ | $INDBMSDtri_{i,t}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PERFtri_{i,t-1}$ | 1.0000 | | | | | | | | | |
| | $PERFtri_{i,t}$ | -0.0740** | 1.0000 | | | | | | | | |
| | $SIZE_{it}$ | 0.0756** | 0.0914** | 1.0000 | | | | | | | |
| | $AGE_{i,t}$ | 0.0533** | 0.0984** | 0.4104* | 1.0000 | | | | | | |
| | $ASPAvgTRI_{i,t}$ | 0.5332** | -0.0437** | 0.2786* | 0.2095** | 1.0000 | | | | | |
| | $LEV_{i,t}$ | -0.0150 | -0.0271 | 0.1316* | -0.0135 | -0.0430** | 1.0000 | | | | |
| | $INFLR_{t}$ | 0.0265 | -0.2294** | 0.0346 | -0.0544** | 0.0752** | -0.0014 | 1.0000 | | | |
| | $GDPg_{t}$ | 0.2448** | -0.2782** | -0.0233 | -0.1677** | 0.0795** | 0.0154 | 0.6380** | 1.0000 | | |
| | $RISKBMSDtri_{i,t-1}$ | 0.3332** | -0.0382* | 0.0887* | 0.1361** | 0.6338** | 0.0154 | -0.0385* | -0.0120 | 1.0000 | |
| | $INDBMSDtri_{i,t}$ | -0.0010 | -0.0502** | -0.0561* | -0.0682** | -0.0606** | 0.0096 | 0.0360* | 0.0548** | -0.0071 | 1.0000 |