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Do Peer Firms Affect Corporate Capital Structure Policy?

Evidence from The Moderating Effect of CEO's Risk Preference

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ABSTRACT

This research studies how a CEO's risk preference is able to moderate the peer firm effect on a firm's capital structure decision. The sample of analysis covers from the US firms from 1992 to 2018 that are listed within S&P 500, S&P 400, and S&P 600. However, the analysis restricts the sample from financial, utility, and governmental companies to avoid regulatory bias, which results to 1094 firms. Using fixed-effect regression, the relationship moderates the peer firm leverage with the CEOs' option Vega in estimating the firm-specific leverage. The hypothesis of this study is, as given the peer firm effect, risk-seeking CEO have the higher leverage ratio compared to risk-averse CEOs. However, the result shows that given the peer firm effect, risk-averse CEOs have the magnitude of leverage in comparison to risk-seeking CEOs, even after with the robustness check. Eventually, the relationship shown can implicate to the importance of corporate governance and network profiling for strategic endeavour.

Keywords: Vega, CEO, Risk Preference, Peer Firm Effect, Risk-seeking, Risk-averse, Leverage,

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1. INTRODUCTION

Capital structure refers to the composition of debt and equity to finance a firm's investments and projects to increase the expected return of investment. Firms raise their capital through the combination of borrowed money in the form of debt. The decision framework of raising capital is seminally started by the finding from Modigliani and Miller (1959), which stated that raising either debt or equity is irrelevant against the firm's value. The theorem's assumption was far from being realistic, but henceforth improved, e.g., Static Trade-off Theory (STT) and Pecking Oder Theory (POT). Despite the theoretical aspects of capital structure, one of the most influential empirical findings in capital structure is a study by Leary and Roberts (2014). They studied US firms from 1965 to 2008 and found that a firm mimics its peers of the same industry in establishing leverage (or debt issuance) on the same direction. Firms want to mimic their peers because mimicking is considered convenient and inexpensive rather than delving into their self-research and development, as they can observe the best propositions of their peers in a certain (Shapiro et al., 2015; Alhaj-Yaseen and Rao, 2019).

Initially, peer effect was observed as human behavioural and psychological studies of how one or many individuals can affect the other individuals' behaviour and outcomes. For example, some studies suggest that peers positively affect students' performance and job performance (Sacerdote, 2011; Nanda and Sørensen, 2006). In a business context, besides capital structure decisions, peer effect is also used to determine the decisions on various firm's outcomes such as increasing innovation (R&D) investment, more dividend pay-out, encouraging for better ESG practice, and stock buybacks (Machokoto et al., 2021; Grennan, 2019; Keeve, 2024; Adhikari and Agrawal, 2018). Generally, peer effect can be understood as a learning motive (Eisenkopf, 2010; Leary and Roberts, 2014). It can be also explained as firms mimic or herd to avoid aggressive competition (e.g., preventing loss in market share), and to adhere to industry standards. In the context of capital structure decisions, peer firm effect can be explained as a firm responds to the signalling effect made by its peers' capital structure decisions (Ross, 1977; Ali-Rind et al., 2023). For example, Ross (1977) explains that if a firm increases its debt capacity, it signals to the market that this firm may have healthy financials and possess strong future prospects in terms of earnings and profitability.

However, processing information by mimicking other firms typically involves managerial risk preferences (i.e., risk aversion and risk-seeking behaviour). Given the signals from peer firms, managers can either remain conservative on their strategy (e.g., herding to the industry standards) or go aggressive (e.g., against the herd and take more risks) since these

managers are the only one who know their own firms' true value and prospects henceforth. In other words, by considering the risk preference on mimicking or herding, managers are assumed to know what is the optimal in terms of value-enhancing sense, in which was empirically limited to be answered by Leary and Roberts (2014). Simultaneously, managers risk-taking decisions also need to be considered as it can cause a misconduct and harm (i.e., moral hazards) not only to the firm (e.g., stock price crash), but also causing the systemic risk to an economy (i.e., economic contraction) at the macro level, namely global financial crisis in 2008 (Busato and Coletta, 2017; Minksy, 1977; Armstrong et al., 2021; Kim et al., 2015). In empirical corporate finance, these managerial risk preferences can be quantified by the monetary value of compensation or incentive packages that are received by the managers as part of their tenure. The quantification of the risk preferences is then simplified by Coles et al. (2006), in which they did it by extracting Vega and Delta out of the executive stock holdings. In many literatures, higher value of executive Vega (higher risk-taking approach) is associated with the implementation of riskier firm policies (e.g., higher leverage, higher spending on R&D, higher dividend pay-out, etc.) (Guay, 1999; Cohen et al., 2000; Coles et al., 2006; Chava and Purnanandam, 2010; Shue and Townsend, 2017; Caliskan and Douskas, 2015). Although various literature investigates the direct relationship between the Vega as the proxy managerial risk preference and firms' policies, there have been no studies that investigate Vega as the moderator. Thus, the main question of this research is: "How does managerial risk preference affect in moderation to the peer firm effect towards a firm's capital structure decisions?"

To estimate the relationship, this study focuses on quantitative analysis using fixed-effect/panel regression. To construct the variables, this study uses Compustat–Capital IQ database as the basis for firms' annual fundamental characteristics and peer-firm variables construction (e.g., leverage ratio, market-to-book ratio, profitability, size, and tangibility). The moderating variable, Vega, is constructed by employing the Black-Scholes-Merton option pricing method on CEOs' stock options. This analysis picks CEO as the subject to Vega considering that CEOs are the most influential echelon in companies' decision-makings. The stock option data for Vega calculation can be extracted from ExecuComp database. However, for practicalities, the sample takes the constructed Vega of Coles et al. (2006) that is based on Core and Guay's (2002) methodology. The sample takes a period of 1992 to 2018 that are within S&P 500, S&P 400, and S&P 600, but is restricted to non-financial, non-utilities, and non-governmental to avoid regulatory bias which subsequently accounts for 1094 firms. The classification for the risk preference model is done by categorising Vega based on the lower 33rd percentile as the measure of risk aversion and higher 67th percentile as the measure of risk-

seeking behaviour. The analysis thus would compare the magnitude of the moderating effect between two groups of CEOs: risk-averse and risk-seeking CEOs.

Given the research question, this study thus aims to find the relationship of the moderating effect of the CEO's risk preference on the peer firm effect towards the capital structure decisions. The expected relationship would be that a risk-seeking CEO (i.e., proxied by CEO's option Vega) moderated with the peer firm effect would magnify the increase in leverage higher than the increase in leverage of a risk-averse CEO. This study in managerial risk preference is expected to be the continuous link on behavioural economics and corporate finance from a different empirical strategy. Not only does this study highlight the importance of prospecting and weighting own firm's value given the external information, but also highlights the importance of observing managers' behaviour for corporate governance, as well as peer-firm managers' behaviour for leveraging opportunities. As in real world, the representation of this behaviour is very common to happen since managers can frequently observe business news/media, communicate, and interact with their personal networks of peer managers, especially through the industry associations.

This paper finds significant, but counterintuitive results regarding the moderating effect of CEO's risk preference with peer firm effect on the capital structure decision. Given the peer firm effect, the result suggests that a risk-seeking CEO would increase the leverage lower than the increase of leverage higher than the increase of a risk-averse CEO. This may indicate that a CEO's risk-seeking behaviour associated with the confidence of financing more with retained earnings to finance instead of using more on leverage. In addition, as suggested by similar literature, a risk-seeking CEO thus is less affected by the herding behaviour or not following much to his peer firms' outcomes. Interestingly, based on the robustness check, CEOs from follower companies do not get affected by the leverage outcome of the leader firms in terms of stock return. However, risk-averse CEOs of leader firms based on profitability and stock return measures do get affected by the leverage outcomes of the follower firms in the same industry.

The remainder of this paper is structured as follows. Chapter 2 examines the relevant prior literature that supports the empirical strategy of this study. Chapter 3 presents the sample of the datasets, as well as providing the methodology for the analysis. Chapter 4 exhibits the empirical results as well as the robustness check of the empirical strategy. Chapter 5 discusses the empirical results including the answer of developed hypotheses. Lastly, Chapter 6 attempts to conclude the overall research as well as mentioning the implication and the limitation of this research. In addition, Appendix A describes the method of this study's variable construction.

2. LITERATURE REVIEW

2.1 Review on Capital Structure Determinants

A modern approach of capital structure formulation is initiated by Modigliani and Miller (1958), known as the MM Theorem. Initially, the theorem posits that a firm value is irrelevant against the composition of capital structure. This theory was later refined by adjusting to the real-world settings, namely by employing cost of capital (i.e., cost of debt and cost of equity) which acknowledges the impact of tax shield benefits, capital risk classes, and bankruptcy cost (Modigliani and Miller, 1963; Stiglitz, 1969). From the cost of equity side, investors are assumed to be less responsive towards a firm's decision on raising leverage despite the increasing probability of default (Stiglitz, 1969; Rubinstein, 1973). Meanwhile, from the perspective of cost of debt, debt on a certain point (i.e., especially if it is excessive) can outweigh the marginal benefit of interest tax shields, that later developed as the cost associated with financial distress and bankruptcy (Myers, 1977; Miller, 1988). Hence, this refers to the Static Trade-off Theory (STT), which explains to the optimal choice of capital structure by maximising the benefit of debt's tax shield without significantly increasing the cost of debt per se (Hirshleifer et al., 1966; Kraus and Litzenberger, 1973). In other words, under the STT, a firm must choose in the trade-off between the benefit from the tax shield and the cost of debt for future investment (i.e., bankruptcy and distress) to determine its capital structure.

2.1.1 Pecking Order Theory

The caveat from the prior theories is that those theories rigidly focused too much on finding the "perfect" balance between debt and equity, while in practice, it is almost impossible to find that theoretical number (Leary and Roberts, 2014). Although STT has solved the separability issues between debt and equity, it still does not consider the hierarchical aspect of debt and equity considering that each security bears its cost and risk distinctively. Ross (1977), subsequently, proposes the idea of signalling as the consequences of asymmetric information, which is caused by capital structure decisions of one firm. Signalling effect is understood as one party observes the prominent information from another party to demonstrate its unobservable qualities (Su et al., 2016). In the model of Ross (1977), debt issuance conveys a signal to the market regarding a firm's overall quality that a firm undergoes a promising prospect in the future, the strength and confidence in future cashflows. By choosing debt, this kind of firm discerns themselves from lower-quality firms as lower-quality firms are unlikely to be able to manage the same risk of financial distress.

Subsequently, Myers and Majluf (1984) completed Ross' model (1977) by incorporating the foundation of agency cost associated with asymmetric information, providing flexibility in determining the capital structure, which is famously known as the Pecking Order Theory (POT). The theory does not disremember the trade-off principle made by STT but remodels it. Simultaneously, POT addresses the adverse selection problem caused by information asymmetries between investors and firms. For instance, investors may face the problem of overvaluation or undervaluation because of not knowing the true value of that firm and may result in unnecessary funding (Myers, 1984). For that case, if a firm is overvalued, a firm's manager would be delighted to sell a full or a share of equity, while if the case of undervaluation he would not, which would eventually drop the firm's value (Cadsby et al., 1990).

POT dissects the capital structure determinants as three layers of hierarchy. Firstly, firms are always assumed to prefer internal financing by retained earnings or free cash flows to finance other investment projects or maximise shareholder value, considering that free cash flows hold the lowest asymmetric information cost (Mello and Parsons, 1992; Jensen, 1986). That low cost of asymmetric information is beneficial at hindering a firm from external oversight and managerial inflexibility, which in agency theory, those constraints are associated with monitoring and bonding cost. If internal financing, however, is unlikely to be attained, they can seek external financing either from debt or equity, depending on the degree of the information asymmetries. Issuing debt imposes a disciplinary mechanism on managers since they are mandatorily required to make regular interest payments, reducing the amount of free cash flow to the firm that later can develop onto the state of financial distress. Subsequently, issuing equity is often considered as the last resort for fund managers because of the costliness in asymmetric information compared to issuing debt. Firms raise equity because they want to attain several considerations that require large investment funds that are too costly from issuing debt, such as innovation, pursuing strategic goals, and risk management (i.e., restructuring). Therefore, firms are reluctant to disclose their firm-specific information as they do not want to compromise their competitive advantage, managerial, and operational flexibility (Fazzari and Athey, 1987). Hence, since the empirical nature of leverage ratio is difficult to meet the optimum level, the debt-to-equity ratio is emphasised as the threshold to the amount of external financing (i.e., debt capacity) although empirically also shown that firms with higher profitability and growth opportunities use less debt (Turnbull, 1979; Myers, 2001).

2.2 Peer Firms Effect and Herding Behaviour

The word “peer” is defined as a group of people that shares the same or similar characteristics, such as gender, age, achievements, physical appearances, and any other classification. Peer effect, then, is defined as the consequence of the transmission from peers’ behaviour, characteristics, or outcomes to another individual which causes these individuals to imitate of those peers' behaviour and outcomes (Sacerdote, 2011). The dynamism of peer effect in a group occurs by exerting individuals to follow the collective standards and beliefs, which is known as conformity (Crutchfield, 1955). On the other hand, individuals may also act upon their peers’ opinions and narratives, regardless of being right or wrong (Sherif, 1935). In an institutional context, peer effect performs through "isomorphism", which according to DiMaggio and Powell (1983), is the compliance of entities within a population that stands in the same institutional and environmental settings either that is normative, mimetic, or coercive. For example, the authors mentioned that such pressures exist as there are changes or emergence of new policy, regulations, or standard operating procedures. Additionally, peer individuals affect the other’s (behavioural) outcome through a channel of social learning, which is through observation and/or cognitive deduction (Eisenkopf, 2010; Bandura, 1977).

From corporate perspective, Devenow and Welch (1996) explained that managers or investors are naturally and rationally herding for survivability. For example, herding or mimicking needs to be done to survive as highly levered firms can impose predatory pricing mechanism in a competition with less-levered competitors by increasing the market share relative to the less-levered rivals. Despite the difference in capital structure level, if the expected cost/price associated with the predatory pricing is high enough for less-levered firms, less-levered firms will mimic because mimicking prevents them from losing competitiveness, i.e., market share (Bolton and Scharfstein, 1990). In terms of reputation, managers who make decision by herding are more concerned to their reputation in the market instead of using the private information because using private information can bring the risk of reputational damage if the decision results to be unsuccessful (Scharfstein and Stein, 1990). Consequently, they conform and mimic to their peers based on the prior information they had given. However, such behaviour (i.e., mimicking and conformity) can be considered as a risky move as well because it leads to the prompt growth of new behaviour that is intrinsically sensitive and idiosyncratic towards negative impacts, e.g., economic bubble (Bikhchandani et al., 1992). Conclusively, peer firm effect occurs as inherently asymmetric information exists among firms and any other relevant stakeholders.

2.3 Empirical Evidence

Peer effect on individuals have shown significant results in creating certain outcomes in the same way. Cornelissen et al. (2017) found that peer effect in the workplace on low-skilled German labour force leads to higher wage. From that context too, Cornelissen et al. (2017) implied that peer effect is more apparent if one can observe or mimic the others' outcome easily (i.e., knowledge transfer or spillovers). They also added that low-skilled workers would mimic the high-skilled workers in a way that low-skilled workers put more effort than the high-skilled workers Within an academic setting, randomly assigned peer students significantly affect low-performing students in getting higher grades, but on a small size of increase (Feld and Zölitz, 2017). In addition, high-performing and mid-performing students also get benefited in terms of increase in grades if they are paired with better peers, but at the same time low-performing students are jeopardised if they are paired with such better peers. A study from Nanda and Sørensen (2006) suggests that individuals are more possible to become entrepreneurs if their peers had experience in becoming self-employed or various fields on working. They also highlighted the importance of knowledge spill-over and entrepreneurial exposure that created those channels for peer effect.

Besides Leary and Roberts (2014) with their settings for leverage as one of the corporate policies, there are numerous studies regarding the effect of peer firm on corporate policies. Machokoto et al. (2021) found that peer firms influence firm-specific long-term innovations and product market performance. Peer-firm effect also plays a role on ESG practice and ratings improvement for the U.K. firms, which one of it is by encouraging firms to have greater degree of gender pay gap information disclosure (Keeve, 2024). Under a financial constraint, the U.S. financially constrained firms mimic in a greater degree than non-financially constrained firm within the same industry (Park et al., 2017). Firms would issue dividends if their existing peers also issued dividends, and thus higher amount of dividend payment, but no evidence if one firm decreases its dividend payments (Grennan, 2019). Peer effect also influences firms in the same industry to do stock buybacks (Adhikari and Agrawal, 2018). Furthermore, peer firm effect magnitude is also dependent on the geography, distance, network with peers, and local labour market conditions, especially in bigger cities, although the mimicking does not always occur under the same industry (Gao et al., 2011; Matsumoto et al., 2022; Kedia and Rajgopal, 2009; Jiraporn et al., 2013; Husted et al., 2016). Penalties due to misconduct on the leader peer firms in the same industry reduces the earnings management of a specific firm (Cai et al., 2023). In terms of IPO, if a private firm's direct competitor(s) go public, that firm is more likely to follow

the exit route via IPO as well irrespective market condition like the hot market effect (Aghamolla and Thakor, 2022).

2.4 Hypothesis Development

Theoretically, Stiglitz (1969) also argued that a firm will change its leverage if that firm observes another firm from the similar risk class (i.e., the same operational risk and industrial characteristics, etc.) that has the same ratio (or different) but perceives at a different value. Additionally, to reduce the information asymmetry in making informed decisions, firms under the same industry would mimic their peers because self-obtained information (e.g., from R&D) may be regarded as costly and inconvenient. However, at the same time they might perceive the best propositions of their peer companies within the in a certain period (i.e., market performance and operational characteristics). (Devenow and Welch, 1996; Shapiro, 2005; Lambert, 2006; Shapiro et al., 2015; Alhaj-Yaseen and Rao, 2019). In the context of capital structure decisions, the composition of debt and equity (or total assets) creates signals to the market, especially to its peers within the same industry. Based on Ross' model (1977) when a firm tries to raise capital from retained earnings or debt, it signals confidence of the firm per se, good prospects to the market, and related to the market condition itself (i.e., macroeconomic condition). On the other hand, lowering leverage may signal undesirable aspects such as financial distress and operational constraints, or in response to macroeconomic conditions (e.g., uncertainty, monetary contractionary policy, higher inflation, etc.) (Alter and Elekdag, 2020; Narayan et al., 2021). This leads to the first hypothesis that when the peer firms within the same industry raise capital in terms of leverage, a firm is expected to increase its leverage in the same direction/positively.

H1: When peer firms increase their leverage, a firm is expected to raise its leverage in the same direction/positively.

2.5 The Moderating Effect of CEO's Risk Preference

Risk preference is a mental assessment model under risk and uncertainty for achieving a particular objective associated with maximising benefit/utility by weighting the pre-determined outcomes with the probability of either gaining or losing that is with respect to the reference point (i.e., equilibrium point) (Kahneman and Tversky, 1973; Brockhaus, 1980). Innately, it is determined by the psychological factors such as cognitive biases, personality traits, and heuristics or mental shortcuts (Mata et al., 2018). Furthermore, in general, variety in

risk preference occurs as risk preference is attached to the personal traits and emotions that leads to differences in reaction among individuals (Loewenstein et al., 2001; Slovic, 1999).

Risk-seeking behaviour occurs as an individual realises his presence in the negative-payoff dimension (Kahneman and Tversky, 1973). To break even or gaining higher outcome to the reference point, individuals in that realm expect for higher value/payoff, while losses are certainly anticipated by them (i.e., because of their realisation in the negative-payoff realm). This results individuals in the tendency for committing new (higher amount of) resources, such as involving higher amount of money. Meanwhile, risk aversion occurs within the positive-payoff dimension. Individuals in this dimension prefer the expected positive payoff instead of the risky unexpected payoff. Therefore, they are more conservative in committing on new resources. Risk-seeking behaviour can be implied as the CEO's overconfidence. For example, Goel and Thakor (2008) mentioned that overconfident managers tend to make value-destroying investment, in which value-destroying decision itself can refer to the decisions that bear higher risk. Similarly, Dittrich et al. (2005) also found that overconfident individuals deviate from optimal decisions and tend to purchase and involve in risky assets.

Subsequently, the measurement of risk preference is quantified by the incentive that appears to be more urgent, immediate, tangible, and marginal against the outcomes (De Petrillo et al., 2020). In this research context, executive compensation packages can empirically capture the executives' behaviour since compensations are designed to incentivise the executives to willingly take and tolerate more risks of seizing firms' opportunity (Gervais et al., 2011; Wiseman and Gómez-Meija, 1998; Wen, 2010). In addition, not only does the executive compensation package narrow down the risk preference bias, but it also reduces the agency cost associated with information asymmetries among agents (Grossman and Hart, 1983). Coles et al. (2006) then simplifies the measurement of the managerial risk preference by extracting the option Vega and Delta out of the executives' stock option. Vega per se is defined as the sensitivity of stock price based on the changes in (implied) volatility, but can be implied as managers' exposure to risks. Risk-averse CEOs (i.e., proxied by delta) are more likely to pay dividends, while risk-seeking CEOs (i.e., proxied by Vega) are less likely to pay dividends even the markets at a particular period demand for dividend payments (Caliskan and Douskas, 2015). More importantly, various articles have confirmed that higher Vega leads to the higher use of leverage (Guay, 1999; Cohen et al., 2000; Coles et al., 2006; Chava and Purnanandam, 2010; Shue and Towsend, 2017). However, no literature exists that specifically addresses Vega as the moderating effect on outcomes. Given peer firm effect, based on the literature review of Vega,

this study expects the results of the moderating effect of risk-seeking CEOs would increase the leverage higher than the risk-averse CEOs. This leads to the second hypothesis:

H2a: The relationship between peer firms' capital structure decision moderated with the firm-specific CEO's risk-seeking behaviour on the firm-specific capital structure decision is positive, but the effect is larger compared to risk-averse or risk-neutral CEO[1].

H2b: The relationship between peer firms' capital structure decision moderated with the firm-specific CEO's risk-averse behaviour on the firm-specific capital structure decision is positive, but the effect is smaller compared to risk-averse or risk-neutral CEO.

[1] The construction of risk-neutral CEOs is discussed in Chapter 3.2.6 as part of Vega construction.

3. DATA & METHODOLOGY

3.1 Data Collection and Sample Construction

Table 1.

Data Sources

Datasets/Variable	Source	Frequency	Period
Firm Accounting/Fundamental Data	CRSP-Compustat Merged (CCM) Database	Annually	1992-2018
Firm Stock Return	CRSP-Compustat Merged (CCM) Database	Monthly	1987-2018
Equal-Weighted Industry Portfolio Returns including Distribution	CRSP	Monthly	1987-2018
Vega	Lalitha Naveen's Website (https://sites.temple.edu/lnaveen/data/)	Annually	1992-2018
Risk-Free Rate	Kenneth R. French Website	Monthly	1987-2018

Research for this study uses data that are collected from three different sources. Firstly, the master data are obtained from Centre for Research in Security Price (CRSP)-Compustat Merged (CCM) database in the period between 1987-2018 with non-missing values for all analysis variables and excluding firms from financial, utilities, and governmental industry to avoid regulatory bias. This master database is already merged with firms' monthly return subject to their annual accounting data. Secondly, complementary to firms' monthly return data, another data of monthly equal-weighted industry portfolio returns (including distribution) is extracted from CRSP monthly stock file in the period 1987 to 1992, and then need to be merged with CCM database through the unique identifier of PERMCO and the corresponding monthly identifier. Monthly risk-free rate data are collected from Kenneth R. French website from 1987 to 2018. The monthly risk-free rate data is merged with the CCM to all firms based on the corresponding monthly date. The variable of risk preference, Vega, are based on Coles et al., (2006) from Lalitha Naveen's website. Coles et al. (2006) pre-constructed the Vega based on firms that are within the S&P 500, S&P Midcap 400, and S&P Small-Cap 600. Subsequently, that Vega data is merged with CCM using the unique identifier of Global Company Key (GVKEY) and the corresponding year identifier. The number of observations pre-merged initially consists of 80,000 units. Subsequently, the master dataset is merged with dataset and leaves 8523 units of observation and account for 1094 firms that are unbalanced in each period

.

3.2 Variable Description

Table 2

Summary Statistics

The sample consists of firms across all industries excluding financial, utility, and governmental firms from the annual Compustat database from 1992-2018 with non-missing data for all variables of interest. The variables of CEO characteristics are obtained from ExecuComp database from the range period of 1992 and 2018. The database thus merged with CEOs Vega, Delta, and firm wealth database from Coles, Daniel, and Naveen (2006) which Vega and Delta calculation are based on Core and Guay (2002). Vega is winsorised at 2nd and 98th percentile to eliminate extreme outliers and transformed into natural logarithmic form. The table contains means, standard deviations (SD), and medians for all variables in levels and first differences**.** Peer Firm Averages are calculated based on the average of all firms of each industry-year, excluding the i^{th} observation. Industries are determined by three-digit Standard Industry Classification (SIC) code. Firm-Specific Factors denotes variables corresponding to firm *i*'s value in year *t*.

	Levels			First Differences		
	Mean	Median	SD	Mean	Median	SD
Firm-Specific Factors						
Book Leverage (Total Debt/Book Assets	0.225	0.208	0.185	0.003	0.000	0.250
Market Leverage	0.231	0.172	0.219	0.003	0.000	0.280
Market-to-Book	1.414	1.073	1.193	-0.017	-0.049	1.820
Size	5.989	6.022	2.313	0.056	0.528	2.898
EBITDA/Assets	0.109	0.123	0.136	-0.003	0.004	0.203
Net PPE/Assets	0.300	0.245	0.215	-0.003	0.002	0.202
Vega	3.368	3.619	1.848	0.038	0.020	0.552
Peer-Firm Averages						
Book Leverage (Total Debt/Book Assets	0.232	0.221	0.102	0.001	0.000	0.051
Market Leverage	0.227	0.209	0.131	-0.001	0.000	0.066
Market-to-Book	1.736	1.535	0.815	0.034	0.000	0.445
Size	5.238	5.167	1.386	-0.043	-0.003	0.525
EBITDA/Assets	0.063	0.083	0.096	-0.002	0.000	0.045
Net PPE/Assets	0.293	0.234	0.185	-0.002	0.000	0.044
Vega	3.379	3.450	1.186	0.030	0.042	0.669
Observations	8,523					
Firms	1094					
Industries	189					

3.2.1 Book and Market Value of Leverage

Leverage ratio is calculated by dividing total debt of a firm in one period with its current equity or assets (known as debt-to-equity ratio or debt-to-asset ratio). Leverage ratio is used as

the proxy of cumulative threshold number of monitoring the amount of external financing, considering the difficulty on finding the optimum level and prevention of financial distress (Harris and Raviv, 1991). Book value of leverage, as in **Appendix A**, is calculated by dividing total debt with its book value of assets. In other words, book value refers to the face value that is represented in the financial statement that is strongly affected by a firm's past earnings (Ohlson, 1995). In practice, book value of leverage is used by finance practitioners as a guidance for modelling the debt capacity which also reflects the assets tangibility (i.e., that is useful for debt collateral) and restricts the growth opportunity that can cause Myers' (1977) problem of undervaluation/underinvestment (Barclay et al., 1995). Market value of leverage, on the other hand, is calculated by dividing the total debt with the market value of assets (**Appendix A)**. The market value always increments the book value which is reflected from the sales of assets (i.e., debt and equity) in capital market (e.g., stock market and bond market), affecting todays and future cash flow, as well as taking risks into account (Ohlson, 1995; Welch, 2004). Although empirically scholars would rely on book value rather than market value, Sweeney et al., (1997) found that book value of leverage may cause some issues in cross-sectional, time-series, and panel studies in proving capital structure theories because, in nature, market-based leverage always results in higher value than the book value in all periods of time, and thus it can cause mismeasurement.

3.2.2 Market-to-Book Ratio

Market-to-book ratio measures the growth opportunity of a firm. It is calculated (based on **Appendix A**) by dividing the market value of assets with the total book value of assets on average, firms with high market-to-book ratio leads to negative leverage ratio (Chen and Zhao, 2006; Frank and Goyal, 2009). Firms which have higher market-to-book ratio imply more profitability and thus use less debt because they can finance from their earnings. However, by creating subsample of firms, Chen and Zhao (2006) found that less mature firms (high growth opportunity and low-to-middle market-to-book-ratio) has the negative relationship between market-to-book ratio and leverage ratio. Meanwhile, mature firms with low growth opportunity showing a positive relationship between market-to-book ratio and the leverage ratio. In the context of market timing, when the valuations were high (proxied by market-to-book ratio), firms would use less leverage or issue more equity, while firms would issue more equity (or less leverage) if the valuations were low (Baker and Wurgler, 2002).

3.2.3 Firm Size

Size or market share represents the goods and services of a firm sold in a particular period within the industry. It is determined by transforming the sales variable in the natural logarithm. Schwarz and Van Tassel (1950) firstly found that firm size correlates positively on the leverage ratio. They explained that smaller firms would have smaller accessibility to capital markets because of the high sunk costs associated with registering costs. Another mechanism can be explained as higher firm size contributes to the higher firm value that can reduces default/insolvency risk and bankruptcy costs (Warner, 1977; Ang et al., 1982). higher-size firm would use lower leverage as they can assure higher collateral values, higher informational disclosure, larger assets diversification, receiving debt at favourable interest rate, and higher investment opportunities (Ezeoha, 2008).

3.2.4 Profitability

Profitability in this study is constructed by dividing earnings before interest, tax, amortisation, and depreciation (EBITDA) with total book value of assets (**Appendix A)**. Aligned with the prior explanation of Frank and Goyal (2009) and Chen and Zhao (2006), (highly) profitable firms use less leverage as they can finance their operations or projects from the internally generated earnings.

3.2.5 Assets Tangibility

Assets tangibility refers to a firm's possession in holding the physical and tangible form of assets as opposed to the intangible items. Assets tangibility is calculated based on **Appendix A** by dividing net property, plant, and equipment (PPE) with total book value of assets. In financial practices, assets tangibility is used as a collateral towards corporate borrowing. Evidence from Hall (2012) suggests that higher assets tangibility leads to the higher use of leverage. This occurs as assets tangibility create a sort of assurance towards the creditors in a case that there is a default, a firm is avoided from insolvency risk.

3.2.6 Vega

Option Vega is the measurement for option price changes/sensitivity towards one percent change in volatility. Vega in this study uses the pre-constructed dataset from Coles et al. (2006), which the calculation is based on Core and Guay's (2002) method by employing Black-Scholes of option pricing. The variable of analysis is set into two setups. Firstly, Vega is used as the control variable within the regression. Vega is transformed into the natural logarithmic form as done similarly by Coles et al. (2006) in their analysis. To remove any extreme outlier in the data, Vega is winsorised at 2^{nd} and 98^{th} percentile like Coles et al. (2006) did. Secondly, Vega

is used as the indicator variable for the interaction term with the main independent variable. The classification for the indicator variable is based on the normal distribution of Vega, starting from below 33rd percentile as the risk-averse indicator, between 33rd and 67th percentile as the risk-neutral indicator, and greater than 67th percentile as the risk-seeking indicator. Additionally, the analysis includes the risk-neutral indicator because it represents the centrality of the approximate CEOs' option Vega that neither are skewed by a small distribution of exceptionally large nor small values, and to help ease the interpretation.

3.3 Methodology

This study replicates the seminal paper of Leary and Roberts (2014) per se regarding the influence of peer firms towards corporate capital structure, using panel regression as follows:

$$Y_{ijt} = \alpha + \beta \bar{Y}_{-ijt} + \gamma' \bar{X}_{-ijt-1} + \lambda' X_{ijt-1} + \delta' \mu_j + \phi' \upsilon_t + \varepsilon_{ijt} \quad (1)$$

where subscript *i* denotes firm *i,* subscript *j* denotes industry *j,* and subscript *t* denotes time *t*. The outcome variable, firm-specific leverage ratio, is denoted by Y_{ijt}. The main control variable, which is the peer-firm leverage ratio, is denoted by $\bar{Y}_{-ijt}$ excluding firm *i*. Other control variable, such as firm-specific and peer-firm characteristics are respectively denoted by $\bar{X}_{-ijt-1}$and X_{ijt-1}. Function $\mu_j$and υ_t denotes respectively the industry fixed effect and time fixed effect. Lastly, the error term is specified as ε_{ijt} correlated within firms and robust to heteroskedasticity. Notation $\alpha, \beta, \gamma', \lambda', \delta',$ and ϕ' are the parameters for each variable. Since a CEO's risk preference (i.e., proxied by CEO's stock option Vega) is discussed as the moderating effect of the status quo of the baseline relationship. The empirical econometric model for this study is as the following:

$$Y_{ijt} = \alpha + \beta \bar{Y}_{-ijt} \times \nu^r_{ijt} + \omega \nu_{ijt} + \gamma' \bar{X}_{-ijt-1} + \lambda' X_{ijt-1} + \delta' \mu_j + \phi' \upsilon_t + \varepsilon_{ijt} \quad (2)$$

where ν_{ijt} denotes the amount of a firm-specific CEO's stock option Vega. Variable $\bar{Y}_{-ijt} \times \nu^r_{ijt}$ denotes the interaction term between the indicator/dummy variable of the firm-specific CEO's stock option Vega ν^r_{ijt} and the peer-firm leverage $\bar{Y}_{-ijt}$. The superscript *r* in the indicator variable denotes the risk-preference indicator whether the CEO is risk-averse, risk-neutral, or risk-seeking. Variable ω is the parameter for the Vega.

3.4 Endogeneity Issue

Leary and Roberts (2014) and the other scholars who studied peer-firm effect specified that peer-firm corporate policy bears reflection issues. According to Manski (1993), this

reflection issue arises when studying peer effect fails to consider the prior and underlying information, which would result in endogeneity. Moreover, this reflection issues occur if one firm mimics another firm, and simultaneously the same other firms mimic the first firm or even the others, and occurs repeatedly. Reflection issue becomes more obvious if the mimicking and imitation happens under the same roof of a group classification, for instance, industry, fundamental and risk classification. This issue brings threat to internal validity such as reverse causality between peer-firm leverage, the predictor, against the outcome (i.e., firm-specific leverage).

3.5 Instrumental Variable

The remedy of endogeneity issue is by employing the instrumental variable. In order to obtain the valid instrument, the instrument must satisfy three assumptions. (1) Firstly, the instrument must be relevant in significantly affecting the variable that is considered as endogenous. (2) Secondly, the instrument is supposed to be exclusively restrictive, meaning that the instrument only shows effect to the dependent variable if and only if having the effect through the endogenous variable, and not from any other mechanism. In addition, the second assumption suggests that the instrument must be uncorrelated towards the error term (i.e., the omitted factors). (3) Thirdly, the instrument must be uncorrelated with the dependent variable to prevent two-way relationship.

For this analysis, Leary and Roberts (2014) used peer firms' idiosyncratic return on equity shock (simplified as 'idiosyncratic return'). In financing decision, return on equity generally can be the relevant factor (Marsh, 1982; Loughran and Ritter, 1995). Leary and Roberts (2014) considered several factors on why (peer firms') idiosyncratic return is appropriate to be the instrument: (1) independent from manipulation compared to other capital structure determinants (i.e. sales, earnings, etc.), (2) providing significant statistical magnitude and external validity for broad panels of firm, (3) enclosing most of relevant values from particular events, and (4) taking asymmetric information into account as the part of capital structure decision of Myers and Majluf (1984). They also argued that idiosyncratic return is an innate factor of one firm and as suggested by several asset pricing literature, isolating them out of the expected and the realised return creates variations in exogeneity. The instrument (i.e., peer idiosyncratic return) is expected to have a significantly negative relationship with the endogenous variable (i.e., peer firms capital structure) because peer idiosyncratic return individually possesses a less common variation (Leary and Roberts, 2014). In addition, Leary

and Robert (2014) also confirmed that the instrument does not correlate with other capital structure determinants such as profitability, assets tangibility, size, and market-to-book ratio.

3.5.1 Idiosyncratic Equity Shock Return

Idiosyncratic return is constructed under an augmented asset pricing model in equation (3) as the following:

$$r_{ijt} = \alpha_{ijt} + \beta_{ijt}^{M}(RM_t - RF_t) + \beta_{ijt}^{IND}\left(\bar{R}_{-ijt} - RF_t\right) + \eta_{ijt} \quad (3)$$

In equation (3), r_{ijt} is the expected return of a firm *i* in industry *j* at time *t*, $(RM_t - RF_t)$ denotes the excess return on market portfolio, $\left(\bar{R}_{-ijt} - RF_t\right)$ indicates the excess return on the equal-

Table 3
Stock Return Factor Regression Results

The sample consists of monthly returns for all nonfinancial, nonutility, and nongovernmental firms from Compustat-CRSP Merged (CCM) database that contains monthly CRSP database with annual Compustat database between 19-87-2018. The database thus is merged with CEOs Vega, Delta, and firm wealth database from Coles, Daniel, and Naveen (2006) which Vega and Delta calculation are based on Core and Guay (2002) The table informs the man factor loadings and adjusted R^2 from Fama-French Augmented Market Model for Stock Returns:

$$R_{ijt} = \alpha_{ijt} + \beta_{ijt}^{M}(RM_t - RF_t) + \beta_{ijt}^{IND}\left(\bar{R}_{-ijt} - RF_t\right) + \eta_{ijt}$$

Where R_{ijt} is the total return to firm *i* industry *j* during month *t*, $(RM_t - RF_t)$ is the excess return on the market, and $\left(\bar{R}_{-ijt} - RF_t\right)$ is the excess return on an equal-weighted industry portfolio excluding firm *i*'s return, where industries are determined through three-digit SIC code. The regression is computed for each firm on a rolling annual basis using historical monthly returns data from the CRSP database. It undertakes 60 months (5 year) of data in estimation. Idiosyncratic returns are computed as the difference between realized and expected returns

	Mean	Median	SD
α_{it}	0.036	0.016	0.102
β_{ijt}^{M}	0.008	0.008	0.009
β_{ijt}^{IND}	0.142	0.046	0.651
Obs. per Regression	59.663	60	1.804
Adjusted R^2	0.134	0.094	0.144
Idiosyncratic Monthly Return	-0.003	-0.003	0.068
Expected Monthly Return	0.016	0.014	0.037
Average Monthly Return	0.014	0.011	0.071

weighted industry portfolio excluding firm *i* in industry *j* over period *t,* and η_{ijt} is the error term that is used as the idiosyncratic factor for the return on equity shock. Peer-firm variable of idiosyncratic return is estimated within an industry (based on three-digit SIC code) in a year. The estimation of the coefficients (or betas) is done by conducting the annual rolling regression that require 60 months prior of stocks returns. For instance, the sample of observation of interest

starts in 1992, thus, to construct the idiosyncratic error, the asset pricing method requires 60 months or 5 years in prior, which starts from January 1987 to December 1991. Such calculation results in the beta/factor loading that is important to determine the monthly expected return. The idiosyncratic component for return is constructed by this following equation:

$$\hat{\eta}_{it} = r_{it} - \hat{r}_{it} \quad (4)$$

where $\hat{\eta}_{it}$ the total estimated idiosyncratic return, r_{it} is the monthly expected return, and $\hat{r}_{it}$is the realised monthly return. After estimating the idiosyncratic return of the firm, the monthly sample is annualised or averaged into annualised measure as suggested to reduce sample noise and allowing the sample to be merged with the other annual sample, which is the annual accounting/fundamental data of firms. Based on **Table 3**, the idiosyncratic return on average can explain the variation of return on stock prices by 13.4 percent, as Leary and Roberts (2014) regarded this relationship as a less noisy measure in of investment opportunities.

3.6 Identification Threat

This section investigates the identification threat of the proposed instrument whether it satisfies the prevailing assumptions of an instrumental namely the exclusive restriction, which is presented in **Table 4**. The dependent variable is the peer-firm idiosyncratic return but divided into two temporal setups: contemporaneous (T=t*)* and one-period lagged (T=t-1). The control variables are the firm-specific characteristics such as size, market-to-book ratio, profitability (EBITDA/assets), and assets tangibility (Net PPE/assets). Almost all variables show insignificant relationship towards the dependent variable, except for the size in contemporaneous setup by 10 percent significance level and market-to-book ratio in the one-period lag by five percent significance level. However, such significance only results in a very small magnitude. This indicates that the instrument does not correlate with the omitted factors, which satisfies the exclusive restriction assumption.

Table 4

Peer Firm Return Shock Properties

The sample consists of all nonfinancial, nonutility, nongovernmental firms from the annual Compustat database in a range period of 1992 to 2018 with no missing data for all analysis variables. The table exhibits the estimated coefficients and standard errors which are robust to heteroskedasticity and within-firm analysis. The dependent variable is the average peer firm idiosyncratic equity shock. The independent variables are firm-specific factors (i.e., size, market-to-book ratio, EBITDA/assets, and net PPE/assets), controlled with peer firm average characteristics, that are in level with the dependent variable and one-period lagged relative to the dependent variable (shown at the top of the column). Peer firm average characteristics are estimated from the average of all firms within an industry-year combination, excluding the i^{th} observation. Industries are classified through three-digit SIC code.

	Peer Firm Idiosyncratic Equity Shock	
	Contemporaneous Independent Variables	1-Period Lead Independent Variables
Firm-Specific Factors		
Size	0.000*	-0.001
	(0.000)	(0.001)
Market-to-Book	0.000	-0.001**
	(0.000)	(0.000)
EBITDA/Assets	-0.001	-0.002
	(0.002)	(0.004)
Net PPE/Assets	-0.002	-0.001
	(0.001)	(0.004)
Peer Firm Average Characteristics	Yes	Yes
Firm *i* Equity Return Shock	Yes	Yes
Industry Fixed Effect	Yes	Yes
Firm Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
Observations	8404	7123
Adjusted R^2	0.393	0.387

*Standard errors are in parentheses *** p<.01, ** p<.05, * p<0.1*

4. RESULTS

4.1 Baseline Results

This section examines the results of the baseline model that employs the same identification strategy with Leary and Roberts (2014) that is presented on **Table 5.** The table exhibits the coefficients and standard errors of each corresponding variable with year, firm, and industry fixed effect. The peer-firm feature is computed from the average of all firms within an industry-year classification, excluding i^{th} observation. Industries are classified through three-digit SIC code. The dependent variables which are on the top of the column are firm-specific's book leverage, market leverage, change in book leverage, and change in market leverage. The independent variables including the predictor (peer and control variables (i.e., firm-specific and peer firms average characteristics) are lagged by one period of year. All variables are standardised, which are scaled in standard deviation units. The endogenous variable is the peer firm leverages, and the instrument is one-year-lagged period peer firm idiosyncratic equity shock return. The sample of results is on the range period of 1992 to 2018 with non-missing data for all analysis variables.

Table 5

Peer Effects in Financial Policy: Baseline Results

The sample consists of all nonfinancial, nonutility, nongovernmental firms from the annual Compustat database in a range period of 1992 to 2018 with non-missing data for all analysis variables. All coefficients are scaled in standard deviation units. The table exhibits the two-stage least squares (2SLS) estimated coefficients and standard errors which are robust to heteroskedasticity and within-firm analysis. The dependent variables are as shown at the top of the column. The endogenous variable is the peer firm average of each dependent variable. The instrument is the one-year-lagged peer firm average idiosyncratic return. Peer firm average is estimated from the average of all firms within an industry-year combination, excluding the i^{th} observation. Industries are classified through three-digit SIC code. Firm-Specific Factors denotes variables corresponding to firm *i*'s value in year *t*. All variables are in levels or first difference, depending on the dependent variables that are indicated at the top of the column. All independent variables (including instrument but excluding the endogenous variable) are lagged 1 year prior to the dependent variable. The sample firms in this analysis are firms that are classified as "big cap" (i.e., S&P500), "mid cap" (i.e., S&P 400) and "small cap" (i.e., S&P 600).

	Book Leverage	Market Leverage	Δ in Book Leverage	Δ in Market Leverage
	(1)	(2)	(3)	(4)
Peer Firm Averages				
Independent Variable	0.097	0.198**	0.35***	0.257***
	(0.264)	(0.091)	(0.135)	(0.051)
Market-to-Book	0.012	0.031	0.026*	-0.005
	(0.025)	(0.023)	(0.016)	(0.011)
Size	0.03	0.018	-0.041	-0.026
	(0.11)	(0.043)	(0.039)	(0.035)
EBITDA/Assets	0.011	0.008	0.000	-0.014
	(0.043)	(0.021)	(0.015)	(0.016)
Net PPE/Assets	0.064	0.035	0.033	0.010
	(0.04)	(0.043)	(0.053)	(0.047)

Firm Specific Factors				
Market-to-Book	-0.022	-0.165***	0.023	-0.036***
	(0.02)	(0.014)	(0.020)	(0.011)
Size	0.368***	0.431***	0.021	0.028
	(0.055)	(0.049)	(0.071)	(0.065)
EBITDA/Assets	-0.172***	-0.178***	-0.042***	-0.032***
	(0.026)	(0.018)	(0.016)	(0.012)
Net PPE/Assets	0.168***	0.197***	0.01	0.089***
	(0.031)	(0.027)	(0.034)	(0.033)
Equity Shock	-0.014	-0.109***	-0.015**	-.0101***
	(0.014)	(0.015)	(0.008)	(0.011)
First-Stage Instrument on Peer-Firm Leverage				
Peer-Firm Average Equity Shock	-0.033***	-0.094***	-0.064***	-0.160***
	(0.008)	(0.010)	(0.008)	(0.008)
Industry Fixed Effect	Yes	Yes	No	No
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Observations	7025	7025	5897	5897
Adjusted R-Squared	0.051	0.161	0.003	0.071

*Standard errors are in parentheses *** p<.01, ** p<.05, * p<0.1*

Firstly, the first-stage instrument results the negative relationship between the peer-firm average equity shock and peer-firm leverage measure. The first-stage regression shows a statistically significant relationship, meaning that the instrument is not weak the endogenous variable. Similarly, the firm-specific equity shock does show negative correlation against the firm-specific leverage. This relates to risk to optimal leverage and financing choices (Scott, 1976). Specifically, Myers (1997) also mentions that the decision of capital structure are better associated with the stock return instead of debt. Subsequently, an increase in peer-firm book leverage increases firm-specific book leverage, but it does not show any statistical significance, meaning there is no effect between the peer-firm book leverage policy towards the firm-specific book leverage. However, the result provides significant results when it comes firm-specific market leverage, change in book leverage and change in market leverage. An increase in peer-firm market leverage by one standard deviation unit increases firm-specific market leverage by 0.198 standard deviation unit and being statistically significant by five percent. Secondly, a change increase in book leverage of peer firms by one standard deviation unit leads to 0.35 standard deviation unit increase and being statistically significant by one percent. Lastly, one standard deviation unit change increase of peer firm's market leverage increases firm-specific change in market leverage by 0.257 standard deviation unit and being statistically significant by one percent.

There is no effect shown between peer-firm average characteristics, but only in market-to-book ratio that is by only 10 percent of statistical significance. However, almost all firm-specific factors do show effects, and the direction is expected what was discussed in Chapter 3.2. An increase in firm-specific market-to-book ratio by one standard deviation unit has a negative effect towards firm-specific market leverage and change in market leverage. If a firm increases its market size, it positively affects to the increase in leverage of that firm. Meanwhile, an increase in profitability of a firm, it reduces the usage of leverage, indicating that a firm is signalling confidence of its financing from retained earnings. An increase in a firm's assets tangibility will increase the usage of leverage since assets tangibility implies the accessibility of collateral uses for leverage. Therefore, this result suggests sufficient evidence to fail rejecting or accept the hypothesis, in which hypothesis suggests peer firms' leverages increase a firm's use of leverage as well.

4.2 Empirical Results

On **Table 6**, the analysis includes CEO's Vega (i.e., sensitivity of executive stock option price towards one percent change in volatility) that is lagged by one year as the control variable. Vega in this analysis is constructed by transforming the value into the natural logarithmic form. Like any other variables, to ease the interpretation, Vega is scaled using the standard deviation unit. The result on **Table 5** uses with fixed effects of firm, industry, and year, except in changes of leverage that do not include yearly fixed effect**.** The result suggests that the increase of the firm-specific CEO's Vega by one unit of standard deviation decreases the use of leverage. The result is counterintuitive with the prior theoretical review which suggests CEO's Vega on the prior period would increase the risk-taking behaviour, and thus riskier policies especially higher leverage.

Table 6
The Effect of Risk Preference on Firm-Specific Capital Structure

	Book Leverage	Market Leverage	Δ in Book Leverage	Δ in Market Leverage
	(1)	(2)	(3)	(4)
Peer-Firm Independent Variable	0.114	0.207**	0.35***	0.258***
	(0.262)	(0.091)	(0.135)	(0.051)
Vega $_{t-1}$	-0.041***	-0.058***	-0.002	-0.019*
	(0.014)	(0.012)	(0.010)	(0.011)
Firm-Specific Characteristics	Yes	Yes	Yes	Yes
Peer Firm Average Characteristics	Yes	Yes	Yes	Yes
Firm *i* Equity Return Shock	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	No	No
Firm Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.052	0.165	-0.096	0.057
Observations	7025	7025	5897	5897

*Standard errors are in parentheses *** p<.01, ** p<.05, * p<0.1*

On **Table 7**, the analysis tests Hypothesis 2, whether the peer firm leverage changes the magnitude of the firm-specific leverage in moderation with CEOs risk aversion, risk-seeking, and risk-neutral behaviour. Although the hypothesis compares the moderating effect of risk taking and risk aversion of CEOs, the analysis assumes CEO's risk-neutral behaviour parameter to benchmark the results between the risk-averse outcome and risk-seeking outcome. The classification of a firm's CEO being whether risk-averse, risk-neutral, and risk-seeking is based on the partition of CEO's Vega normal distribution, considering that theoretically risk-seeking and risk-averse behaviour are the deviation against the reference point (Kahneman and Tversky, 1979). Risk-averse CEOs are determined based on the lower 33rd percentile, risk-neutral CEOs are determined based on between the 33rd percentile and 67th percentile, and risk-seeking CEOs are determined if the distribution is above the 67th percentile. Such risk preference indicator variables thus are interacted with the endogenous variable, peer firms leverage, and the instrument, one-year-lagged peer firms idiosyncratic equity shock. The interaction term of the risk preference with the endogenous variable must be paired with the same indicator in the instrument. For example, the risk-neutral interaction term with the endogenous variable must be paired with the risk-neutral interaction term of the instrument.

Table 7
The Moderating Effect of Risk-Preference on Capital Structure

The sample consists of all nonfinancial, nonutility, nongovernmental firms from the annual Compustat database in a range period of 1992 to 2018 with non-missing data for all analysis variables. All coefficients are quantified in standard deviation units. The table exhibits the two-stage least squares (2SLS) estimated coefficients and standard errors which are robust to heteroskedasticity and within-firm analysis. The dependent variables are as shown at the top of the column. The endogenous variable is the peer firm average of each dependent variable interacted with the indicator variable that defines CEOs risk preference based on the lower 33rd percentile (risk-averse), between 33rd

and 67th percentile (risk-neutral), and above 67th percentile (risk-seeking). The instrument is the one-year-lagged peer firm average idiosyncratic return. Peer firm average is estimated from the average of all firms within an industry-year combination, excluding the ith observation. Industries are classified through three-digit SIC code. Firm-Specific Factors denotes variables corresponding to firm i's value in year t. All independent variables (including instrument but excluding the endogenous variable) are lagged 1 year prior to the dependent variable. The sample firms in this analysis are firms that are classified as "big cap" (i.e., S&P500), "mid cap" (i.e., S&P 400) and "small cap" (i.e., S&P 600).

	Δ in Book Leverage			Δ in Market Leverage		
	Peer-Firm Book Leverage × Risk Aversion	Peer-Firm Book Leverage × Risk Neutral	Peer-Firm Book Leverage × Risk Seeking	Peer-Firm Market Leverage × Risk Aversion	Peer-Firm Market Leverage × Risk Neutral	Peer-Firm Market Leverage × Risk Seeking
Peer Firm Independent Variable	2.063	0.610**	0.059	0.422**	0.364***	0.178**
	(7.74)	(0.254)	(0.172)	(0.199)	(0.102)	(.079)
Vega $_{t-1}$	0.006	-0.003**	0.006	0.014	0.012	0.000
	(0.010)	(0.001)	(0.010)	(0.011)	(0.012)	(0.010)
Peer Firm Average Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Specific Factors	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	No	No	No	No	No	No
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	-0.169	-.417	-.001	-0.141	-0.073	0.033
Observations	5897	5897	5897	5897	5897	5897

*Standard errors are in parentheses *** p<.01, ** p<.05, * p<.0.1*

In the change of book leverage of the specific firm, there is no relationship in the moderating effect of a firm-specific CEO risk-averse and risk-seeking behaviour interacted with the peer firm effect on the firm-specific capital structure decisions. A significant relationship is only shown in the risk-neutral behaviour of a CEO moderated with peer-firm leverage towards the firm-specific book leverage. This result aligns with the argument of Barclay et al. (1997) suggesting that book leverage in nature restricts the growth opportunity driven by expectations, especially expectations from risk-seeking attitude, in which opportunity can cause overinvestment/underinvestment problem, unlike market leverage. Therefore, book value of leverage is supposedly determined through a collective action on an annual basis in a firm's fundamental by discussions among managers and executives to avoid that biased value.

On the other hand, all peer firm independent variables possess significant relationship in the column of the change in market leverage. A risk-neutral CEO when mimics its peer firms will increase his/her change in market leverage by 0.364 standard deviation unit. Interestingly, when a risk-averse CEO mimics his/her peer firms will increase his/her change in market

leverage greater by 0.422 standard deviation unit than the risk-seeking CEO when mimics his/her peer firms, which only increases by 0.178 unit of standard deviation. Such result is counterintuitive as the hypothesis were made suggesting that the risk-seeking CEO has a higher magnitude compared to the risk-averse CEO. As the consequence, the result rejects the second.

4.3 Robustness Check

The robustness check of this study adopts strategy used by Leary and Roberts (2014). They regress in the restriction of sub-sample analysis of "follower" firms and "leader" firms based on performance measures such as profitability, market size, and stock return. This robustness check expects that executive risk preference still plays a role in executive decision-making either on the "follower" firms or the "leader" firms for the same industry-year. The construction of leader and follower firms takes distribution of ranking on profitability, market size, and stock return. The "follower" firms are classified based on the middle- and lower-third (the bottom third) of the ranking distribution of the performance indicator, while the "leader" firms are based on the highest third of the ranking on the performance indicator. Both "follower" and "leader" firms are indicated as the dummy variable. To simplify the interpretation, the analysis uses the change in market leverage as the dependent variable. However, this analysis separates the observation where the dependent variable pertains to the "leader" firms, while the independent variable and the control variables are "follower" firms', and vice versa. This strategy still uses two-staged least squares (2SLS) to address the endogeneity issue, where the endogenous variable is the peer-firm change in market leverage and the instrumental variable is the peer-firm idiosyncratic equity shock return. Subsequently, such dummy variables of "follower" and "leader" firms are interacted with the endogenous variable and the instrument alongside with the interaction term of CEOs risk preferences as what is discussed in Chapter 3.3, and it must be in the same degree of the interaction. For instance, follower-profit indicator is interacted with the endogenous variable, while the instrument needs to be interacted with the follower-profit indicator.

Table 8

The Moderating Effect of CEOs' Risk Preference on the Leader-Follower Model

The sample consists of all non-financial, non-utility, non-governmental firms from the annual Compustat database in a range period of 1992 to 2018 with non-missing data for all analysis variables. All coefficients are quantified in standard deviation units. The table exhibits the two-stage least squares (2SLS) estimated coefficients and standard errors which are robust to heteroskedasticity and within-firm analysis. The estimations table implement leader-follower model, where the classification is based on the ranking within industry-year of profitability, size, and stock return. Firms are grouped as "follower" if that firms' classification (i.e., profitability, size, and stock return) are ranked on the middle and lower-third of the whole ranking distribution. Meanwhile, "leader' firms are classified based on their upper-third classification ranking of the whole ranking distribution. The classification of "Follower" and "Leader" model is transformed into dummy variables. The dependent variables are the change in market leverage, interacted with the indicator variable that defines CEOs risk preference based on the lower 33rd

percentile (risk-averse), between 33rd and 67th percentile (risk-neutral), and above 67th percentile (risk-seeking). The endogenous variable is the change in peer-firm market leverage. The instrument is the one-year-lagged peer firm average idiosyncratic return. Both the endogenous variable and the instrumental variable are interacted with the dummy variable of firms' classification on profitability, size, and stock return separately, as well as with the risk-preference indicator (i.e., risk-averse, risk-neutral, and risk-seeking) Peer firm average is estimated from the average of all firms within an industry-year combination, excluding the i^{th} observation. Industries are classified through three-digit SIC code. The regression restrictively estimates the change in market leverage ratio of firms in the middle and lower-thirds of the within-industry-year ranking distribution (i.e., Follower) against the change in market leverage of firms in the upper third (i.e., Leaders), as well as the control variables.

Panel A: Follower Firms (Dependent Variable) Response to Leader Firms (Independent Variable)

	Profitability			Size			Stock Return		
	Risk-Averse	Risk-Neutral	Risk-Seeking	Risk-Averse	Risk-Neutral	Risk-Seeking	Risk-Averse	Risk-Neutral	Risk-Seeking
Peer Leader-Firms									
Peer Leader Firm Leverage	1.275**	0.735***	0.884**	0.464*	0.434***	0.453**	0.607	0.801	0.593
	(0.606)	(0.246)	(0.408)	(0.242)	(0.144)	(0.229)	(0.874)	(0.588)	(0.914)
$Vega_{t-1}$	0.005	0.006	0.004	0.007	0.007	0.007	0.006	0.007	0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Peer Firm Average Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Specific Factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effect	No	No	No	No	No	No	No	No	No
Firm Fixed-Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	-0.031	0.008	0.017	0.080	0.072	0.083	0.087	0.060	0.079
Observations	7025	7025	7025	7025	7025	7025	7025	7025	7025

Panel B: Leader Firms (Dependent Variable) Response to Follower Firms (Independent Variable)

Peer Follower Firm Leverage	0.059**	0.212***	0.001	0.024	0.081*	0.019	.094***	.286***	.042
	(0.023)	(0.061)	(0.029)	(0.019)	(0.043)	(0.019)	(.03)	(.081)	(.027)
$Vega_{t-1}$	0.019	0.02	0.02	-0.001	-0.001	-0.001	0.014	0.015	0.013
	(0.014)	(0.014)	(0.014)	(0.01)	(0.01)	(0.01)	(0.012)	(0.012)	(0.012)
Peer Firm Average Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Specific Factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed-Effect	No	No	No	No	No	No	No	No	No
Firm Fixed-Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.043	-0.007	0.057	0.062	0.052	0.062	-0.011	-0.095	0.012
Observations	7025	7025	7025	7025	7025	7025	7025	7025	7025

*Standard errors are in parentheses *** p<.01, ** p< .05, *p<.0.1*

Employing the identical strategy but using the subsample of "followers" and "leaders", **Table 8** results that the outcome is similar with the previous empirical results. Given the peer firm effect, Panel A suggests that risk-averse CEOs of the "follower" firms would raise the leverage higher than the risk-neutral and risk-seeking CEOs for profitability and market size factor. However, there is no relationship shown by the CEOs of the follower firms on the stock return factor. Interestingly, in Panel B the result is counterintuitive with the findings of Leary and Roberts (2014) per se. In Panel B, given the peer firm effect, risk-averse and risk-seeking CEOs of the leader firms would mimic the follower firms in terms of profitability factor. Moreover, risk-averse and risk-neutral CEOs mimic the follower firms in terms of the stock return factor. This aligns with the argument of Hirshleifer et al. (1994) suggesting that despite the leaders and the followers, herding or mimicking in stock return factor occurs if one firm has superior information associated with the stock return increase.

5. DISCUSSION

The results suggest that the novel empirical strategy of this research produces the outcome similarly. The baseline result of this paper is similar to the original paper of Leary and Roberts (2014) which shows the positive relationship between peer firm effect and change in capital structure decision. However, employing the moderating effect of risk preference has produced the outcomes slightly different. The first empirical model results that risk-seeking CEO is less affected by their peer firms, showing a lower magnitude in capital structure decision compared to risk-neutral CEO and risk-averse CEO, while risk-averse CEO shows the highest magnitude of increase in leverage. Therefore, the results produce insufficient evidence to neither reject nor fail to reject the null hypothesis.

Although the empirical result suggests contrary to the hypothesis, such result may be in line with the study by Liu and Chen (2017) which suggests that risk-seeking CEOs would be less affected by the herding behaviour because they are willing to take risk by looking into their internal capabilities. Similarly, Rejikumar et al. (2021) found that people with risk aversion and cognitive simplicity mental model tend to consume public information and do online herding. Another mechanism of the relationship can be understood through the existence of corporate debt capacity (i.e., the promised face value of debt to be paid to the creditors) and its adherence to the industry average of leverage as the reference point (Turnbull, 1979). In this case, firms want to maximise their utilisation of leverage respective to the debt capacity without causing financial distress.

Empirically, risk-averse CEOs appear to be more conservative by responding more sensitively against the industry standards or their peers' in adjusting their firm-specific leverage to avoid debt overcapacity irrespective of such decisions are being optimal or not. On the other hand, because of the hindrance against debt overcapacity in prior period, risk-averse CEOs can be implied to use more leverage to maximise the room of debt capacity. Subsequently, risk-neutral CEOs may be considered as exhibiting a balance in utilising debt capacity and keeping up with the industry standards. Thirdly, risk-seeking CEOs would be less affected by the industry standards or their peers, suggesting that they may behave outside the norm that considers the optimal decision. Instead of aligning with the industry standard, risk-seeking CEOs might perceive the debt capacity differently by typically using self-explored aggressive growth projections. In addition, risk-seeking CEOs can be implied in setting less leverage in response to their peer firms or the industry standard, considering the possibility of using excessive leverage that nearly reached the debt capacity in prior period.

6. CONCLUSION

This study aims to investigate the role of a CEO's risk preference proxied by Vega of their stock option holdings as the moderating effect towards the peer firms' capital structure decision on the specific firm's capital structure decision, especially how the difference in risk preference (e.g., risk-seeking and risk-averse behaviour) can affect the magnitude of the increase in leverage given the peer firm effect. Risk preference is important to look at because usually mimicking and observing peer firms' behaviour require risk preference as the assessment model with respect to the firm-specific prospects and constraints. Risk preference also can be considered as exogeneous because it is inherently embodied in a person's, especially CEO, characteristics. Although there is numerous literature that studied the role of risk preference as the moderator, there has been no article the studies Vega specifically as the proxy of risk preference to be the moderator.

The empirical method has been done by using fixed-effect/panel regression in which model adopts the econometric model of Leary and Roberts (2014). The sample of analysis consists of firms that are classified within S&P 500, S&P 400, and S&P 600 over the period between 1992 until 2018, but restrict firms from financial, utilities, and governmental industries. In the model, the analysis involved Vega as the new variable plus the interaction term of the risk preference classification (i.e., risk-seeking and risk aversion) with the peer firm effect variable. The empirical result of this study is counterintuitive against the developed hypothesis and the theoretical model. This hypothesis suggests that risk-seeking CEOs that mimic their peer firms would increase the leverage higher than the risk-averse CEOs. However, the empirical result suggests otherwise, showing that risk-seeking CEOs increase the leverage lower than the risk-averse CEOs.

This study therefore concludes the factors of capital structure decision with respect to mimicking and herding through the behavioural perspective. The result concludes that risk-averse CEOs are more conservative in establishing leverage by following more on the peers or the industry standards. Meanwhile, risk-seeking CEOs would be less affected by peer firms' behaviour nor the industry standards as they would prefer to act upon their internal capabilities. With respect to the debt capacity utilisation, CEOs and their firms want to maximise their use on leverage. Risk-seeking CEOs would set less leverage because of the possibility of using excessive leverage in prior period that caused them currently inflexible with their debt capacity. On the contrary, because of the avoidance of using leverage in prior period, risk-averse CEOs would set higher leverage.

6.1 Implications

This study of risk preference relates and implicates to few stakeholders that are involved. Primarily, this study highlights the importance of profiling the peer-firm CEOs', especially through networking. Understanding them usually require people skills, and the medium of observing one's behaviour through business meetings, networking events, business organisations, and industry observations. For the board of executives/directors and managers, understanding the peer firm effect enables managers to more informed decisions about their capital structure policy. Simultaneously, managers can face trade-off to either mimic and herd with the industry norms or take the risk by utilising internal information and resources. For investors and/or creditors, this study can help investors in predicting these managers behaviour upon the different market conditions and sentiments. For example, in a high risk or risk-averse industry, investors can predict how leverage does change and is being more aligned with the peer firms or not. For regulators, as mimicking and herding behaviour were discussed beforehand in increasing the systemic risk, this study is expected to help regulators realise the importance of firm-level and industry-level supervision, as well as making policies that ensure economic stability.

6.2 Limitations and Further Research Recommendations

Although this study produces a compelling result, this study still contains some limitations. Firstly, the dataset of Vega is taken directly from Coles et al. (2006), which contains unbalanced and missing observations on CEOs' Vega in each company and each year. Therefore, it is highly advisable to construct own Vega based on Core and Guay's (2002) methodology to avoid missing data since Vega construction in this study is limited due to statistical software constraint. Alternatively, researchers may also conduct the natural or laboratorial experiment that involves a hypothetical situation of mimicking and herding peer firms while observing and capturing the CEOs' behaviour in terms of risk preference. Lastly, it is important for further research to include a dynamic debt capacity as the control variable to produce more robust outcomes for analysis.

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APPENDIX A: Variable Calculation

Variables	Variable Description	Compustat Variable
Total Book Value of Assets	-	**at**
Total Debt	Short-term Debt + Long-term Debt	**dltt+dlc**
Book Value of Leverage	Total Debt / Total Book Value of Assets	**Total Debt/at**
Market Value of Assets (MVA)	Closing price × Common Shares Outstanding + Short-term Debt + Long-term Debt + Preferred Stock – Deferred Taxes and Investment Credit	**prcc_f × cshpri + dlc + dltt + pstkl - txditc**
Market Value of Leverage	Total Debt / Market Value of Assets	**Total Debt/MVA**
Firm Size	Logarithmic form of Sales	**Log(Sale)**
Market-to-Book Ratio	Market Value of Assets / Total Book Value of Assets	**MVA/at**
Profitability	EBITDA/Total Book Value of Assets	**oibdp/at**
Assets Tangibility	Net Property, Plant, and Equipment (PPE) / Total Book Value of Assets	**ppent/at**