Three Essays on Corporate Ownership Structure and Governance Mechanisms

Submitted by

Mohsin Zahid Khawaja
Master of Business Administration

A thesis submitted in total fulfillment of the requirements for the degree of Doctor of Philosophy

Department of Economics, Finance and Marketing
La Trobe Business School
College of Arts, Social Sciences and Commerce

La Trobe University
Victoria, Australia

November 2020

Dedication

I dedicate my thesis to my parents
and my beloved wife, Farzeen,
for their immense support, patience, and encouragement
throughout my PhD journey.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 2

Chapter 3

Chapter 4

LIST OF APPENDICES

LIST OF FIGURES

ABSTRACT

This thesis presents three empirical chapters to examine the effects of corporate ownership structure and governance mechanisms on two aspects of firms: (1) raising capital and (2) insider trades. In the first chapter, I analyze how ownership and governance affect firms' decisions to raise capital. I use a sequential decision-making framework to establish that the two decisions of firms, namely the decision to raise capital and the choice of financing instrument, are sequential and should be investigated together. In the second chapter, I extend the analysis by incorporating in the sequence the third decision about issuance volume. I test how economic uncertainty – in addition to ownership and governance – determines the three decisions. In both chapters, my findings support the control hypothesis that concentration of power among shareholders and executives leads them to avoid risk-sharing at the cost of high bankruptcy risk. I infer this from the findings that higher ownership concentration and institutional ownership are associated with the usage of debt-based instruments to raise capital. Further, governance mechanisms that empower executives – such as CEO duality – lead firms to avoid equity financing. Economic uncertainty, measured by the economic policy uncertainty and the implied volatility indices, increases firms' need for capital as they raise funds more frequently; this is followed by a preference for bank loans and bonds. In the next chapter, I investigate how economic uncertainty, ownership, and governance affect the trading of firms' insiders. By applying an endogenous framework, I find that uncertain economic conditions allow firm insiders to exploit their information advantage, which is intensified by the rise in information asymmetry. The results also complement the literature that long-term institutional ownership helps to reduce insider trading due to increased monitoring.

STATEMENT OF AUTHORSHIP

This thesis includes work by the author that has been published or accepted for publication as described in the text. Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis accepted for the award of any other degree or diploma. No other person's work has been used without due acknowledgment in the main text of the thesis. This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

The extent and nature of collaborative efforts are specified in Appendix 1. Each statement of collaborative input has been approved by all co-authors and their approval verified by Professor Darren Henry in the Authority to Submit Form.

MOHSIN KHAWAJA Date: 06 November 2020

ACKNOWLEDGEMENTS

I express my sincere gratitude to my principal supervisor, Professor Darren Henry, for his continuous support throughout my experience of writing this thesis. His motivation and insightful comments played a crucial role in improving the contents of each chapter. I am particularly impressed by the gentle nature of his responses, given the changing circumstances under the Covid-19 pandemic that affected us in different ways. I would like to thank him for taking the time out of his busy schedule and continuing to supervise me in these testing times.

I would also like to acknowledge the support I received from my co-supervisors, namely Dr. Muhammad Al Mamun and Professor Ishaq Bhatti. I would also thank Dr. Dawood Ashraf and Professor Avanidhar Subrahmanyam, whose scholarly opinions and feedback helped me enormously to improve my work.

The Department of Economics, Finance and Marketing at La Trobe Business School provided me numerous opportunities to engage in academic activities. The more prominent of them include the weekly department seminars, annual colloquium, and the annual conferences. I received valuable feedback after presenting my work in each of these events. Mr. Greg Jamieson, Professor Bala Balachandran, and Professor Petko Kalev deserve an applause for dedicating their valuable time to organize these events.

I also find it important to mention the roles of Professor Chris Pakes and Dr. Gordon Boyce for their timely advice at several stages of my work. In addition, all my colleagues at La Trobe Business School were supportive throughout my experience.

ACKNOWLEDGEMENT OF FINANCIAL SUPPORT

This work was supported by a *La Trobe University Postgraduate Research Scholarship* and *Full Fee Research Scholarship*.

THIS PAGE IS INTENTIONALLY LEFT BLANK

Governance is the process whereby people in power make decisions that create, destroy or maintain social systems.[1] *(Maria Ramos, CEO Transnet)*

Chapter 1

Introduction

This thesis presents three essays on empirical corporate finance. The introduction chapter sets the background and the motivation of the thesis; it presents the motivation of examining the influence of ownership structure and governance mechanisms on firms' financing decisions and insider trading activities. It then summarizes the structure of the thesis with a discussion on the three empirical chapters and their findings. The introduction chapter ends with a discussion about the contribution to the literature and policy implications.

1.1 Motivation

Shareholders show keen interest in firms' financing decisions – particularly the choice of instrument. Choosing equity to raise capital dilutes the ownership of shareholders (Lemmon and Zender, 2019; Admati et al., 2018). In contrast, the trade-off theory implies that raising excessive debt leads firms toward bankruptcy (Modigliani and Miller, 1958). Moreover, firms have different types of owners, such as government, individual, or institutional, each having competing goals (Elyasiani and Jia, 2010; Putterman, 1993). Accordingly, ownership structure can have significant influence on firms' financing choices.

I examine how ownership and governance structures affect firms' decisions to raise capital and the choice of instrument. Bharath and Hertzel (2019) and Lin et al. (2013) find that the ownership, as well as governance, structure have a significant impact on firms' decisions to choose between bank borrowing or public debt financing. Yun (2009) presents evidence that efficiency of internal governance is an important determinant of firms' choice of cash and lines

[1] Thoughts on corporate governance.
https://www.forbesindia.com/article/thoughts/thoughts-on-corpo-rate-governance/40659/1

of credit. Megginson and Weiss (1991) show that better governed firms witness lower underpricing in their IPOs when they are certified by venture capitalists. Hence, both ownership structure and governance mechanisms play an important role in firms' financing decisions and instrument choice.

I use a sequential decision-making framework to estimate (1) the determinants of firms' decision to raise capital and (2) the choice of instrument. Prior studies separately analyze the two decisions of firms: whether to raise capital and choice of financing instrument (Jung et al., 1996; MacKie-Mason, 1990; Gatchev et al., 2009; Lewis et al., 2003). However, my approach is unique because the sequential decision-making framework helps to eliminate sample selection bias by incorporating both decisions simultaneously.

Next, I examine how economic uncertainty affects firms' decisions to raise capital; the effect of uncertainty on (a) whether to raise capital, (b) the choice of instrument, and (c) the issuance volume. To measure economic uncertainty, I apply separate measures – the most important being the economic policy uncertainty (EPU) index[2] by Baker et al. (2016). EPU index has commonly been applied in several studies as a measure for economic sentiment in a country.[3] This measure is built with the help of textual analysis by using news outlets, tax code expiration data, and economic forecaster disagreement. Studies by Graham and Harvey (2001) and Choe et al. (1993) suggest that business cycles, GDP growth rates, and interest rates can significantly affect firms in their decisions to raise capital and the choice of security. However, to my knowledge, uncertainty in macroeconomic conditions has not yet been investigated in this context. Hence, this thesis investigates how EPU, coupled with ownership structure and governance mechanisms, affects firms' decisions of whether to raise capital, and the subsequent decisions about the choice of instrument and the issuance volume.

[2] Economic Policy Uncertainty (EPU) index
https://www.policyuncertainty.com/

[3] Some of the recent studies that apply the EPU index include Duong et al. (2020), Husted et al. (2019), Datta et al. (2019), and Çolak et al. (2018).

Finally, I investigate how economic uncertainty relates with insider trades. Insiders are characterized as individuals in the firm that possess information about firms' future cash flows which is not reflected in the firm's stock price. These individuals include executives and members of boards and supervisory committees. Insider trades are those executed by insiders based on their information advantage. Insider transactions are found to generate abnormal returns (Jeng et al., 2003) which can compel managers to make inefficient operating decisions, consequently bringing wealth loss to other shareholders (Bagnoli and Khanna, 1992). Insider trading also negatively affects managements' investment decisions because of inefficiency in share prices (Fishman and Hagerty, 1992).

Evidence suggests that EPU significantly increases the information asymmetry between firms and outside investors (Nagar et al., 2019). This has clear implications in that the rise in economic uncertainty should equip insiders with greater information advantage and, consequently, incentivize more frequent insider transactions. The thesis empirically investigates this relationship between insider trades and economic uncertainty. Prior studies analyze the impact of macroeconomic factors on insider trades (Erenburg et al., 2006; Fleming and Remolona, 1999). However, this is the first study to investigate how EPU determines insider trades. I also control for endogeneity among EPU and insider trades since the former could be simultaneously affected by macroeconomic factors.

Several studies investigate how insider trades could be curtailed. Intense monitoring by shareholders is found to constrain insider trading. This is possible in the presence of a concentrated ownership structure (Fidrmuc et al., 2006) and the presence of long-term institutional shareholders (Chen et al., 2007). Similarly, efficient corporate governance allows firms to adopt restriction policies to reduce insider transactions (Lee et al., 2014).

Ownership structure in publicly owned firms in the US has changed considerably over the past few decades (Bogle, 2018). Family ownership in US firms was as high as 92 percent in 1945.

However, individual owners have largely been replaced by institutional owners with about a 73 percent share as of 2018 (Bogle, 2018). Similarly, the proportion of firms with a unitary leadership structure, in which the Chairman of the Board of Directors also serves as the CEO, has reduced from about 78 percent in 1983 (Rechner and Dalton, 1991) to nearly 45 percent in 2019.[4] Hence, this thesis investigates the relation between ownership structure and governance attributes, in addition to EPU, and insider transactions.

1.2 Structure of the thesis

This thesis contains five chapters including three empirical essays (Chapters 2, 3, and 4).

Chapter 1 presents a summarized discussion on the motivation, main empirical questions, key findings, and the contributions of each chapter to the relevant literature.

The first empirical chapter (Chapter 2) addresses the question of how firms' ownership structure and governance mechanisms affect their decisions to raise capital. Precisely, it examines the hypothesis that concentration of power among shareholders and top executives leads to a decline in firms' tendency to raise capital and use risk-sharing financing instruments like equity.

The second empirical chapter (Chapter 3) seeks to understand how firms adapt their frequency of raising capital and preference toward the choice of financing instrument during periods of varying degrees of economic uncertainty. Two contrasting arguments are weighed up; the first being that during periods of high economic uncertainty, firms would choose equity-based instruments to avoid bankruptcy costs. The second suggests that high economic uncertainty leads firms to choose debt-based instruments due to their lower cost and to reduce their overall cost of capital.

[4] The Wall Street Journal: More US companies separating Chief Executive and Chairman roles https://www.wsj.com/articles/more-u-s-companies-separating-chief-executive-and-chairman-role-11548288502

The third empirical chapter (Chapter 4) analyzes the effect of economic uncertainty, ownership structure, and governance mechanisms on share trading transactions by firm insiders by examining three separate hypotheses. The main hypothesis is that under high economic uncertainty, firm insiders would have a greater tendency to trade by exploiting the rise in information asymmetry between the firm and outside investors. Second, blockholding owners and institutional investors are expected to moderate the effect of EPU on insider transactions through their intense monitoring. Finally, efficient governance practices should align with a smaller magnitude of insider trade activity.

Finally, the last chapter (Chapter 5) presents the general conclusions of the thesis, overall findings and their implications, and directions for future research.

1.3 Summary of empirical chapters

Empirical studies regarding firms' decisions to raise capital focus either on (a) the binary decision of firms' choice from either debt or equity usage (Jung et al., 1996; MacKie-Mason, 1990); or (b) firms' choice of financing instrument. (Gatchev et al., 2009; Lewis et al., 2003). In Chapter 2, I classify firms' decisions to raise capital into two sequential decisions. Hence, the analysis treats the first binary decision as a condition for the subsequent decision regarding instrument choice. This is achieved by applying the Heckman ordered probit model to remove endogeneity arising out of sample selection bias (Heckman, 1979).

This chapter analyzes a range of instruments, whereby each instrument represents a risk level to the firm. To achieve this objective, I extract data for firm issuance of financing instruments including equity, bonds, bank loans, and sukuk. To my knowledge, there is no prior study to incorporate such a wide range of instruments representing unique risk levels.

I formulate two hypotheses to understand the role of ownership and governance in the two financing decisions. The first hypothesis is that firms with concentrated ownership prefer debt-

based instruments to avoid dilution of the large shareholder stakes. The second hypothesis is about the role of governance mechanisms stating that a unitary leadership structure, reflected by the presence of CEO duality in the firm, is associated with a tendency to maintain control by using debt to raise capital. The idea is that greater control centred at the top results in rising debt levels of firms despite the presence of bankruptcy costs. CEO duality is retained as part of the main hypothesis because it implies representation of both the board and executive by the same individual. Hence, their decisions reflect opinions of the board as well as the management, potentially reducing agency costs (Brickley et al., 1997) or exacerbating them (Pi and Timme, 1993).

The main finding is that firms with high ownership concentration are associated with raising capital by using debt-based instruments. Also, firms with CEO duality are more inclined to raise capital by issuing debt. Overall, the results suggest that greater control leads to a tendency of avoiding equity as it dilutes ownership in the firm. In addition, diversity within the board of directors, in terms of gender and size, does not lead to a certain preference toward the choice of security. However, board diversity is found to be associated with greater instances of raising capital.

This study could be enhanced by addressing two limitations. First, the tests are focused on ownership and governance along with firm-specific attributes, such as firm size, profitability, leverage etc. The study pays limited attention toward investigating the role of macroeconomic variables on firm decisions. Second, decisions by the board of directors as well as executives could be influenced by a rise in their ownership within the firm. Therefore, analysis of their beliefs and optimism about firm performance can improve the analysis. I address these two limitations in the next chapters.

Chapter 3 compares two arguments about how EPU affects firm decisions to raise capital. The market timing theory suggests that businesses would be in a better position to raise capital

through equity if the change in economic policy results in an optimistic outlook for the firm (Baker and Wurgler, 2002). On the other hand, evidence by Pastor and Veronesi (2013) implies that a rise in EPU leads to a higher equity risk premium and, hence, debt would be the preferred choice of financing. To understand this relationship, I add EPU to the two other categories of variables previously investigated, namely ownership structure and governance mechanisms. Besides this, I also add issuance volume as a third sequential decision in the capital-raising process. Hence, the question addressed in this study is how EPU, ownership structure, and governance mechanisms affect three decisions of firms, including the binary decision to raise capital, the subsequent decision of the choice of financing instrument, and finally the decision about the volume of capital to raise. I apply the Heckman ordered probit model to analyze each decision sequentially in a separate equation to account for the endogenous sample selection bias in policy decisions as suggested by Jensen et al. (1992).

In addition to testing for macroeconomic uncertainty, I incorporate two modifications to the variables on ownership and governance. First, the institutional ownership is split into long-term and short-term institutional owners (Zhang and Zhou, 2018). Second, the governance variables also include insider optimism, which controls for the purchase and sale transactions of board members and executives. Like the previous chapter, I include a wide range of securities which are frequently chosen by firms to raise capital. These include bank loans, corporate bonds, convertible bonds, preferred equity, and common equity. The list includes securities in an increasing order of risk-sharing.

The results of this study indicate that firms raise capital more frequently during high EPU and prefer debt to equity. However, there is no significant difference in the volume of capital raised. Second, high EPU leads firms to choose financing with lower costs of capital. Long-term institutional investors are also associated with greater issuances of debt-based instruments, albeit with a lower dollar volume of capital raised. Amongst the governance variables, the

results suggest that the presence of a golden parachute clause in executive contracts is associated with significantly higher preference for equity issuance. Further, both insider- and market-optimism are associated with significantly greater instances of equity issuance.

Chapter 4 evaluates the effects of economic uncertainty, corporate ownership and governance on informed trading by firm directors and executives. The primary hypothesis is based on the premise that EPU widens information asymmetry between insiders and outside investors (Nagar et al., 2019). Hence, a rise in EPU should lead to an increase in insider stock trading. The results endorse this postulate by showing a significant increase in insider transactions during periods of high economic uncertainty, establishing that firm directors and executives exploit the rise in their information advantage generated by increased information asymmetry. The results further suggest that ownership concentration and institutional investors generally encourage insider share investment but exert monitoring pressure to reduce insider trading during periods of high economic uncertainty. I also find that efficiency in governance mechanisms leads to a decline in insider trades. However, powerful executives with the dual role of CEO and chairman are found to not be deterred in their trading behavior, implying that greater control is associated with steady trading by firm insiders.

Overall, the results of this thesis can be summarized in the following sequence. First, greater control by shareholders and directors of a firm incentivizes them to maintain their control by avoiding risk-sharing when they raise capital. Second, high EPU is associated with firms' choice of low-cost instruments to raise capital. Finally, high EPU incentivizes insiders to exploit their information advantage by trading their firms' shares more actively, although this exploitation is reduced in the face of effective monitoring pressure. The results are robust after controlling for information asymmetry and firm-specific factors.

1.4 Contribution

This thesis centres around examining how ownership and governance of firms, along with variation in macroeconomic factors, affect their decisions to raise capital and limit insider trades. Although the literature on corporate governance is vast, the empirical evidence from this thesis helps to understand certain trends, which are beneficial to both practitioners and researchers.

The results from Chapter 2 endorse the control motive theory that shareholders with large ownership stakes in a firm tend to maintain their control and avoid losing ownership by issuing equity (Ellul, 2008; Admati et al., 2018). This study uses the simultaneous equation model which treats two important decisions sequentially, namely the decision to raise capital and the subsequent decision of the choice of security. This helps to control for the endogenous sample selection bias (Heckman, 1979) by incorporating firms that have issued capital during the sample period as well as firms that have not. Further, it uses a broad range of securities with varying levels of risk-sharing. This helps to understand the preference of shareholders as well as board members and top executives based on the level of risk that they are prepared to take at the cost of diluting their control over the firm. The wide array of financing instruments used in this study plays a role to explain this relationship. In addition, by incorporating sukuk in the list of securities, the study highlights its level of risk-sharing. The results suggest that sukuk offer shareholders a moderate-to-high level of risk-sharing.

This chapter also offers useful findings to analysts and investors as they could perform firm valuations from the perspective of control and bankruptcy trade-off. Since firms with concentrated ownership and powerful CEOs are identified to avoid risk-sharing, they have a greater tendency to raise leverage. This has direct implications for understanding firm risk and stability.

Chapter 3 offers evidence to the strand of literature suggesting that the demand for capital rises under high economic uncertainty (Atta-Mensah, 2004; Abel, 1983). The results also endorse the pecking order theory (Myers and Majluf, 1984) as debt is found to be the preferred option when information asymmetry rises between the firm and investors because of an increase in EPU (Nagar et al., 2019). This chapter applies a three-step decision making model that evaluates the determinants of each decision sequentially. The model yields a robust analysis as it also helps to eliminate sample selection bias (Heckman, 1979). Also, the chapter uses a diverse spectrum of securities that US firms have used to investigate the process of raising capital. The wide range of instruments, including loans, bonds, convertible securities, and equity, helps in predicting the choice of firms' decision-makers as economic uncertainty varies. Chapter 3 also has implications for policy makers. The empirical evidence, which suggests that a higher demand for debt instruments is associated with higher political and economic uncertainty, implies that there is a need for careful scrutiny of central bank intervention in the secondary markets as it may pose a threat to the safety of the financial system (Acharya and Steffen, 2020).

Chapter 4 establishes a positive relationship between economic uncertainty and insider share trading. This suggests that when EPU is high, shareholders have a greater responsibility to closely monitor the firm to compensate the increase in information asymmetry (Nagar et al., 2019). Second, this chapter offers evidence that influential owners of firms, such as large blockholding and institutional investors, play a significant role in achieving price discovery (Ellul and Payandies, 2018), particularly during periods of high EPU. Another finding relevant to the shareholders is that powerful executives are less deterred to trade their firms' shares. In other words, executives with greater control, as in the case of CEO duality, are less likely to scale down insider transactions even after controlling for EPU and ownership types. This has

implication for shareholders since greater executive control could negatively affect price efficiency.

To summarize, this thesis contributes to the literature about firm ownership and governance and highlights the motives of different stakeholders to retain control over the firm under different circumstances. The findings have implications for shareholders, analysts, and policy makers.

References

Abel, A. B. (1983). Optimal investment under uncertainty. *American Economic Review, 73*(1), 228-233.

Acharya, V. V., and Steffen, S. (2020). The risk of being a fallen angel and the corporate dash for cash in the midst of COVID. *CEPR COVID Economics, 10*.

Admati, A. R., Demarzo, P. M., Hellwig, M. F. and Pfleiderer, P. (2018). The leverage ratchet effect. *The Journal of Finance, 73*, 145-198. https://doi.org/10.1111/jofi.12588

Atta-Mensah, J. (2004). *Money demand and economic uncertainty* (No. 2004-25). Bank of Canada.

Bagnoli, M., and Khanna, N. (1992). Insider trading in financial signaling models. *The Journal of Finance, 47*(5), 1905-1934. https://doi.org/10.1111/j.1540-6261.1992.tb04688.x

Baker, M., and Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*(1), 1-32. https://doi.org/10.1111/1540-6261.00414

Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, *131*(4), 1593–1636. https://doi.org/10.1093/qje/qjw024

Bharath, S. T., and Hertzel, M. (2019). External governance and debt structure. *The Review of Financial Studies, 32*(9), 3335-3365. https://doi.org/10.1093/rfs/hhy112

Bogle, J. (2018). The modern corporation and the public interest. *Financial Analysts Journal, 74*(3), 8-17. https://doi.org/10.2469/faj.v74.n3.1

Brickley, J. A., Coles, J. L., and Jarrell, G. (1997). Leadership structure: Separating the CEO and chairman of the board. *Journal of Corporate Finance, 3*(3), 189-220. https://doi.org/10.1016/s0929-1199(96)00013-2

Chen, X., Harford, J., and Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279-305. https://doi.org/10.1016/j.jfineco.2006.09.005

Choe, H., Masulis, R. W., and Nanda, V. (1993). Common stock offerings across the business cycle: Theory and evidence. *Journal of Empirical Finance, 1*(1), 3-31. https://doi.org/10.1016/0927-5398(95)90043-8

Çolak, G., Gungoraydinoglu, A., and Öztekin, Ö. (2018). Global leverage adjustments, uncertainty, and country institutional strength. *Journal of Financial Intermediation, 35*, 41–56. https://doi.org/10.1016/j.jfi.2018.01.010

Datta, S., Doan, T., and Iskandar-Datta, M. (2019). Policy uncertainty and the maturity structure of corporate debt. *Journal of Financial Stability, 44*, 100694. https://doi.org/10.1016/j.jfs.2019.100694

Duong, H. N., Nguyen, J. H., Nguyen, M., and Rhee, S. G. (2020). Navigating through economic policy uncertainty: The role of corporate cash holdings. *Journal of Corporate Finance,* 101607. https://doi.org/10.1016/j.jcorpfin.2020.101607

Ellul, A. (2008). *Control Motivations and Capital Structure Decision*. Available at SSRN: https://ssrn.com/abstract=1094997

Ellul, A., and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage? *Journal of Financial and Quantitative Analysis, 53*(1), 203-241. https://doi.org/10.1017/s0022109017000990

Elyasiani, E., and Jia, J. (2010). Distribution of institutional ownership and corporate firm performance. *Journal of Banking & Finance, 34*(3), 606-620.

Erenburg, G., Kurov, A., and Lasser, D. J. (2006). Trading around macroeconomic announcements: Are all traders created equal? *Journal of Financial Intermediation, 15*(4), 470-493. https://doi.org/10.1016/j.jfi.2005.07.003

Fidrmuc, J. P., Goergen, M., and Renneboog, L. (2006). Insider trading, news releases, and ownership concentration. *The Journal of Finance, 61*(6), 2931-2973. https://doi.org/10.1111/j.1540-6261.2006.01008.x

Fishman, M. J., and Hagerty, K. M. (1992). Insider trading and the efficiency of stock prices. *The RAND Journal of Economics*, 106-122. https://doi.org/10.2307/2555435

Fleming, M. J., and Remolona, E. M. (1999). Price formation and liquidity in the US Treasury market: The response to public information. *The Journal of Finance, 54*(5), 1901-1915. https://doi.org/10.1111/0022-1082.0017

Gatchev, V.A., Spindt, P.A., and Tarhan, V. (2009). How do firms finance their investments? The relative importance of equity issuance and debt contracting costs. *Journal of Corporate Finance, 15*(2), 179-195. https://doi.org/10.2139/ssrn.971301

Graham, J. R. and Harvey, C. R. (2001). The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics, 60*, 187-243. https://doi.org/10.1016/S0304-405X(01)00044-7

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153-161. https://doi.org/10.2307/1912352

Husted, L., Rogers, J., and Sun, B. (2019). Monetary policy uncertainty. *Journal of Monetary Economics, 2017*(1215), 1–56. https://doi.org/10.1016/j.jmoneco.2019.07.009

Jeng, L. A., Metrick, A., and Zeckhauser, R. (2003). Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective. *Review of Economics and Statistics, 85*(2), 453-471. https://doi.org/10.1162/003465303765299936

Jensen, G. R., Solberg, D. P., and Zorn, T. S. (1992). Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies. *The Journal of Financial and Quantitative Analysis, 27*(2), 247. https://doi.org/10.2307/2331370

Jung, K., Kim, Y., and Stulz, R.M. (1996). Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Economics, 42*(2), 159-185. https://doi.org/10.1016/0304-405x(96)00881-1

Lemmon, M. L., and Zender, J. F. (2019). Asymmetric information, debt capacity, and capital structure. *Journal of Financial and Quantitative Analysis, 54*(1), 31-59. https://doiorg/10.1017/S0022109018000443

Lee, I., Lemmon, M., Li, Y., and Sequeira, J. M. (2014). Do voluntary corporate restrictions on insider trading eliminate informed insider trading? *Journal of Corporate Finance, 29*, 158-178. https://doi.org/10.1016/j.jcorpfin.2014.07.005

Lewis, C. M., Rogalski, R. J., and Seward, J. K. (2003). Industry conditions, growth opportunities and market reactions to convertible debt financing decisions. *Journal of Banking & Finance, 27*(1), 153-181. https://doi.org/10.1016/s0378-4266(01)00212-6

Lin, C., Ma, Y., Malatesta, P., and Xuan, Y. (2013). Corporate ownership structure and the choice between bank debt and public debt. *Journal of Financial Economics, 109*(2), 517-534. https://doi.org/10.1016/j.jfineco.2013.03.006

MacKie-Mason, J. (1990). Do Taxes Affect Corporate Financing Decisions? *The Journal of Finance, 45*(5), 1471. https://doi.org/10.2307/2328746

Megginson, W. L., and Weiss, K. A. (1991). Venture capitalist certification in initial public offerings. *The Journal of Finance, 46*(3), 879-903. https://doi.org/10.1111/j.1540-6261.1991.tb03770.x

Modigliani, F., and Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review, 48*(3), 261-297.

Myers, S. C., and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221. https://doi.org/10.3386/w1396

Nagar, V., Schoenfeld, J., and Wellman, L. (2019). The effect of economic policy uncertainty on investor information asymmetry and management disclosures. *Journal of Accounting and Economics, 67*(1), 36-57. https://doi.org/10.1016/j.jacceco.2018.08.011

Pástor, Ľ., and Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520–545. https://doi.org/10.1016/j.jfineco.2013.08.007

Pi, L., and Timme, S. G. (1993). Corporate control and bank efficiency. *Journal of Banking & Finance, 17*(2-3), 515-530. https://doi.org/10.1016/0378-4266(93)90050-n

Putterman, L. (1993). Ownership and the nature of the firm. *Journal of Comparative Economics, 17*(2), 243-263.

Rechner, P. L., and Dalton, D. R. (1991). CEO duality and organizational performance: A longitudinal analysis. *Strategic Management Journal, 12*(2), 155-160. https://doi.org/10.1002/smj.4250120206

Yun, H. (2009). The choice of corporate liquidity and corporate governance. *The Review of Financial Studies, 22*(4), 1447-1475.

Zhang, X., and Zhou, S. (2018). Bond covenants and institutional blockholding. *Journal of Banking & Finance, 96*, 136-152. https://doi.org/10.1016/j.jbankfin.2018.09.006

The contents of Chapter 2 are extracted from the published article in the academic journal *Emerging Markets Review*. I contributed to completing this article by developing the design of the paper, acquiring the research data, collecting the literature, generating the results, and drafting and revising the manuscript. My co-authors, Dr. Ishaq Bhatti and Dr. Dawood Ashraf, contributed by assisting in the development of the paper design and interpretation of research results. The citation of this paper is as follows:

Khawaja, M., Bhatti, M. I., and Ashraf, D. (2019). Ownership and control in a double decision framework for raising capital. *Emerging Markets Review*, *41*(C).
https://doi.org/10.1016/j.ememar.2019.100657

Chapter 2

Ownership and control in a double decision framework for raising capital

2.1 Introduction

Firms face difficult choices when they seek to raise capital. Raising funds using equity potentially reduces the control of existing shareholders by diluting their ownership stake (Lemmon and Zender, 2019; Admati et al., 2018; Boubakri and Ghouma, 2010; Ellul, 2008; Harris and Raviv, 1998). On the contrary, the decision use debt instruments can raise bankruptcy costs (Glover, 2016; Fama, 1980; Masulis, 1988). Firms can raise capital by choosing from a range of financial instruments, each having unique impact on shareholders' control and firms' bankruptcy costs. The trade-off between shareholders' desire for control and managing bankruptcy costs leads firms to their choice of financing instrument. Figure 1 ranks several instruments based on their relative-sharing and the possibility of shareholders' control dilution.[5] The figure depicts that raising funds using securities with equity-like features (at the

[5] I categorize sukuk as an instrument offering more risk-sharing than loans and bonds but less than equity, as shown in Figure 1. From among bonds and loans, I classify loans as instruments with lesser risk-sharing although both bonds and loans are pure debt. This classification is based on the argument by Chemmanur and Fulghieri (1994) that bondholders choose to liquidate the security in case of a liquidity shortfall facing the issuer. On the other hand, banks keep the option of renegotiating loans even if the issuer undergoes cash flow problems. This

top end of the matrix) implies lower bankruptcy cost but greater dilution of ownership and loss of control.

INSERT FIGURE 1 HERE

Most of the capital structure theories[6] consider tax shield benefits and firms' financial strength as primary determinants of firms' choice of financing instrument. However, control motives of shareholders can also affect the choice of instrument to raise capital because shareholders resist leverage reduction to maintain control despite higher bankruptcy costs (Admati et al., 2018) and even optimally default at times when they can raise funds through equity (Alanis et al., 2018). Furthermore, in most of the empirical literature, the decision to choose between debt and equity is evaluated based on debt as a set of homogenous instruments without giving due consideration to hybrid securities (Walsh and Ryan, 1997; Dong et al., 2012; Jung et al., 1996; MacKie-Mason, 1990; Loughran, 2008). In other studies, authors consider solely hybrid securities such as convertible debt, warrants, or preferred shares (Balachandran et al., 2017; Lewis et al., 2003; Suchard and Singh, 2006; Gatchev et al., 2009). To the best of my knowledge, no prior study has used a broader array of securities to examine the impact of shareholders' control motives in the choice of instrument for raising funds. Following the control motive theory (Ellul, 2008; Admati, 2018; Liu et al., 2011), this chapter examines the role of ownership structure and governance in firms' decisions to raise capital and their choice

implies that firm ownership shares less risk by choosing bank loans as the source of capital. Finally, common equity including initial public offerings and secondary equity offerings clearly offers the highest level of risk-sharing among the four asset types. Therefore, I place equity in the top-right corner implying that the instrument leads to highest risk-sharing and dilution of control.

[6] Major capital structure theories include static trade-off theory, pecking order theory, market timing theory, agency theory, and dynamic targeting theory. Trade-off theory suggests that the choice of new capital instrument, whether equity or debt, is a trade-off of tax shields and bankruptcy costs (Myers, 2001; Kraus and Litzenberger, 1973). Pecking order theory suggests firms prefer debt issuance over equity (Myers, 1984; Myers and Majluf, 1984). Market timing theory, on the other hand, indicates that firms benefit from their high valuation by issuing equity (Baker and Wurgler, 2002). Agency theory highlights the conflict of interest between shareholders and management in a firm that could lead to circumstances whereby management does not act in the interest of the shareholders (Jensen and Meckling, 1976). Dynamic targeting theory suggests that firms have a target leverage and firms under financial distress tend to adjust their financing decisions more frequently (Ariff et al., 2008).

of instrument by using a wide array of instruments including equity, bond, bank loan, and sukuk.[7]

Several previous studies consider a single equation model to analyze the decision of firms' choice of security. For example, Lewis et al. (2003) and Jung et al. (1996) apply the logistic regression model. MacKie-Mason (1990) uses the probit model, and Gatchev et al. (2009) apply the asset-weighted regression model. A discrete choice model does not describe the selection of instrument to raise capital, especially on the risk-sharing matrix, for two fundamental reasons. First, firms would be coded the same whether they raise funds through equity or debt. Second, the exclusion of non-issuing firms from the study leads to endogenous sample selection bias (Heckman, 1979). The present study develops an empirical model for the determinants of firms' decision to raise capital and, conditional on its outcome, their decision to choose the financing instrument. One of the crucial contributions of this chapter is the application of the Heckman ordered probit (HOP) model. The model allows the sequential determination of the factors affecting the two decisions about raising capital. The application of the HOP model not only removes the sample selection bias but also addresses endogeneity that may exist in single-equation models.

By using a sample of 1,565 firms from Malaysia, Indonesia, Singapore, and Pakistan for the period from 2000 to 2015, I find that firms with concentrated ownership are less likely to use equity financing to avoid ownership dilution.[8] This finding is in line with the control motive theory suggested by Ellul (2008) and Admati et al. (2018). Similarly, firms with CEO duality (where the CEO also acts as the chairperson of the board of directors) avoid equity financing,

[7] Sukuk in Islamic Finance are hybrid instruments which are generally considered as fixed income security to raise funds in a Shariah-compliant way (Bhatti, 2007). Sukuk are certificates of shares and rights in assets which could be tangible assets, services, or equity of a given project (Yatim, 2009). In other words, sukuk issuer offers ownership in an asset of the sukuk-issuing firm until maturity in a risk-sharing manner without permanently diluting control or increasing insolvency risk excessively as in the case of bonds and bank loans.

[8] The sample includes only those countries where corporate sector has issued all the four major instruments including sukuk, during the sample period.

if such firms are to raise funds externally. Furthermore, the size of boards of directors and the proportion of female members on the board also lead to a higher probability of raising funds externally. However, these attributes do not reflect a preference for a specific type of financing instrument. Besides, low information asymmetry is found to be strongly associated with debt-based financing with instruments including loans, bonds, and sukuk. The empirical results remain robust with alternative specifications of the empirical model, sub-sample analysis and use of annual data.

This chapter contributes to the literature in several ways. First, this study analyzes the choice of instrument based on the nexus of shareholders' desire for control and management of bankruptcy costs in a hierarchical risk-sharing framework. Second, this study incorporates ownership structure and governance mechanisms of firms in their decisions about raising funds and the subsequent choice of instrument based on the desire for control and risk-sharing. Third, the use of a simultaneous equation model deals with endogeneity and sample selection bias. Finally, this study adds sukuk to the list of instruments. Sukuk are largely ignored as a choice of security that firms may choose to raise capital.

The findings of this chapter provide an insight into the nexus of shareholders' desire for control and their risk-sharing tendency. The results of this study could be of interest to investors to understand the financing preferences of firms given that higher ownership concentration and CEO duality are associated with a greater desire for control and lower risk-sharing. Furthermore, such firms have a greater tendency to be highly leveraged, which could drive down firm valuation. This study offers researchers an alternate view of evaluating firms' decision-making process, particularly from the perspective of the trade-off between control and bankruptcy costs.

The remainder of the chapter is structured as follows. Section 2 provides an overview of sukuk. In Section 3, I present a brief literature review and develop the hypotheses. I discuss the

empirical methodology in Section 4. Variables used in this study are defined in Section 5, followed by data sources and descriptive statistics in Section 6. Section 7 provides details of the multivariate analysis conducted in this study. Section 8 concludes the chapter.

2.2 Sukuk: an overview

Most of the empirical literature investigating the debt-equity trade-off in the context of capital structure focuses on two classes of capital: bonds and equities (Hovakimian et al., 2004). However, firms often raise long-term funds using syndicated finance and more recently – in some jurisdictions – sukuk. Despite its unique features, sukuk has not been considered in the corporate finance literature as an instrument choice to raise capital.

Sukuk has emerged globally as an Islamic capital market instrument to raise funds. Corporate and sovereign sukuk were used to raise $97 billion in 2017.[9] The Islamic Development Bank Group (2018) uncovered several trends in the global sukuk market. The report cites that sukuk issuance surpassed $88 billion in 2016 as compared to $34 billion a decade ago in 2006, with sukuk maturities ranging from one week to perpetuity. Furthermore, corporate issuance has surged to reach 24 percent of global sukuk issuance in 2016, as compared to 12 percent in 2014. Several governments have raised funds by issuing sovereign sukuk. Some of the issuing countries have a non-Muslim majority such as the United Kingdom, Hong Kong, Luxembourg, and South Africa. Further growth in sukuk issuance is expected in the coming years because of the budget deficit situation in the Middle East and North African countries.

Research on sukuk has recently gained momentum. The role of sukuk has been analyzed in the context of economic development (Smaoui and Khawaja, 2017), motivation for issuing sukuk (Halim et al., 2017), negative correlation between sukuk and stock market indices during financial crisis (Balcılar et al., 2015), issuer's choice of the type of sukuk (Azmat et al., 2014),

[9] Global Sukuk Market Outlook: Another Strong Performance in 2018: available at https://www.spratings.com/

application of bond ratings on sukuk (Azmat et al., 2015), market reactions upon issuance of sukuk (Klein et al., 2018; Godlewski et al., 2013, 2016), and corporate determinants of sukuk issuance (Nagano, 2016; Mohamed et al., 2015; Klein and Weill, 2016). These studies focus on sukuk as an independent class of instrument without offering evidence as to why sukuk was preferred to raise capital.

Some recent studies uncover the factors behind firms' preference for sukuk versus bonds. Nagano (2017) finds that firms select sukuk over bonds in the presence of high information asymmetry and high funding requirements. Halim et al. (2017) show that sukuk is preferred over bonds in the presence of high agency costs due to better monitoring incentives for investors. A limitation in the existing sukuk literature is the lack of consideration about shareholders' motives for control and risk-sharing. Since sukuk is a certificate of ownership, it offers risk-sharing among the issuer and the investor and is better placed as quasi-equity. Ahmed et al. (2018) evaluate reasons why businesses choose sukuk over bonds. They conclude that smaller and riskier firms issue sukuk to exploit its risk-sharing nature. They also find adverse market reactions upon sukuk issuance despite good earnings of the sukuk-issuing firms. These findings suggest that firms with good earnings may avoid sukuk because its issuance is not perceived favorably by investors. However, in a survey study conducted in the United Arab Emirates, Duqi and Al-Tamimi (2019) reveal that the features of sukuk play the most significant role in the investors' choice. These features include its price, return, liquidity, and risk-sharing.

From the above review of literature, it is evident that no prior study has examined sukuk as a choice of instrument for raising capital along with equity and conservative bank financing (loans). This study fills this gap by using a broad array of financing instruments including sukuk, equity, bond, and loan. The next section reviews the literature and develops hypotheses about how ownership structure and governance affect firms' decisions to raise capital.

2.3 Review of literature and hypotheses development

2.3.1 Ownership structure

Ownership structure of firms can affect the decision to raise funds due to shareholders' desire to maintain control (Lemmon and Zender, 2019; Admati et al., 2018; Boubakri and Ghouma, 2010; Ellul, 2008; Harris and Raviv, 1998) or to reduce bankruptcy costs (Glover, 2016; Fama, 1980; Masulis, 1988). This is reflected in firms' choice of instruments to raise funds. Firms may prefer issuing equity to reduce bankruptcy cost. However, it leads to ownership dilution and loss of tax benefits, which are available in debt securities.

Empirical literature reports mixed findings about how ownership structure affects the security selection by firms. Some studies imply that firms with concentrated ownership prefer debt instruments to maintain control over the firm; this contradicts the trade-off theory, which suggests that firms do not raise leverage beyond optimum levels. For example, Admati et al. (2018) suggest that shareholders avoid leverage reduction even in the presence of high debt ratios, calling it the *ratchet effect*. Similarly, Keasey et al. (2015) and Donelli et al. (2013) find that firms with high ownership concentration prefer debt rather than equity because the latter dilutes shareholding status. Ben-Nasr et al. (2015) and Lin et al. (2013) provide evidence that firms with high ownership concentration choose public debt over bank debt to avoid bank monitoring. On the contrary, Santos et al. (2014) report a negative relationship between ownership concentration and leverage among European firms.

Besides ownership concentration, a high proportion of ownership by a specific category of shareholders can affect the choice of security. For example, the trade-off between control motives and bankruptcy costs may not be relevant for firms with high government ownership that encourages debt financing due to implied government guarantees (Boubakri and Saffar, 2019; Liu et al., 2011). Shailer and Wang (2015) report that government ownership in Chinese firms is associated with a low cost of debt; this effect is more pronounced in the presence of

high ownership concentration. However, Borisova et al. (2015) report that firms with a higher proportion of government ownership bear higher costs of debt due to state-induced investment distortions; albeit, higher government ownership helps to lower the cost of debt during financial crises and for firms more likely to be distressed due to implicit government guarantees. In emerging markets there exists a possibility of favoritism in the form of frequent bank lending to government-owned firms (Li and Zhang, 2010).

Like firms with a higher proportion of government shareholdings, firms dominated by individual/family ownership may also prefer debt financing to maintain control. Anderson et al. (2003) suggest that despite the prevalence of high leverage in family-owned firms, their cost of borrowing is low because the bondholder and shareholder agency problem is lower within those firms. On the contrary, Boubakri and Ghouma (2010) observe that a high proportion of family ownership is associated with wider bond spreads and lower ratings. They attribute this finding to the ability of family owners to extract benefits at the cost of bondholders' interests. Family-owned firms also display the "tunneling" phenomenon whereby the controlling shareholders, typically the members of a family, decide to sell new shares at a discount to members of their own family (Caixe et al., 2019; Bhaumik and Gregoriou, 2010). Tunneling can adversely affect firm valuation especially when such firms choose equity financing.

Literature on institutional ownership suggests divergent findings regarding how institutional investors can drive the decision to raise funds and the choice between debt and equity. Sun et al. (2016) suggest that institutional investors are more concerned about firm survival; firms with high institutional ownership are likely to lower their leverage by issuing equity instead of bonds. Roberts and Yuan (2010) find that loan spreads are lower for firms with high proportions of institutional ownership, suggesting that loan access is easier for such firms because of reduced bank monitoring load. However, Brav et al. (2008) suggest that institutional investors such as hedge funds use leverage as a tool for activism. Boubaker et al. (2019) suggest

that long-term institutional investors not only prefer debt to equity but also make slower adjustments to capital structure, implying fewer instances of security issuance. Boubakri and Ghouma (2010) illustrate that a higher proportion of institutional ownership has a positive effect on bond ratings, but not on spreads.

Given the role of concentration and the various categories of ownership, I form three testable hypotheses about firms' choice of instruments for raising funds:

i. Greater ownership concentration leads to higher debt issuance to avoid ownership dilution.
ii. Firms with a higher proportion of shares held by government or individual/family prefer debt-like instruments to avoid ownership dilution.
iii. Firms with a higher proportion of shares held by institutional investors prefer debt-like instruments to exert monitoring pressure over the management.

2.3.2 Governance mechanisms

Berkovitch and Israel (1996) argue that governance structure plays a vital role in defining firms' capital structure. Managerial ownership can significantly increase agency costs despite the presence of other agency deterrent mechanisms (Singh and Davidson, 2003). Chintrakarn et al. (2014) report that powerful CEOs view leverage negatively and avoid debt. Similarly, Munir et al. (2017) suggest that CEOs in Chinese firms tend to avoid debt financing. A higher degree of CEO control is reflected through CEO duality, where the CEO is also the chairperson of the board. Daily et al. (1998) and Vafeas and Theodorou (1998) assert that CEO duality appears to have an insignificant influence on capital structure. However, Pi and Timme (1993) suggest that CEO duality may increase agency costs resulting in lower cost efficiency and profitability. Brickley et al. (1997) found empirical evidence which suggests that CEO duality results in lower agency costs, and firms could subsequently benefit from issuing debt.

Board independence is an important governance mechanism that can influence the decision to raise capital and the choice of instrument. Heng et al. (2012) find a positive relationship between independent non-executive directors and leverage. They also find an inverse relation between board size and leverage. Bradley and Chen (2015) report that board independence can both decrease and increase cost of debt depending on leverage levels of firms. However, Pearce and Zahra (1992) suggest that firms with large board sizes have a greater reliance on debt financing. Small boards have the advantage of having fewer communication problems, helping to achieve consistent and timely decisions on capital structure (Eisenberg et al., 1998)

Regarding board diversity, Adams and Funk (2012) suggest that financing preferences of directors can be different depending on their genders. More precisely, female board members have a higher tolerance for risk. On the other hand, Sila et al. (2016) and Matsa and Miller (2013) assert that neither risk-seeking nor risk-aversion are significant traits of womens' approach toward corporate decision-making.

This strand of literature focuses on leverage but doesn't consider the efficiency of the financing process, especially the choice of instrument. Based on this gap in the literature, I hypothesize that governance mechanisms can affect the decision to raise capital and the choice of instrument as follows:

a. CEO duality leads to a higher preference for debt issuance to maintain control.
b. Board diversity, both in terms of size and gender, does not translate into a preference toward the choice of instrument.

Appendix A lists selected studies by breaking them down into categories of capital structure, security choice, corporate ownership, and corporate governance.

2.4 Empirical methodology

Ntim et al. (2015) assert that existing studies on the corporate governance and performance association have mainly used single equation models and suggest controlling for simultaneous equation interdependencies. Al-Najjar and Belghitar (2011) and Drakos and Bekiris (2010) advocate the use of simultaneous equation models to remove endogeneity concerns in the corporate governance literature. The use of a simultaneous equation model removes the endogenous sample selection bias (Heckman, 1979) and offers a coherent response to the impact of ownership structure and governance mechanisms on policy decisions such as raising capital.

The decisions to raise capital and the choice of instrument are separate yet coherent; however, in the empirical literature both decisions are treated separately. This study proposes a simultaneous equation model to analyze the two selection decisions. The first decision is a binary decision to raise capital. Depending on the outcome of the first decision, the second is about the choice of instrument. Both decisions are driven by shareholders' control motives and relative riskiness associated with each instrument.

The empirical methodology is based on the premise that a firm's decision to raise capital follows a two-step sequential decision process. Once a firm decides to raise capital, it chooses instrument *I* among *j* alternatives based on decreasing levels of desired control and higher risk levels. We can only observe the actual choice I_j, where $j \in \{1, \ldots, j\}$, not the desired instrument I_j^*, a latent continuous variable reflecting the desired level of control and relative riskiness.

Each firm chooses the instrument that maximizes the expected utility of alternative instruments I_j, given some observable characteristics *x*:

$$\mathrm{MAX}_{j\in\{1,\ldots,j\}} r(I_j \mid x) - c(I_j \mid x) \qquad (1)$$

Each firm maximizes the expected utility by maximizing control *c*, and minimizing relative risk *r*, associated with raising funds using instrument I_j. The utility-maximizing function $\varphi_c(\varphi_r)$ is affected by a set of observable variables *x*, and other random unobservable factors $\varepsilon_c(\varepsilon_r)$. The optimal instrument I_j^* maximizes the utility given certain assumptions (see Lauer, 2002 and 2003) that:

$$\Pr(I_j \mid x) = \Pr\left[\mu_{j-1} \frac{1}{\varphi(x)} < \ln \varepsilon \le h_j \frac{1}{\varphi(x)} \right] \qquad (2)$$

where $\varphi(x) = \frac{\varphi_c}{\varphi_r}, \varepsilon = -\frac{\varepsilon_c}{\varepsilon_r}$ and $\mu_j = \ln \left(\frac{r(I_{j+1}) - r(I_j)}{c(I_{j+1}) - c(I_j)} \right)$.

The odds that a firm chooses the desired instrument I_j with expected control and risk are represented by the probability that the error term falls between two thresholds. This condition implies that firms may choose increasing levels of control and risk to raise capital, given their respective constraints *x*. The levels of control and risk can be expressed in thresholds whereby firms may opt for instrument I_{j+1} if it increases the marginal utility for higher levels of control and lower level of risk and vice versa. $\varphi(x)$ and ε measure the net impact of observable characteristics and unobservable individual heterogeneity on the thresholds, h_j respectively. From Equation 2, one cannot assess the actual control benefits and cost of financial risk related to the behavioral choice of firms for each alternative instrument. However, it is enough to determine how observed variables *x* influence the perceived marginal benefit of control to the financial risk ratio and, therefore, the choice of instrument.

Assuming that $\varphi(x) = \exp[\beta x]$ and that $\ln \varepsilon$ are normally distributed with mean equal to *zero* and variance equal to *one*, I rewrite Equation 2 as:

$$\Pr(I_j \mid x) = \Phi(h_j - \beta x) - \Phi(h_{j-1} - \beta x) \qquad (3)$$

where Φ is the cumulative standard normal distribution function. This expression corresponds to an ordered probit model for behavioral choice.

The behavior of firms towards risk and control in terms of security choice can be observed only over a non-random sample of those firms who have raised capital. To examine the behavior of firms raising capital, it is unrealistic to use a single equation model like the ordered probit model as proposed in Equation 3 assuming homogeneity due to the unobserved heterogeneity of non-issuing firms (Heckman et al., 2006). Essentially, the estimation model is similar to Cameron and Heckman (1998) where there is a need to account for two decisions: a binary selection decision and a discrete ordered choice decision.

To account for the two sequential decisions by the firm, De Luca and Perotti (2011) suggest an ordered probit model with sample selection through the following bivariate threshold crossing models:

$$I_{it}^{*} = \alpha_0 + \alpha' w_{it} \qquad i = 1, \ldots., I \qquad (4)$$

$$I_{jt}^{*} = \beta_0 + \beta_1 x_{it} + \varepsilon_{it} \qquad \text{if } I_{it} = 1 \qquad (5)$$

where I_{it}^{*} is a latent variable related to the first decision and indicates the likelihood of firm *i* to raise capital in year *t*, if $I_{it}^{*} + u_{it} > 0$. w_{it} is a vector of covariates with coefficients α to be estimated. Equation 4 is observed in overall sample firms. I_{jt}^{*} represents a continuous latent variable for choice of instrument and is observable through $I_{jt} = \sum_{j=0}^{J} h\, I(\lambda_h < I_{jt}^{*} \leq \lambda_{h+1})$ where $\lambda = 1, \ldots..., \lambda_h$ that partitions I_{jt}^{*} into *h*+1 exhaustive and mutually exclusive thresholds. Equation 5 applies only to firms that issue any instrument i.e. where $I_{it} = 1$. In Equations 4 and 5, error terms are assumed to be jointly normally distributed (bivariate normal) with an unknown coefficient of correlation between the latent errors u_{it} and ε_{it}. For empirical

estimation, the dependent variable in Equation 5 is a categorical variable based on control-risk motives.

2.5 Variable definitions

I classify independent variables into three broad categories: ownership structure, corporate governance, and other control variables.

2.5.1 Ownership structure

Control motive theory suggests that ownership concentration affects firms' decisions on capital structure to avoid ownership dilution (Ellul, 2008; Farooq, 2015; Mitton, 2002). In the decision-making process represented in Equations 4 and 5, shareholders are less concerned about the first decision as they delegate it to the management (Shibata and Nishihara, 2010). The choice of financing instrument affects firm ownership; therefore, shareholders are concerned about the second decision. Based on this premise, I include ownership variables in the choice equation only.

The ownership concentration variable, *Concentration*, indicates the highest proportion of shares held by a single shareholder in the firm. I expect that firms with concentrated ownership prefer to raise capital with debt financing to avoid ownership dilution.

I include three distinct categories of shareholders to analyze their effects on the instrument choice decision. *Govt*, which represents the percentage of share ownership by the government, is included to control for state-ownership in firms. The variable *Financials* controls for the effect of institutional ownership, representing stake in mutual funds, hedge funds, venture capital, private equities, and other financial institutions. I also control for the effects of ownership by individual/family shareholding by using the variable *Individual*, which represents the proportion of shares held by an individual/family.

2.5.2 Corporate governance

Governance mechanisms of firms affect the decisions of capital issuance and instrument choice due to the involvement of the board of directors in each decision. Therefore, governance variables are included in both Equations 4 and 5 as control variables.

To control for the unitary leadership structure with shared incumbency of the Chairman and CEO positions, I use a binary variable *CEO duality* that equals *one* if the CEO and Chairman positions are held by the same individual, *zero* otherwise. To account for board independence, I include the variable *Board independence*, which takes on numeric values corresponding to the BvD independence indicator from Orbis,[10] which assigns independence indicators of A^+, A, A^-, B^+, B, B^-. I choose discrete numbers with higher values indicating a greater degree of board independence.

Board size and gender diversity are indicators of corporate governance that affect firms' leverage (Heng et al., 2012; Mak and Kusnadi, 2005; Yermack, 1996; Eisenberg et al., 1998; Pearce and Zahra, 1992). *Board size*, the number of directors on the board, is included as a control variable. To account for gender diversity, I include the proportion of female members on the board of directors through the variable *Female ratio*; it represents the ratio of the number of female directors to the total number of directors on the board.

2.5.3 Other control variables

Several proxies for information asymmetry exist in the literature. Size of firms can serve to reduce information asymmetry (Autore and Kovacs, 2010; Frank and Goyal, 2003). Large firms are also found to have easier access to debt financing (Sakai et al., 2010; Zeghal, 1984). In addition, Autore and Kovacs (2010) find that firms with higher growth opportunities resort

[10] BvD independence indicator is issued by Bureau van Dijk. It shows each company's degree of independence with regard to its shareholders. Available at: https://www.bvdinfo.com/en-us/our-products/our-expertise/find-out-how-we-add-value-to-company-information/corporate-ownership-structures

to debt financing in the presence of high information asymmetry, which is reflected by asset tangibility and firm profitability. To control for the impact of information asymmetry, I use the variables *Firm size*, *Tangibility*, and *Profitability*, representing the logarithm of total assets, ratio of tangible assets-to-total assets, and return-on-assets, respectively.

Firms covered by a large number of analysts may experience lower information asymmetry and consequently have easier access to capital (Beck et al., 2008). Jensen and Meckling (1976) assert that security analysts reduce agency costs associated with the separation of ownership and yield higher equity issuance due to lower information asymmetry. I use the variables *Analyst coverage* and *Analyst variance*, with the former representing the number of analysts covering each firm and the latter calculated as the standard deviation among analyst recommendations (Krishnaswami and Subramaniam, 1999; Gomes and Phillips, 2012). A higher value of *Analyst variance* corresponds to greater dispersion among analysts' forecasts, indicating higher information asymmetry.

The empirical literature suggests several other firm-specific and macroeconomic control variables affecting the decision to raise capital and the related decision about the choice of instrument. I use leverage ratio (*Leverage*), market-to-book ratio (*MBV*), capital expenditures-to-assets ratio (*Capex)*, and cash-to-assets ratio (*Cash*) as indicators of firms' decision to raise funds and their choice of instrument.[11]

Wei and Zhang (2008) provide evidence supporting the overinvestment hypothesis that the presence of free cash flows offers inexpensive internal capital to the managers, tempting them to overinvest. Hence, the presence of surplus free cash may lead to lower demand for capital. I

[11] See for example Suchard and Singh (2006), Öztekin and Flannery (2012), Kayo and Kimura (2011), Korajczyk and Levy (2003), Kayhan and Titman (2007), Leary and Roberts (2005), Welch (2004), Lemma and Negash (2014), Booth et al. (2001), Hovakimian (2006), Frank and Goyal (2009), and De Jong et al. (2011).

add a binary variable *Free cash flow* to control for agency costs of free cash flow. The variable is equal to *one* if a firm has positive free cash flows, and *zero* otherwise.

Korajczyk and Levy (2003) highlight the significance of macroeconomic variables in the choice of security. To control for the impact of the macroeconomic environment (Tawatnuntachai and Yaman, 2007) and business cycle effects (Choe et al., 1993), I use the variable *GDP*, measured as the log of gross domestic product in millions of US dollars. To control for monetary economic environment, I use the variable *Interbank rate*, which is the three-month interbank rate prevalent in the respective country of the firm. Appendix B provides a summarized list of variable definitions and their expected signs.

2.6 Data sources and descriptive statistics

The sample consists of all non-financial firms listed on the stock exchanges of Malaysia, Indonesia, Singapore, and Pakistan.[12] Financial statement data are extracted from Thomson Reuters Worldscope, and ownership and governance data are acquired from Orbis. I also use the Institutional Broker's Estimate System (IBES) database for data on analyst recommendations on firms. The data for equity, bonds, bank loans, and sukuk issuance are obtained from Bloomberg Professional. I take the size of issued capital to decide the choice of instrument for firms that issued multiple securities in a single quarter. In other words, the amount of capital raised would determine the level of risk assumed by the firm.

Due to the use of multiple data sources, I use firm name as the common identifier that matched up to 92 percent across databases. All observations with missing data on assets, debt, equity, board of directors, or ownership information are dropped. I further winsorize data at the 1st and 99th percentile to account for the outliers. The final dataset consists of 1,565 firm records with 67,734 firm-quarter observations for the period from year 2000 to 2015.

[12] Only those countries are included in the sample where corporate firms have raised funds during the sample period using equity, sukuk, bonds, and loans.

Table 1 presents descriptive statistics of the numeric variables in three panels. Panel A reports summary statistics of the overall sample, while Panels B and C report summary statistics of the sub-samples representing issuer and non-issuer firms, respectively. Issuers include firms that raised funds at any instance of the sample period, while non-issuers have no records of raising capital. The last column of Table 1 reports Kruskal-Wallis test statistics for differences in means to understand difference between issuers and non-issuers in their ownership structure, governance, information asymmetry, and financial attributes.

INSERT TABLE 1 HERE

Variables on ownership structure show significant differences among various categories of shareholdings; however, the variable on ownership concentration does not vary significantly across issuers and non-issuers. Issuing firms, on average, have a relatively higher ownership stake held by the government and institutional shareholders than non-issuing firms. In addition, board size, board independence, and the female ratio are slightly higher in issuing firms.

From Table 1, it is also evident that issuers are larger, covered by more analysts with diverse opinions, more highly leveraged, and increasingly growth-oriented as compared to non-issuers. Variables on tangibility and market-to-book ratio show a similar trend. On the other hand, non-issuers exhibit higher profitability and cash holdings, suggesting that highly profitable firms may prefer to fund their capital expenditure from internal resources.

Since ownership and governance variables do not change frequently on a quarterly basis, a bias may exist in their differences in means. To control for the slow quarterly variation, Table 2 reports descriptive statistics based on annual frequency. Table 2 shows that most of the variables continue to show a similar trend, both in terms of mean and variance, as in Table 1 except for board independence and tangibility, in which the differences in means between issuers and non-issuers are not significantly different.

INSERT TABLE 2 HERE

I proceed by analyzing how firm variables differ after breaking down the data based on every financial instrument, including loan, bond, sukuk, and equity. Table 3 shows Kruskal-Wallis test for differences in means in the last column. An interesting finding is that the average size of firms decreases in the order of loans, bonds, sukuk, and then equity issuers as proposed in the Pecking order theory and exhibited in Figure 1. Similarly, equity issuers are the least leveraged as compared to loan issuers. Furthermore, firms issuing equities reflect higher growth potential based on the market-to-book ratio. In line with Rajan and Zingales (1995), I find that the proportion of tangible assets is higher in firms that prefer debt, including loan and sukuk issuers. This is intuitive since sukuk are asset-backed securities and banks often require collateral for financing.

INSERT TABLE 3 HERE

It is evident from Table 3 that issuers of each type of instrument are significantly different not only in their ownership concentration levels, but also in each of the other ownership categories. Interestingly, loan issuers are more concentrated than others and have institutional investors as their major shareholders. On the contrary, equity issuers have a more balanced representation across all categories of ownership. Among governance variables, firms with greater board independence prefer equity financing. Other variables on ownership and governance structure also differ significantly across issuers of different instruments, but do not reflect a specific pattern.

Table 4 helps to understand the jurisdictional differences among issuers. Panel A reports means of ownership and governance variables after dividing the data based on the sample countries. Panel B reports the difference in means analysis among the issuers from each country-pair. Panel A shows that there is little difference between issuers and non-issuers belonging to a

country; however, Panel B implies that ownership and governance variables are significantly different across the sample countries. For example, Indonesian firms have the highest ownership concentration while issuers in Singapore have the highest proportion of institutional investors. However, this applies to both issuers and non-issuers in the countries. Also, board size is larger among the firms from Pakistan while diversity, calculated by female representation on board of directors, is greater in Malaysian firms. Panel B reports the Kruskal-Wallis test for the six pairs of countries. The null hypothesis of no difference is rejected in all variables, suggesting that the mean of each of the variables in the sample is significantly different from the mean taken from other countries in the sample.

INSERT TABLE 4 HERE

Table 5 shows the correlation matrix. Among the most notable results is the insignificant correlation between concentrated ownership and CEO duality. Concentrated ownership displays a strong negative correlation with board independence, suggesting that firms with concentrated shareholdings with strong control motives may have a less independent board. Variables in the instrument category report a positive correlation with concentrated ownership and an insignificant coefficient with CEO duality. However, sukuk issuers are associated with a weak negative correlation with CEO duality. This warrants multivariate analysis to shed light on the significance of how ownership structure and governance mechanisms affect a firm's choice of instrument in the presence of control motives and risk-sharing while raising capital.

INSERT TABLE 5 HERE

Besides analyzing the correlation across variables, I also run a variance-inflation factor (VIF) ratio test to ensure the absence of multicollinearity among the independent variables. The results in Table 6 show that all variables have a VIF ratio less than 4, confirming the absence of multicollinearity which could pose a hindrance in the regression analysis (O'Brien, 2007).

INSERT TABLE 6 HERE

2.7 Multivariate analysis

This section reports estimation results of the empirical model. The model incorporates two decisions sequentially. Equation 4 models the first decision about issuance of capital. Conditional on the first decision, Equation 5 accommodates the instrument choice decision. The dependent variable in the issuance equation is binary, taking the value *one* if a firm raises capital during a quarter, and *zero* otherwise. For the second decision, I use a categorical variable that takes the value from 1, 2, 3, or 4 if a firm chooses loan, bond, sukuk, or equity, respectively. The order of securities reflects dilution in ownership control in an increasing order, as shown in Figure 1. For empirical estimation, I use the Heckman ordered probit (HOP) model.

I postulate that shareholders are not concerned with the initial decision to raise capital as this decision depends on the needs of the firm and does not affect their desired level of control. Therefore, shareholders delegate this decision to the management (Shibata and Nishihara, 2010). However, the instrument choice decision either leads to dilution of ownership or elevates bankruptcy risk. Hence, to capture the effects of ownership structure, I include ownership variables in the choice decision only. Accordingly, variables *Concentration*, *Govt*, *Individual*, and *Financials* are placed only in the choice equation, while other variables are kept in both equations.

During the sample period, 867 of the 1,565 firms raised funds using one of the four instruments at some point. This reflects sample selection bias, which validates the application of the HOP model. To further confirm the existence of sample selection bias, I perform a *z*-test to test the null hypothesis that the disturbance terms in the issuance and choice equations are uncorrelated (H_0: $\rho = 0$). The test generates $z = 648.02$ (*p*-value =0.000). A Wald test of the same null

hypothesis produces $\chi^2(1) = 377.24$ (p-value = 0.000). The rejection of the null hypothesis in both tests supports the use of the HOP model for empirical estimations.

Table 7 reports the empirical results, showing that ownership concentration is associated with low risk-sharing. The negative and significant coefficient of the *Concentration* variable with the choice decision suggests that firms with higher ownership concentration – irrespective of the category of shareholding – prefer debt-based instruments to raise capital. This further suggests that shareholders prefer to avoid ownership dilution over risk-reduction. This result complements the findings of Admati et al. (2018), Keasey et al. (2015), Donelli et al. (2013), and Friend and Lang (1988) regarding the positive relationship between ownership concentration and leverage. Among shareholder categories, I do not find significant evidence of preference for any instrument. This is reflected by insignificant coefficients of the ownership variables except for *Individual*, which is significant at the 10 percent level suggesting a preference for equity.

INSERT TABLE 7 HERE

Among governance variables, the coefficient of *CEO duality* is negative and significant in both issue and choice equations, suggesting that firms with a concentration of power at the top level avoid raising capital. However, when they seek capital, the preferred mode of financing is the one with lower risk-sharing, i.e. debt. The reluctance to raise capital by firms with CEO duality can be attributed to the fact that external financiers, especially those from capital markets, may challenge control and require better governance mechanisms with separate management and board structures as suggested by Chintrakarn et al. (2014). Furthermore, the preference toward debt endorses Rajan (1992) and Zeghal (1984) who assert that banks prefer to deal with a unitary leadership structure and lend more easily to firms with whom they could establish strong relationships, which is more likely in the presence of CEO duality.

Among other governance covariates, the coefficients of *Board independence* are negative and significant in the issue decision and insignificant in the choice decision. The coefficient in the issue decision suggests that firms with independent boards prefer not to raise capital externally. Further, once the decision to raise capital is made, greater board independence is not associated with a preference for either debt or equity financing.

The *Board size* and *Female ratio* variables have positive and significant estimates in the first decision model, suggesting that firms with larger boards and higher proportions of female board members prefer to raise capital more frequently. However, this tendency does not follow a preference for any specific mode of financing. The result supports the finding of Sila et al. (2016) that female board members do not necessarily tend to be risk-averse or risk-seekers and contradicts the findings of Adams and Funk (2012) suggesting a higher risk tolerance level among female directors.

Among the variables related to information asymmetry, the coefficient of *Analyst variance* is positive and significant in the issue decision. This suggests that diversity among analyst recommendations encourages firms to seek external financing, endorsing Autore and Kovacs (2010). However, neither *Analyst coverage* nor *Analyst variance* affects the choice decision, which is reflected by the insignificant coefficients of both variables in the choice equation. This finding is in line with Gatchev et al. (2009) about the impact of analyst coverage on the choice of instrument. Across firm-specific control variables, the coefficients of *Firm size, Profitability,* and *Tangibility* are negative and significant, indicating that firms that are highly profitable, larger, and have more tangible assets may have a higher tendency to raise capital with low risk-sharing instruments. These results complement the findings of Faulkender et al. (2012) regarding firm size and tangibility but contradict Lemma and Negash (2014) regarding the effects of profitability over the choice of instrument.

Among other firm-specific control variables, the coefficient of *Leverage* is positive and significant in the issue decision and negative and significant in the choice decision, suggesting that highly leveraged firms seek external financing and prefer debt financing. The inclination of leveraged firms toward debt financing is consistent with the view that highly leveraged firms are more likely to borrow from banks (Rajan, 1992; Zeghal, 1984) or through bonds (Tawatnuntachai and Yaman, 2007). The coefficient of the *Capex* variable is negative and significant in the choice equation. This suggests that firms investing in long-term assets, depending on the decision to raise capital, prefer debt-based instruments.

Results further suggest that firms with higher future potential, reflected by the market-to-book ratio (*MBV*), are associated with a higher likelihood to raise funds externally. Subsequently, they are more likely to use equity financing. These findings are in line with the market timing theory that firms with higher future potential or growth opportunities are more likely to raise funds through equity (Baker and Wurgler, 2002; Viswanath, 1993). I also find that firms with a higher proportion of liquid assets prefer not to raise capital, which is reflected by the negative and significant coefficient of the variable *Cash* in the issue decision. Also, when these firms raise capital, they would do so through equity financing. The coefficients of the *Free cash flow* variable, highlighting the effect of surplus cash flows on the two decisions, are insignificant in both issue and choice equations.

Regarding macroeconomic variables, I find that firms prefer not to raise capital in a higher interest rate environment. However, when the decision to raise funds is reached in such an environment, the preferred mode of financing is debt. The variable *GDP* does not have a statistically significant effect on the security choice decision.

In summary, the empirical results in Table 7 highlight that ownership concentration and CEO duality are important determinants in firms' choice of security to raise funds. Firms with high ownership concentration and CEO duality, on average, prefer to raise capital using debt

instruments. On the contrary, firms with higher growth potential are more inclined to raise capital by using equity.

2.8 Robustness test

2.8.1 Multinomial logit model

The use of HOP model assumes that financing instruments are ordered based on their risk-sharing features. However, it is possible that firms' decisions do not take into account any particular order. As a robustness test, I estimate Equation 4 – for the choice decision – by using a multinomial logit model (MLM). The MLM does not determine any order in the categorical dependent variable; rather it considers each category independently. With this model, the dependent variable may take the value from *zero* to *four*; *zero* reflects non-issuance and values *one* to *four* represent bank loan, bond, sukuk, and equity issuance, respectively. The MLM also reports results for each instrument separately.

Table 8 presents the MLM estimation results. The findings are similar to those presented in Table 7. The coefficient of *Concentration* is positive and significant in the case of loan financing and sukuk financing, indicating a preference for low risk-sharing instruments. The negative and significant relationship of *Concentration* with equity financing confirms the control hypothesis that shareholders avoid dilution of ownership and prefer not to raise capital through equity financing. Furthermore, the preference by firms with concentrated ownership for sukuk over bonds supports the finding of Halim et al. (2017) that firms prefer sukuk over bonds to curtail agency costs of debt.

INSERT TABLE 8 HERE

Among other categories of ownership structure, the empirical results suggest that firms with a higher proportion of individual ownership avoid raising funds in general. Although the coefficient of the *Individual* variable is negative and significant for loans, its coefficient is

insignificant for bonds, sukuk, and equity instruments. An important finding is that a higher proportion of government ownership is associated with greater issuance of bonds, endorsing Liu et al. (2011). As observed in Table 7, institutional investors do not prefer a particular security type.

The estimation results for governance variables are in line with those reported in Table 7. The *CEO duality* coefficient is negative and significant in all categories of financing except for loans, where it is insignificant. The coefficient of the *Board size* variable shows that firms with large board sizes are associated with sukuk and bond financing. Higher female representation on the board is associated with greater instances of debt financing. The results of other control variables are similar to those reported in Table 7; they are not discussed here for brevity.

2.8.2 Size effect

To ensure that results are not biased due to the size of firms, I divide the sample into terciles by using the book value of assets. The terciles are dubbed as "Small", "Medium" and "Large", indicating respective sub-samples of firms. I apply the HOP model again on each tercile. The empirical results based on sub-samples are reported in Table 9. The two main variables of interest, *Concentration* and *CEO duality*, bear similar results in terms of signs. However, the significance level of the *Concentration* and *CEO duality* variables changes in large and small firm terciles, respectively.

INSERT TABLE 9 HERE

Table 9 shows some interesting differences as well. For example, the *Analyst coverage* variable has insignificant coefficients in medium and large firm terciles; however, it is positive and significant in the small firm tercile, suggesting that greater analyst coverage of small firms helps them to raise funds using equity. Another significant difference is the impact of business cycle - measured by GDP growth - showing a positive effect in equity issuance, but which is negative for large firms.

2.8.3 Annual data

The use of quarterly data in the sample may scale down the volatility of the ownership and governance variables. To understand whether data frequency affects empirical estimations, I estimate the HOP model by using annual data. The conversion of quarterly into annual data implies that multiple issues within one year cannot be incorporated separately in the model. For multiple security issuers in a single year, I repeat the method used in quarterly data to determine the choice of instrument: issue size decides the firms' security choice.

Table 10 reports the estimation results with annual data. The results are in line with those in Table 7 with the exception of changes in significance levels of certain coefficients. More importantly, the *Concentration* variable continues to have a negative and significant coefficient.

INSERT TABLE 10 HERE

2.8.4 Emerging markets excluding Singapore

The sample in the study represents all jurisdictions where the corporate sector raises funds using sukuk, equity, bond, and loan financing. This sample consists of firms from Singapore (developed market) and three emerging markets, namely Indonesia, Malaysia, and Pakistan. It is plausible to assume that the level of market development could influence estimation results. To control for the impact of market development, I estimate the HOP model after excluding Singapore. The sub-sample has firms from the three emerging markets only. The empirical results in Table 11 are comparable with those reported in Table 7. One exception is that the coefficient for the *CEO duality* variable is insignificant in the choice equation.

INSERT TABLE 11 HERE

2.8.5 Firm and time effects

The descriptive statistics in Table 4 show that the test statistics for differences in means are significantly different across countries. The estimation results can also be biased due to changes

in firm behavior over time. To account for these two sources of bias, I incorporate firm and time fixed effects along with clustered standard errors at the country level in the HOP model. Table 12 reports the estimation results after controlling for fixed effects. The results are consistent with the findings reported in Table 7. The coefficients for the *Concentration* and *CEO duality* variables are negative and significant in the choice equation. Similarly, variables proxying for information asymmetry show robust results. The *MBV* variable displays a deviation as it has an insignificant coefficient in the choice decision. Also, the *Free cash flow* variable has a positive and significant estimate. This lends support to the overinvestment hypothesis that firm's with positive free cash flows are likely to raise additional capital because of overspending.

INSERT TABLE 12 HERE

In summary, estimation results based on various robustness tests confirm the findings of the main model that ownership concentration is an important determinant in the choice of security to raise funds, lending support to the control hypothesis. Results also suggest that powerful CEOs drive firms' decision to raise capital. Hence, I infer that high ownership concentration and CEO duality in firms, on average, play a role by generating preference for debt-based instruments.

2.9 Conclusion

To test the control and risk-sharing hypotheses, I investigate how ownership and governance structure affect firms' decisions to raise capital and their choice of security. I find evidence that firm ownership and governance structure play a significant role in external financing decisions in firms from Malaysia, Indonesia, Singapore, and Pakistan. My sample consists of multiple issuers of sukuk, bonds, equity, and bank loans. This helps to determine how firms adjust their choice of risk-sharing when they raise capital.

One of the crucial contributions of this study is the application of the estimation methodology, which separately treats the decision to raise capital and the choice of financing instrument. By incorporating the Heckman ordered probit model, this study demonstrates that capital financing decisions could be better understood by sequentially analyzing the two decisions.

I find support for control theory, suggesting that firms with higher ownership concentration prefer to raise capital through debt instruments – such as loans and bonds. The empirical findings also suggest that companies with CEO duality prefer to adopt debt financing. Diversity in the board of directors, reflected by large board size and a higher proportion of females on the board, negatively affects firms' decision to raise capital but does not affect their choice of instrument.

Findings of this study provide an insight into understanding the nexus of shareholders' desire to control their firms, their relative risk-sharing in raising funds, and their choice of financing instrument. These findings could be of interest to investors in understanding the financing preferences of firms, given that higher ownership concentration and CEO duality are associated with maintaining higher degrees of control and lower risk-sharing. Such firms have a greater tendency to be highly leveraged, which could drive down firm valuation.

A possible limitation of this study is that it incorporates only four financing instruments namely, equity, bond, bank loan, and sukuk. Although a broader list of securities could expand the data and have implications for other instruments, the scope of the study in terms of risk-sharing and control would be the same. The chosen instruments offer risk-sharing levels that range from very low (in loans) to very high (in equity). Further research can investigate how similar factors explain the third decision about volume of issuance by firms. Also, the effects of macroeconomic uncertainty on capital raising decisions can be analyzed.

References

Adams, R. B., and Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science, 58*(2), 219-235. https://doi.org/10.2139/ssrn.1475152

Admati, A. R., Demarzo, P. M., Hellwig, M. F. and Pfleiderer, P. (2018). The leverage ratchet effect. *The Journal of Finance, 73*, 145-198. https://doi.org/10.1111/jofi.12588

Ahmed, H., Hassan, M., and Rayfield, B. (2018). When and why firms issue sukuk? *Managerial Finance, 44*(6), 774-786. https://doi.org/10.1108/mf-06-2017-0207

Alanis, E., Chava, S., and Kumar, P. (2018). Shareholder bargaining power, debt overhang, and investment. *The Review of Corporate Finance Studies, 7*(2), 276-318.

Al-Najjar, B., and Belghitar, Y. (2011). Corporate cash holdings and dividend payments: Evidence from simultaneous analysis. *Managerial and Decision Economics, 32*(4), 231-241. https://doi.org/10.1002/mde.1529

Anderson, R. C., Mansi, S. A., and Reeb, D. M. (2003). Founding family ownership and the agency cost of debt. *Journal of Financial Economics, 68*(2), 263-285. https://doi.org/10.1016/S0304-405X(03)00067-9

Ariff, M., Taufiq, H., & Shamsher, M. (2008). How capital structure adjusts dynamically during financial crises. *Corporate Finance Review, 13*(3), 11-24.

Autore D. M., and Kovacs, T. (2010). Equity issues and temporal variation in information asymmetry. *Journal of Banking & Finance, 34*(1), 12-23. https://doi.org/10.2139/ssrn.639363

Azmat, S., Skully, M., and Brown, K. (2014). Issuer's choice of Islamic bond type. *Pacific-Basin Finance Journal, 28*, 122-135. https://doi.org/10.1016/j.pacfin.2013.08.008

Azmat, S., Skully, M., and Brown, K. (2015). The (little) difference that makes all the difference between Islamic and conventional bonds. *Pacific-Basin Finance Journal, 42*, 46-59. https://doi.org/10.1016/j.pacfin.2015.12.010

Baker, M., and Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*, 1–32. https://doi.org/10.2139/ssrn.267327

Balachandran, B., Kanapathippillai, S., Krishnamurti, C., Theobald, M., and Velayutham, E. (2017). The issuance of warrants in rights offerings: Agency costs and signaling effects. *Australian Journal of Management, 42*(4), 608-636. https://doi.org/10.1177/0312896216682062

Balcılar, M., Demirer, R., and Hammoudeh, S. (2015). Global risk exposures and industry diversification with Shariah-compliant equity sectors. *Pacific-Basin Finance Journal, 35*, 499-520. http://dx.doi.org/10.1016/j.pacfin.2015.09.002

Bayless, M., and Chaplinsky, S. (1996). Is there a window of opportunity for seasoned equity issuance? *The Journal of Finance, 51*(1), 253. https://doi.org/10.1111/j.1540-6261.1996.tb05209.x

Beck, T., Demirgüç-Kunt, A., and Maksimovic, V. (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics, 89*(3), 467-487. https://doi.org/10.1016/j.jfineco.2007.10.005

Ben-Nasr, H., Boubaker, S., and Rouatbi, W. (2015). Ownership structure, control contestability, and corporate debt maturity. *Journal of Corporate Finance, 35*(C), 265-285. http://dx.doi.org/10.1016/j.jcorpfin.2015.10.001

Berkovitch, E., and Israel, R. (1996). The Design of Internal Control and Capital Structure. *Review of Financial Studies, 9*(1), 209-240. https://doi.org/10.1093/rfs/9.1.209

Bhatti, M. I. (2007). Sukuk and the bonding of Islamic Finance. *Monash Business Review, 3*(1), 17-18. https://doi.org/10.2104/mbr07004

Bhaumik, S. K., and Gregoriou, A. (2010). 'Family' ownership, tunnelling and earnings management: A review of the literature. *Journal of Economic Surveys, 24*(4), 705-730. https://doi.org/10.1111/j.1467-6419.2009.00608.x

Booth, L., Aivazian, V., Demirguc-Kunt, A., and Maksimovic, V. (2001). Capital structure in developing countries. *The Journal of Finance, 56*, 87-130. https://doi.org/10.1111/0022-1082.00320

Borisova, G., Fotak, V., Holland, K., and Megginson, W. L. (2015). Government ownership and the cost of debt: Evidence from government investments in publicly traded firms. *Journal of Financial Economics, 118*(1), 168-191.

Boubaker, S., Chourou, L., Saadi, S., and Zhong, L. (2019). Does institutional investor horizon influence US corporate financing decisions? *International Review of Financial Analysis, 63*, 382-394. https://doi.org/10.1016/j.irfa.2017.09.001

Boubakri, N., and Ghouma, H. (2010). Control/ownership structure, creditor rights protection, and the cost of debt financing: International evidence. *Journal of Banking & Finance, 34*(10), 2481-2499. https://doi:10.1016/j.jbankfin.2010.04.006

Boubakri, N., and Saffar, W. (2019). State ownership and debt choice: Evidence from privatization. *Journal of Financial and Quantitative Analysis, 54*(3), 1313-1346. https://doi.org/10.1017/s0022109018000881

Boyd, B. K. (1994). Board control and CEO compensation. *Strategic Management Journal, 15*(5), 335-344. https://doi.org/10.1002/smj.4250150502

Bradley, M., and Chen, D. (2015). Does board independence reduce the cost of debt? *Financial Management, 44*(1), 15-47. https://doi.org/10.1111/fima.12068

Brav, A., Jiang, W., Partnoy, F., and Thomas, R. (2008). Hedge fund activism, corporate governance, and firm performance. *The Journal of Finance, 63*(4), 1729-1775. https://doi.org/10.1111/j.1540-6261.2008.01373.x

Brickley, J. A., Coles, J. L., and Jarrell, G. (1997). Leadership structure: Separating the CEO and chairman of the board. *Journal of Corporate Finance, 3*(3), 189-220. https://doi.org/10.1016/s0929-1199(96)00013-2

Caixe, D. F., Kalatzis, A. E. G., and Castro, L., R., K. (2019). Controlling shareholders and investment-risk sensitivity in an emerging economy. *Emerging Markets Review, 39*, 133-153. https://doi.org/10.1016/j.ememar.2019.04.002

Cameron, S.V., and Heckman, J. J. (1998). Life cycle schooling and dynamic Selection bias: models and evidence for five cohorts of American males. *Journal of Political Economy, 106*(2), 262-333. https://doi.org/10.3386/w6385

Chemmanur, T., and Fulghieri, P. (1994). Reputation, renegotiation, and the choice between bank loans and publicly traded debt. *The Review of Financial Studies, 7*(3), 475-506. https://doi.org/10.1093/rfs/7.3.475

Chintrakarn, P., Jiraporn, P., and Singh, M. (2014). Powerful CEOs and capital structure decisions: Evidence from the CEO pay slice (CPS). *Applied Economics Letters, 21*(8), 564–568. https://doi.org/10.1080/13504851.2013.875102

Choe, H., Masulis, R. W., and Nanda, V. (1993). Common stock offerings across the business cycle: Theory and evidence. *Journal of Empirical Finance, 1*(1), 3-31. https://doi.org/10.1016/0927-5398(95)90043-8

Daily, C., Johnson, J., Ellstrand, A., and Dalton, D. (1998). Compensation committee composition as a determinant of CEO compensation. *Academy of Management Journal, 41*(2), 209-220. https://doi.org/10.5465/257103

De Jong, A., Verbeek, M., and Verwijmern, P. (2011). Firms' debt–equity decisions when the static tradeoff theory and the pecking order theory disagree. *Journal of Banking & Finance, 35*, 1303- 1314. https://doi.org/10.2139/ssrn.1444172

De Luca, G. and Perotti, V. (2011). Estimation of ordered response models with sample selection. *Stata Journal, 11*(2), 213-239. https://doi.org/10.1177/1536867x1101100204

Donaldson, L., and Davis, J. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management, 16*(1), 49-64. http://dx.doi.org/10.1177/031289629101600103

Donelli, M., Larrain, B., and Urzua I., Francisco. (2013). Ownership dynamics with large shareholders: An empirical analysis. *Journal of Financial and Quantitative Analysis, 48*(2), 579-609. https://doi-org/10.1017/S0022109013000173

Dong, M., Loncarski, I., Horst, J., and Veld, C. (2012). What drives security issuance decisions: Market timing, pecking order, or both? *Financial Management, 41*(3), 637-663. https://doi.org/10.2139/ssrn.1085359

Drakos, A. A., and Bekiris, F. V. (2010). Corporate performance, managerial ownership and endogeneity: A simultaneous equations analysis for the Athens stock exchange. *Research in International Business and Finance, 24*(1), 24-38. https://doi.org/10.1016/j.ribaf.2009.01.002

Duqi, A., and Al-Tamimi, H. (2019). Factors affecting investors' decision regarding investment in Islamic Sukuk. *Qualitative Research in Financial Markets, 11*(1), https://doi.org/60-72.10.1108/QRFM-01-2018-0009

Eisenberg, T., Sundgren, S., and Wells, M. (1998). Larger board size and decreasing firm value in small firms. *Journal of Financial Economics, 48*(1), 35-54. https://doi.org/10.1016/S0304-405X(98)00003-8

Ellul, A. (2008). *Control Motivations and Capital Structure Decision*. Available at SSRN: https://ssrn.com/abstract=1094997

Falaye, O., Hoitash, R., and Hoitash, U. (2011). The cost of intense board monitoring. *Journal of Financial Economics, 101*(1), 160-181. https://doi.org/10.1016/j.jfineco.2011.02.010

Fama, E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy, 88*(2), 288. https://doi.org/10.1017/cbo9780511817410.022

Fama, E., and Jensen, M. (1983). Separation of ownership and control. *The Journal of Law and Economics, 26*(2), 301-325. https://doi.org/10.1086/467037

Farooq, O. (2015). Effect of ownership concentration on capital structure: Evidence from the MENA region. *International Journal of Islamic and Middle Eastern Finance and Management, 8*(1), 99-113. https://doi.org/10.1108/imefm-10-2013-0115

Faulkender, M., Flannery, M. J., Hankins, K. W., and Smith, J. M. (2012). Cash flows and leverage adjustments. *Journal of Financial Economics, 103*(3), 632-646. https://doi.org/10.1016/j.jfineco.2011.10.013

Flannery, M. (1986). Asymmetric Information and Risky Debt Maturity Choice. *The Journal of Finance, 41*(1), 19-37. https://doi.org/10.1111/j.1540-6261.1986.tb04489.x

Frank, M. Z. and Goyal, V. K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics, 67*(2), 217-248. https://doi.org/10.2139/ssrn.243138

Frank, M. Z., and Goyal, V. K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management, 38*(1), 1. https://doi.org/10.1111/j.1755-053x.2009.01026.x

Fried, J. M., and Wang, C. C. (2018). Short-termism and capital flows. *The Review of Corporate Finance Studies, 8*(1), 207-233.

Friend, I., and Lang, L. (1988). An empirical test of the impact of managerial self-interest on corporate capital structure. *The Journal of Finance, 43*(2), 271–281. https://doi.org/10.2307/2328459

Gatchev, V.A., Spindt, P.A., and Tarhan, V. (2009). How do firms finance their investments? The relative importance of equity issuance and debt contracting costs. *Journal of Corporate Finance, 15*(2), 179-195. https://doi.org/10.2139/ssrn.971301

Glover, B. (2016). The expected cost of default. *Journal of Financial Economics,119*(2), 284-299. http://dx.doi.org/10.1016/j.jfineco.2015.09.007

Godlewski, C. J., Turk-Ariss, R., and Weill, L. (2013). Sukuk vs. conventional bonds: A stock market perspective. *Journal of Comparative Economics, 41*(3), 745-761. https://doi.org/10.1016/j.jce.2013.02.006

Godlewski, C. J., Turk-Ariss, R., and Weill, L. (2016). Do the type of Sukuk and choice of Shari'a scholar matter? *Journal of Economic Behavior & Organization, 132*, 63-76. http://dx.doi.org/10.1016/j.jebo.2016.04.020

Gomes, A., and Phillips, G. (2012). Why do public firms issue private and public securities? *Journal of Financial Intermediation, 21*(4), 619-658. https://doi.org/10.3386/w11294

Graham, J. R. and Harvey, C. R. (2001). The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics, 60,* 187-243. https://doi.org/10.1016/S0304-405X(01)00044-7

Halim, A. Z., How, J., and Verhoeven, P. (2017). Agency costs and corporate sukuk issuance. *Pacific-Basin Finance Journal, 42,* 83-95. https://doi.org/10.1016/j.pacfin.2016.05.014

Harris, M., and Raviv, A. (1998). Capital budgeting and delegation. *Journal of Financial Economics, 50*(3), 259-289. https://doi.org/10.1016/S0304-405X(98)00038-5

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153-161. https://doi.org/10.2307/1912352

Heckman, J. J., Urzua, S., and Vytlacil, E. (2006). Understanding instrumental variables in models with essential heterogeneity. *The Review of Economics and Statistics, 88*(3), 389-432. https://doi.org/10.3386/w12574

Heng, T., Azrbaijani, S., and San, O. (2012). Board of directors and capital structure: Evidence from leading Malaysian companies. *Asian Social Science, 8*(3), 123-136. https://doi.org/10.5539/ass.v8n3p123

Hovakimian, A. (2006). Are Observed Capital Structures Determined by Equity Market Timing? *The Journal of Financial and Quantitative Analysis, 41*(1), 221-243. https://doi.org/10.2139/ssrn.413387

Hovakimian, A., Hovakimian, G., and Tehranian, H. (2004). Determinants of target capital structure: The case of dual debt and equity issues. *Journal of Financial Economics, 71*(3), 517. https://doi.org/10.2139/ssrn.302501

Islamic Development Bank Group. (2018). *Global Report on Islamic Finance: The Role of Islamic Finance in Financing Long-term Investments*. Jeddah, KSA.

Jensen, M. C., and Meckling, W. H. (1976). Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X

Jung, K., Kim, Y., and Stulz, R.M. (1996). Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Economics, 42*(2), 159-185. https://doi.org/10.1016/0304-405x(96)00881-1

Kayhan, A. and Titman, S. (2007). Firms' histories and their capital structures. *Journal of Financial Economics, 83*(1), 1-32. https://doi.org/10.1016/j.jfineco.2005.10.007

Kayo, E. and Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking & Finance, 35*(2), 358-371. https://doi.org/10.1016/j.jbankfin.2010.08.015

Keasey, K., Martinez, B., and Pindado, J. (2015). Young family firms: Financing decisions and the willingness to dilute control. *Journal of Corporate Finance, 34*(C), 47-63. http://dx.doi.org/10.1016/j.jcorpfin.2015.07.014

Klein, P.O., and Weill, L. (2016). Why do companies issue sukuk? *Review of Financial Economics, 31,* 26-33. https://doi.org/10.1111/twec.12509

Klein, P.O., Weill, L., and Godlewski, C. (2018). How sukuk shapes firm performance. *World Economy, 41*(3), 699-722. https://doi.org/10.1111/twec.12509

Korajczyk, R. A., and Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics, 68*(1), 75-109. https://doi.org/10.1016/s0304-405x(02)00249-0

Kraus, A. H., and Litzenberger, R. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance, 28*(4), 911-922. https://doi.org/10.2307/2978343

Krishnaswami, S., and Subramaniam, V. (1999). Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics, 53*, 73–112. https://doi.org/10.1016/s0304-405x(99)00017-3

Lauer, C. (2002). A Model of Educational Attainment Application to the German Case. *ZEW Discussion Paper No. 02-06*. Available at SSRN: https://ssrn.com/abstract=327382

Lauer, C. (2003). Education and Unemployment: A French-German Comparison. *ZEW Discussion Paper No. 03-34*. Available at SSRN: https://ssrn.com/abstract=439742

Leary, M., and Roberts, M. (2005). Do Firms Rebalance Their Capital Structures? *The Journal of Finance, 60*(6), 2575-2619. https://doi.org/10.1111/j.1540-6261.2005.00811.x

Lemma, T. T., and Negash, M. (2014). Determinants of the adjustment speed of capital structure: evidence from developing economies. *Journal of Applied Accounting Research, 15* (1), 64-99. https://doi.org/10.1108/jaar-03-2012-0023

Lemmon, M. L., and Zender, J. F. (2019). Asymmetric information, debt capacity, and capital structure. *Journal of Financial and Quantitative Analysis, 54*(1), 31-59. https://doi-org/10.1017/S0022109018000443

Lewis, C. M., Rogalski, R. J., and Seward, J. K. (2003). Industry conditions, growth opportunities and market reactions to convertible debt financing decisions. *Journal of Banking & Finance, 27*(1), 153-181. https://doi.org/10.1016/s0378-4266(01)00212-6

Li, W., and Zhang, R. (2010). Corporate Social Responsibility, Ownership Structure, and Political Interference: Evidence from China. *Journal of Business Ethics, 96*(4), 631-645. https://doi.org/10.1007/s10551-010-0488-z

Lin, C., Ma, Y., Malatesta, P., and Xuan, Y. (2013). Corporate ownership structure and the choice between bank debt and public debt. *Journal of Financial Economics,109*(2), 517-534. http://dx.doi.org/10.1016/j.jfineco.2013.03.006

Liu, Q., Tian, G., and Wang, X. (2011). The effect of ownership structure on leverage decision: new evidence from Chinese listed firms. *Journal of the Asia Pacific Economy*, *16*(2), 254. https://doi.org/10.1080/13547860.2011.564755

Loughran, T. (2008). The impact of firm location on equity issuance. *Financial Management, 37*(1), 1-21. https://doi.org/10.1111/j.1755-053x.2008.00004.x

MacKie-Mason, J. (1990). Do taxes affect corporate financing decisions? *The Journal of Finance, 45*(5), 1471. https://doi.org/10.2307/2328746

Mak, Y. T., and Kusnadi, Y. (2005). Size really matters: Further evidence on the negative relationship between board size and firm value. *Pacific-Basin Finance Journal*, *13*(3), 301-318. https://doi.org/10.1016/j.pacfin.2004.09.002

Masulis, R. W. (1988). *The Debt/Equity Choice*. Cambridge, Mass.: Ballinger.

Matsa, D., and Miller, A. (2013). A female style in corporate leadership? Evidence from quotas. *American Economic Journal: Applied Economics, 5*(3), 136-169. https://doi.org/10.1257/app.5.3.136

Mitton, T. (2002). A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis. *Journal of Financial Economics, 64*(2), 215-244. https://doi.org/10.1016/s0304-405x(02)00076-4

Modigliani, F., and Miller, M. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review, 48*(3), 261-297. Retrieved from: http://www.jstor.org/stable/1809766

Mohamed, H. H., Masih, M., and Bacha, O. I. (2015). Why do issuers issue Sukuk or conventional bond? Evidence from Malaysian listed firms using partial adjustment models. *Pacific-Basin Finance Journal, 34*, 233-252. https://doi.org/10.1016/j.pacfin.2015.02.004

Munir, Q., Kok, S. C., Teplova, T., and Li, T. (2017). Powerful CEOs, debt financing, and leasing in Chinese SMEs: Evidence from threshold model. *North American Journal of Economics and Finance, 42*, 487-503. http://dx.doi.org/10.1016/j.najef.2017.08.011

Myers, S. (2001). Capital structure. *Journal of Economic Perspectives, 15*(2), 81–102. https://doi.org/10.1257/jep.15.2.81

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance, 39*(3), 575–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Myers, S., and Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187–221. https://doi.org/10.1016/0304-405x(84)90023-0

Nagano, M. (2016). Who issues Sukuk and when? An analysis of the determinants of Islamic bond issuance. *Review of Financial Economics, 31*, 45-55. https://doi.org/10.1016/j.rfe.2016.05.002

Nagano, M. (2017). Sukuk issuance and information asymmetry: Why do firms issue sukuk? *Pacific-Basin Finance Journal, 42*, 142-157. https://doi.org/10.1016/j.pacfin.2016.12.005

Ntim, C. G., Lindop, S., Osei, K. A., and Thomas, D. A. (2015). Executive compensation, corporate governance and corporate performance: A simultaneous equation approach. *Managerial and Decision Economics, 36*(2), 67-96. https://doi.org/10.1002/mde.2653

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, *41*(5), 673-690.

Öztekin, O., and Flannery, M. (2012). Institutional determinants of capital structure adjustment speeds. *Journal of Financial Economics, 103*, 88–112. https://doi.org/10.2139/ssrn.1364273

Pearce, J. A., and Zahra, S. A. (1992). Board composition from a strategic contingency perspective. *Journal of Management Studies, 29*(4), 411. https://doi.org/10.1111/j.1467-6486.1992.tb00672.x

Pi, L. and Timme, S. G. (1993). Corporate control and bank efficiency. *Journal of Banking & Finance, 17*(2), 515-530. https://doi.org/10.1016/0378-4266(93)90050-n

Rajan, R. G. (1992). Insiders and outsiders: the choice between informed and arm's length debt. *The Journal of Finance, 47*, 1367–1406. https://doi.org/10.2307/2328944

Rajan, R. G., and Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance, 50*, 1421-60. https://doi.org/10.2307/2329322

Roberts, G., and Yuan, L. E. (2010). Does institutional ownership affect the cost of bank borrowing? *Journal of Economics and Business, 62*(6), 604-626. https://doi.org/10.1016/j.jeconbus.2009.05.002

Sakai, K., Uesugi, I., and Watanabe, T. (2010). Firm age and the evolution of borrowing costs: Evidence from Japanese small firms. *Journal of Banking & Finance, 34*(8), 1970-1981. https://doi.org/10.1016/j.jbankfin.2010.01.001

Santos, M., Moreira, A. C., and Vieira, E. S. (2014). Ownership concentration, contestability, family firms, and capital structure. *Journal of Management & Governance*, 18(4), 1063-1107. https://doi.org/10.1007/s10997-013-9272-7

Shailer, G., and Wang, K. (2015). Government ownership and the cost of debt for Chinese listed corporations. *Emerging Markets Review, 22*, 1-17. http://dx.doi.org/10.1016/j.ememar.2014.11.002

Shibata, T., and Nishihara, M. (2010). Dynamic investment and capital structure under manager–shareholder conflict. *Journal of Economic Dynamics and Control, 34*(2), 158-178.

Shliefer, A. and Vishny, R. W. (1997). A survey of corporate governance. *The Journal of Finance, 52*(2), 737-783. https://doi.org/10.1111/j.1540-6261.1997.tb04820.x

Sila, V., Gonzalez, A., and Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? *Journal of Corporate Finance, 36,* 26-53. https://doi.org/10.1016/j.jcorpfin.2015.10.003

Singh, M., and Davidson III, W. N. (2003). Agency costs, ownership structure and corporate governance mechanisms. *Journal of Banking & Finance, 27*(5), 793-816. https://doi.org/10.1016/s0378-4266(01)00260-6

Smaoui, H., and Khawaja, M. (2017). The determinants of Sukuk market development. *Emerging Markets Finance and Trade, 7,* 1501-1518. https://doi.org/10.1080/1540496x.2016.1224175

Su, L. D. (2010). Ownership structure, corporate diversification and capital structure. *Management Decision, 48*(2), 314-339. https://doi.org/10.1108/00251741011022644

Suchard, J. A., and Singh, M. (2006). The determinants of the hybrid security issuance decision for Australian firms. *Pacific-Basin Finance Journal, 14*(3), 269-290. https://doi.org/10.1016/j.pacfin.2005.10.004

Sun, J., Ding, L., Guo, J. M., & Li, Y. (2016). Ownership, capital structure and financing decision: Evidence from the UK. *British Accounting Review, 48(4),* 448–463. https://doi.org/10.1016/j.bar.2015.04.001

Sundaramurthy, C., and Lewis, M. (2003). Control and collaboration: Paradoxes of governance. *Academy of Management Review, 28*(3), 397-415. https://doi.org/10.5465/amr.2003.10196737

Tawatnuntachai, O., and Yaman, D. (2007). Why do firms issue global bonds? *Managerial Finance, 34*(1), 23-40. https://doi.org/10.1108/03074350810838208

Vafeas, N. and Theodorou, E. (1998). The relationship between board structure and firm performance in the UK. *The British Accounting Review, 30(*4), 383-407. https://doi.org/10.1006/bare.1998.0075

Viswanath, P.V. (1993). Strategic considerations, the pecking order hypothesis, and market reactions to equity financing. *Journal of Financial and Quantitative Analysis, 28*, 213–234. https://doi.org/10.2307/2331287

Walsh, E. J., and Ryan, J. (1997). Agency and tax explanations of security issuance decisions. *Journal of Business Finance and Accounting, 24*(7-8), 943-961. https://doi.org/10.1111/1468-5957.00144

Wei, K. J., and Zhang, Y. (2008). Ownership structure, cash flow, and capital investment: Evidence from East Asian economies before the financial crisis. *Journal of Corporate Finance, 14*(2), 118-132. https://doi:10.1016/j.jcorpfin.2008.02.002

Welch, I. (2004). Capital structure and stock returns. *Journal of Political Economy, 112*(1), 106-131. https://doi.org/10.1086/379933

Yatim, M. (2009). Sukuk (Islamic bond): A crucial financial instrument for securitisation of debt for the debt-holders in Shari'ah-compliant capital market. *International Journal of Business and Management, 4*(10), 166-172. https://doi.org/10.5539/ijbm.v4n10p166

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics, 40*(2), 185-211. https://doi.org/10.1016/0304-405x(95)00844-5

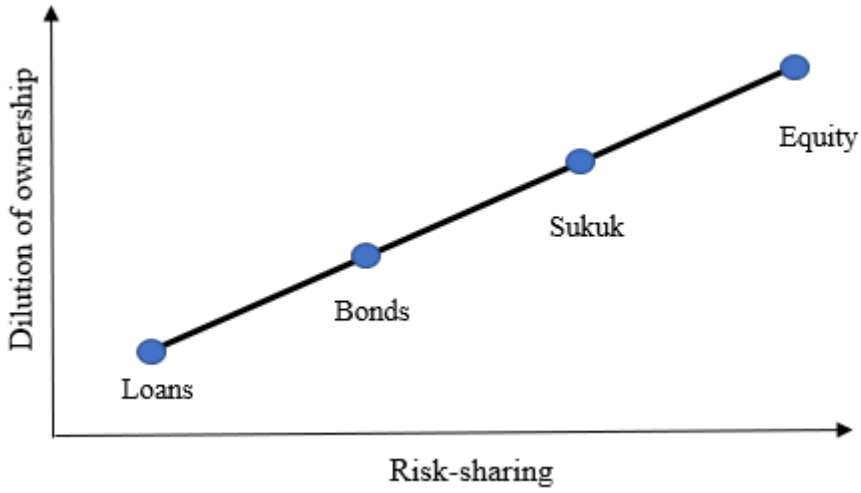
Zeghal, D. (1984). Firm size and the information content of financial statements. *Journal of Financial and Quantitative Analysis, 19*, 299–310. https://doi.org/10.2307/2331092

Zou, H. and Xiao, J. (2006). The financing affects of listed Chinese firms. *The British Accounting Review, 38*(3), 239-258. https://doi.org/10.1016/j.bar.2006.04.008

Figures

Figure 1: Ownership dilution and risk-sharing trade-off

A visual representation of the trade-off between ownership dilution and risk-sharing associated with four financing instruments, namely equity, bond, loan, and sukuk. Equity offers the highest level of risk-sharing, followed by sukuk, bond, and loan. However, the securities offer ownership control in the reverse order.



Tables

Table 1: Descriptive statistics

Descriptive statistics of the non-dummy variables subdivided into three classes: ownership, governance, and other control variables. Quarterly data ranges from Q12000 to Q42015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan. Panel A shows summary statistics of variables for all firms. Panel B and C show the statistics of variables for capital issuers and non-issuers, respectively. The last column reports the chi-squared coefficients of the K-Wallis test of mean difference with significance levels *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

Variable	Panel A: All Firms			Panel B: Issuing Firms			Panel C: Non-Issuing Firms			K-Wallis
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	
Concentration	66,478	37.903	21.377	38,300	37.754	20.429	28,178	38.105	22.601	0.052
Govt	67,734	0.996	7.447	38,786	1.328	8.450	28,948	0.552	5.809	209***
Individual	67,734	12.328	17.948	38,786	11.702	16.779	28,948	13.167	19.374	18.327***
Financials	67,734	14.521	22.325	38,786	14.671	21.910	28,948	14.319	22.87	43.174***
Board size	67,680	7.097	2.465	38,786	7.170	2.345	28,894	7.000	2.614	43.158***
Board independence	67,562	3.739	1.201	38,687	3.759	1.178	28,875	3.712	1.231	8.124***
Female Ratio	67,427	0.116	0.138	38,766	0.121	0.138	28,661	0.111	0.138	130***
Firm Size	67,734	18.447	1.600	38,786	18.686	1.647	28,948	18.127	1.474	2,044***
Analyst Coverage	67,734	1.700	4.332	38,786	2.190	4.927	28,948	1.044	3.261	1,626***
Analyst Variance	67,734	0.180	0.418	38,786	0.226	0.457	28,948	0.119	0.351	1,221***
Tangibility	67,549	0.364	0.225	38,729	0.365	0.224	28,820	0.363	0.227	3.524*
Capex	67,734	0.003	0.008	38,786	0.003	0.008	28,948	0.003	0.008	205***
Leverage	67,700	0.617	1.207	38,776	0.627	1.102	28,924	0.605	1.334	676***
MBV	64,865	1.445	1.723	37,218	1.482	1.693	27,647	1.397	1.760	184***
ROA	59,634	0.048	0.095	34,536	0.047	0.093	25,098	0.051	0.097	21.679***
Cash	67,658	0.130	0.131	38,738	0.127	0.124	28,920	0.133	0.140	28.902***

Table 2: Descriptive statistics with annual data

Variables are subdivided into three classes: ownership, governance, and other control variables. Annual data ranges from year 2000 to 2015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan. Panel A shows summary statistics of variables for all firms. Panel B and C show the statistics of variables for capital issuers and non-issuers, respectively. The last column reports the chi-squared coefficients of the K-Wallis test of mean difference with significance levels *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

Variable	Panel A: All Firms			Panel B: Issuing Firms			Panel C: Non-Issuing Firms			K-Wallis
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	
Concentration	17,493	38.127	21.497	9,996	37.976	20.501	7,497	38.327	22.757	0.004
Govt	17,839	1.014	7.510	10,127	1.352	8.533	7,712	0.570	5.874	3.918**
Individual	17,839	12.189	17.981	10,127	11.564	16.728	7,712	13.009	19.475	7.150***
Financials	17,839	14.520	22.386	10,127	14.725	22.009	7,712	14.251	22.870	13.570***
Board size	17,825	7.082	2.479	10,127	7.161	2.356	7,698	6.978	2.628	13.888***
Board independence	17,794	3.730	1.205	10,102	3.751	1.181	7,692	3.703	1.235	2.272
Female Ratio	17,759	0.117	0.138	10,122	0.121	0.138	7,637	0.111	0.138	36.922***
Firm Size	17,839	18.396	1.601	10,127	18.645	1.647	7,712	18.069	1.476	571***
Analyst Coverage	17,839	1.650	4.266	10,127	2.133	4.862	7,712	1.015	3.218	406***
Analyst Variance	17,839	0.176	0.418	10,127	0.222	0.457	7,712	0.116	0.351	320***
Tangibility	17,788	0.366	0.227	10,107	0.367	0.225	7,681	0.366	0.228	0.272
Capex	17,839	0.007	0.012	10,127	0.007	0.012	7,712	0.007	0.012	26.808***
Leverage	17,832	0.609	1.229	10,126	0.622	1.121	7,706	0.591	1.357	185***
MBV	16,837	1.446	1.711	9,536	1.493	1.703	7,301	1.385	1.720	52.817***
ROA	14,715	0.049	0.095	8,479	0.047	0.093	6,236	0.051	0.097	2.793*
Cash	17,812	0.130	0.133	10,109	0.127	0.125	7,703	0.134	0.142	6.088**

Table 3: Firms segregated by their choice of instrument

Issuers of multiple securities in a single quarter are placed under the instrument that the firm used to raise highest volume of capital in the quarter. Quarterly data ranges from Q12000 to Q42015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan. The last column reports the chi-squared coefficients of the K-Wallis test of mean difference with significance levels *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

Variable	Loans			Bonds			Sukuk			Equity			K-Wallis
	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	
Concentration	501	51.589	20.818	691	39.406	19.314	567	39.670	20.372	760	33.482	19.530	242***
Govt	521	4.556	15.627	692	2.200	11.112	593	0.688	4.599	764	1.034	7.129	148***
Individual	521	2.489	8.758	692	8.662	14.038	593	7.907	12.636	764	13.631	16.547	338***
Financials	521	22.882	27.816	692	20.185	25.722	593	21.673	28.060	764	15.722	22.789	126***
Board size	521	7.455	2.753	692	8.042	2.254	593	8.233	2.272	764	7.215	2.441	280***
Board independence	519	3.175	1.223	691	3.592	1.145	593	3.629	1.264	763	4.010	1.106	162***
Female Ratio	521	0.131	0.142	691	0.128	0.113	593	0.152	0.151	764	0.114	0.139	64.187***
Firm Size	521	20.419	1.518	692	19.951	1.537	593	19.849	1.453	764	18.320	1.880	1,606***
Analyst Coverage	521	6.392	7.800	692	4.608	6.698	593	5.137	7.527	764	2.414	5.429	1,168***
Analyst Variance	521	0.502	0.543	692	0.423	0.526	593	0.503	0.587	764	0.197	0.395	1,078***
Tangibility	521	0.421	0.252	692	0.385	0.203	592	0.390	0.201	764	0.330	0.240	72.840***
Capex	521	0.004	0.010	692	0.003	0.009	593	0.002	0.007	764	0.000	0.010	35.540***
Leverage	521	1.063	1.133	692	1.210	1.148	593	0.874	0.531	764	0.570	0.860	1,155***
MBV	504	2.128	2.050	671	1.492	1.470	586	1.273	1.022	585	2.400	2.270	428***
ROA	465	0.072	0.076	632	0.047	0.059	578	0.049	0.051	448	0.060	0.120	56.297***
Cash	521	0.106	0.087	692	0.113	0.095	593	0.087	0.065	760	0.160	0.130	76.444***

Table 4: Comparison of ownership and governance variables across jurisdictions

Quarterly data ranges from Q12000 to Q42015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan. Panel A reports the means of variables from sample countries. Panel B reports chi-squared coefficients of K-Wallis test of the difference in means with significance levels *** p<0.01, ** p<0.05, * p<0.1. Panel B coefficients represent the mean difference between variables of issuing firms from header country with those from the country in lower row of Panel B (in *italics*). Variable definitions are given in Appendix B.

Variables	Panel A								Panel B					
	Malaysia		Indonesia		Pakistan		Singapore		K-Wallis					
	Issuer	Non-issuer	Issuer	Non-issuer	Issuer	Non-issuer	Issuer	Non-issuer	Malaysia *Indonesia*	Malaysia *Pakistan*	Malaysia *Singapore*	Indonesia *Pakistan*	Indonesia *Singapore*	Pakistan *Singapore*
Concentration	31.66	33.88	56.18	55.90	36.19	26.61	42.2	35.14	13,036***	721***	523***	5,035***	3,398***	1,055***
Govt	0.35	0.08	4.79	1.30	5.08	0.97	0.00	0.00	61.704***	7.018***	4.779**	8.058***	54.83***	13.85***
Individual	14.06	15.40	2.86	3.10	0.59	13.72	16.29	22.39	10,584***	2,082***	779***	185***	9,985***	3,224***
Financials	11.06	8.85	16.58	14.90	3.18	7.31	38.23	35.82	239***	154***	9,664***	404***	5,008***	7,051***
CEO duality	0.020	0.02	0	0	0.06	0.03	0.11	0.12	12.034***	4.589**	199***	17.81***	224***	75.68***
Board size	7.26	7.12	6.22	4.85	10.34	8.89	7.96	7.51	4,435***	31.87***	664***	1,664***	583***	401***
Board independence	4.01	3.88	3.17	3.11	3.02	4.01	3.28	3.81	7,018***	3,778***	247***	7,628***	4,607***	1,430***
Female Ratio	0.12	0.12	0.14	0.13	0.03	0.08	0.10	0.10	3.837*	873***	285***	372***	98.19***	179***

Table 5: Correlation matrix

Matrix of correlation coefficients with significance levels *** p<0.01, ** p<0.05, * p<0.1. Coefficients represent correlation across major independent variables as well as binary variables representing issuance of chosen financing instruments, namely loans, bonds, sukuk, and equity. Quarterly data range from Q12000 to Q42015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan.

	Concentration	**Individual**	**Govt**	**Financials**	**CEO duality**	**Board independence**	**Board size**	**Female ratio**	**Loan**	**Bond**	**Sukuk**	**Equity**
Concentration	1											
Individual	-0.261***	1										
Govt	0.137***	-0.09***	1									
Financials	0.167***	-0.170***	-0.05***	1								
CEO duality	-0.002	0.055***	-0.023***	0.052***	1							
Board independence	-0.829***	0.251***	-0.155***	-0.184***	-0.014***	1						
Board size	-0.097***	-0.038***	0.082***	0.104***	0.031***	0.007	1					
Female ratio	0.075***	-0.008	-0.016***	0.020***	-0.031***	-0.058***	-0.021***	1				
Loan	0.015***	-0.018***	0.017***	0.027***	-0.004	-0.015***	0.015***	0.003***	1			
Bond	0.009**	-0.010**	0.011***	0.035***	0.001	-0.015***	0.024***	0.005	0.020***	1		
Sukuk	0.017***	-0.024***	-0.005	0.058***	-0.008**	-0.013***	0.035***	0.039***	0.006	0.001	1	
Equity	0.016***	-0.016***	0.019***	0.022***	-0.004	-0.012***	0.020***	0.010**	0.009**	0.003	0.011***	1

Table 6: Variance Inflation Factor (VIF) test

Results of Variance Inflation Factor (VIF) test of multicollinearity applied to independent variables in the sample. Quarterly data range from Q12000 to Q42015. Sample firms belong to countries with dual issuers of bonds and sukuk. The countries include Malaysia, Indonesia, Singapore and Pakistan.

Variable	VIF
Concentration	3.61
Board independence	3.36
Analyst coverage	2.37
Firm size	2.09
Analyst variance	1.98
GDP	1.40
MBV	1.34
Interbank rate	1.34
Board size	1.31
Cash	1.28
ROA	1.23
Tangibility	1.20
Leverage	1.20
Individual	1.20
Financials	1.19
Govt	1.08
Capex	1.05
CEO duality	1.03
Female ratio	1.02
Mean VIF	1.59

Table 7: Heckman ordered probit model

Panel regression results using two-staged Heckman ordered probit model. Equations 4 and 5 describe how the variables in Column 1 determine the first decision about raising capital (ISSUED) in Column 2; and second decision about the choice of instrument (CHOICE) in Column 3. The dependent variable ISSUED is binary; the dependent variable CHOICE is an ordered variable with values ranging from 1 to 4 where Loan = 1, Bond = 2, Sukuk = 3, Equity = 4. Quarterly data ranges from Q12000 to Q42015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

	Ordered Probit Model	
VARIABLES	ISSUED	CHOICE
Concentration		-0.0063***
		(0.0024)
Individual		0.0041*
		(0.0023)
Govt		-0.0013
		(0.0028)
Financials		-0.0002
		(0.0011)
CEO duality	-0.3552***	-0.9250***
	(0.0763)	(0.3341)
Board independence	-0.0172**	0.0351
	(0.0088)	(0.0404)
Board size	0.0296***	0.0141
	(0.0043)	(0.0233)
Female ratio	0.3578***	0.4516
	(0.0755)	(0.3130)
Firm size		-0.2169***
		(0.0276)
Analyst coverage		0.0014
		(0.0060)
Analyst variance	0.4311***	0.0669
	(0.0205)	(0.2925)
Tangibility	-0.0125	-0.1952
	(0.0512)	(0.1279)
Capex	0.4577	-7.9960***
	(1.2760)	(2.9564)
Leverage	0.0995***	-0.1636**
	(0.0084)	(0.0661)
MBV	0.0132**	0.1204***
	(0.0063)	(0.0226)
ROA	0.0428	0.0123
	(0.1327)	(0.3829)
Cash	-0.7592***	1.0913**
	(0.1046)	(0.5448)
Free cash flow	-0.0314	-0.0792
	(0.0250)	(0.0647)
Interbank rate	-3.7462***	-14.4855***
	(0.3719)	(3.4111)
GDP		-0.0669
		(0.0573)
Constant		-1.9367***
		(0.0638)
Hausman		15,349.11***
Chi-squared		562.77***
Observations		57,163

Table 8: Multinomial logit model

Panel regression results using the Multinomial Logit Model in the CHOICE equation. Equation 5 describes how the variables in Column 1 determine the decision about the choice of instrument. Quarterly data ranges from Q12000 to Q42015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

Variables	Loan	Bond	Sukuk	Equity
Concentration	0.0070**	-0.0041	0.0179***	-0.0192***
	(0.0036)	(0.0040)	(0.0040)	(0.0046)
Individual	-0.0189***	-0.0088***	-0.0111***	-0.0047
	(0.0063)	(0.0031)	(0.0034)	(0.0035)
Govt	-0.0004	0.0154***	-0.0039	-0.0027
	(0.0037)	(0.0042)	(0.0082)	(0.0075)
Financials	0.0035*	-0.0054***	-0.0004	-0.0033
	(0.0019)	(0.0019)	(0.0019)	(0.0024)
CEO duality	0.4276	-0.6858***	-3.0328***	-1.1484**
	(0.3343)	(0.2621)	(1.0026)	(0.4557)
Board independence	0.0635	-0.0252	0.3468***	0.1653**
	(0.0574)	(0.0659)	(0.0695)	(0.0775)
Board size	-0.0224	0.0201	0.0449**	0.0421*
	(0.0207)	(0.0176)	(0.0202)	(0.0225)
Female ratio	0.5824*	0.6566**	1.8355***	-0.3573
	(0.3384)	(0.3194)	(0.3149)	(0.3692)
Firm size	0.5679***	0.4877***	0.3480***	-0.0258
	(0.0477)	(0.0380)	(0.0414)	(0.0465)
Analyst coverage	0.0236**	0.0033	0.0211**	0.0566***
	(0.0107)	(0.0094)	(0.0098)	(0.0123)
Analyst variance	0.1183	0.2112**	0.5464***	0.1523
	(0.1278)	(0.1023)	(0.0964)	(0.1476)
Tangibility	0.3680	0.1998	-0.0549	-0.5010**
	(0.2433)	(0.2028)	(0.2153)	(0.2545)
Capex	6.6798	5.0820	-7.1554	4.6187
	(5.9009)	(5.3108)	(7.3469)	(5.5171)
Leverage	0.1430***	0.2904***	0.1312***	-0.0362
	(0.0379)	(0.0289)	(0.0389)	(0.0507)
MBV	-0.0423	-0.0737**	-0.1240***	0.1605***
	(0.0290)	(0.0329)	(0.0436)	(0.0225)
ROA	1.2253*	-0.3971	-0.3071	-0.3158
	(0.7340)	(0.6408)	(0.7035)	(0.5315)
Cash	-2.1331***	-1.6587***	-5.9216***	-0.3305
	(0.5958)	(0.4684)	(0.6362)	(0.4132)
Free cash flow	-0.0424	0.2093**	0.8006***	-0.1624
	(0.1108)	(0.0991)	(0.1241)	(0.1196)
Interbank rate	9.3095***	-18.0754***	-12.7203***	-18.7427***
	(1.7201)	(2.1090)	(2.1334)	(2.7387)
GDP	0.9444***	-0.1499*	-0.5715***	1.2030***
	(0.0959)	(0.0898)	(0.0958)	(0.1170)

Constant	-27.7074***	-11.5592***	-7.0258***	-17.3322***
	(1.3308)	(1.1167)	(1.1651)	(1.3953)
Chi-squared				2,960***
Observations				56,254

Table 9: Results with sample subdivided into terciles based on firm size

Panel regression results using two-staged Heckman ordered probit model applied to the sample subdivided intro terciles based on firm size. Panel A consists of the smallest firms in the sample followed by Panels B and Panel C. Equations 4 and 5 describe how the variables in Column 1 determine the first decision about raising capital (ISSUED); and second decision about the choice of instrument (CHOICE). The dependent variable ISSUED is binary; the dependent variable CHOICE is an ordered variable with values ranging from 1 to 4 where Loan = 1, Bond = 2, Sukuk = 3, Equity = 4. Quarterly data ranges from Q12000 to Q42015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

VARIABLES	Panel A: Tercile 1		Panel B: Tercile 2		Panel C: Tercile 3	
	ISSUED	CHOICE	ISSUED	CHOICE	ISSUED	CHOICE
Concentration		-0.0473***		-0.0159**		-0.0034
		(0.0156)		(0.0067)		(0.0028)
Individual		0.0027		0.0108***		0.0083**
		(0.0086)		(0.0040)		(0.0037)
Govt		0.0000		0.0007		-0.0017
		(0.0000)		(0.0102)		(0.0031)
Financials		0.0346**		0.0123***		-0.0029**
		(0.0156)		(0.0029)		(0.0014)
CEO duality	-0.1855	-0.6128	-0.6862***	-3.1438	-0.3622***	-1.0222**
	(0.2175)	(0.8464)	(0.2342)	(236.2342)	(0.0885)	(0.4962)
Board Independence	0.0665**	0.0090	0.0603***	-0.1982*	-0.0017	0.0830
	(0.0293)	(0.2520)	(0.0183)	(0.1138)	(0.0117)	(0.0514)
Board size	-0.0490***	0.1087	0.0301***	0.0261	0.0168***	0.0141
	(0.0162)	(0.1109)	(0.0093)	(0.0363)	(0.0054)	(0.0299)
Female ratio	-0.2127	1.0142	-0.3028*	-0.4411	0.8258***	0.8864
	(0.2075)	(0.9723)	(0.1554)	(0.4600)	(0.1026)	(1.2505)
Firm size		-0.5057*		-0.4012***		-0.1273***
		(0.2670)		(0.1339)		(0.0438)
Analyst coverage		1.4199***		0.0472		-0.0036
		(0.5387)		(0.0365)		(0.0075)
Analyst variance	0.0221	4.4726	0.1284**	-0.0692	0.2890***	0.0632
	(0.2135)	(664.5217)	(0.0610)	(0.2194)	(0.0255)	(0.4824)
Tangibility	-0.2453	0.9849	-0.0473	-1.1580***	0.0744	-0.0616
	(0.1525)	(0.8998)	(0.0965)	(0.2695)	(0.0681)	(0.2048)
Capex	5.5003	-8.1235	3.4597	-7.7222	-2.8105	-7.3817
	(3.6398)	(18.0105)	(2.2672)	(5.6282)	(1.7649)	(5.0161)
Leverage	-0.0595	-0.4774**	0.0936***	-0.2207**	0.0969***	-0.1197
	(0.0372)	(0.2277)	(0.0170)	(0.0857)	(0.0116)	(0.1906)
MBV	0.0422***	0.1367	-0.0175	0.2164***	0.0181**	0.0949***
	(0.0163)	(0.1360)	(0.0184)	(0.0624)	(0.0083)	(0.0222)
ROA	-0.5567**	-1.1341	-0.4375	1.2496	0.2999	1.0767*
	(0.2536)	(1.7954)	(0.2782)	(0.8185)	(0.2288)	(0.5894)
Cash	0.0392	0.9031	-1.1201***	-0.2602	-1.0181***	1.1367
	(0.2154)	(1.2920)	(0.2085)	(0.8994)	(0.1598)	(2.0464)
Free cash flow	0.0612	0.5035	0.1718***	0.2775	-0.0290	-0.1322*
	(0.0843)	(0.3792)	(0.0548)	(0.1855)	(0.0317)	(0.0754)
Interbank rate	-3.5894***	-17.3400**	-5.6533***	-34.2326***	-2.3771***	-11.8090***
	(1.2742)	(8.6220)	(0.8110)	(5.7936)	(0.4776)	(2.2609)
GDP		1.0642***		0.3307**		-0.2312***
		(0.3547)		(0.1436)		(0.0687)
Constant		-2.1573***		-2.1479***		-1.7971**
		(0.2000)		(0.1327)		(0.0847)
Chi-squared		56.72***		179.69***		304.90***
Observations		17,805		19,455		19,903

Table 10: Results with annual data

Panel regression results with *annual* data using two-staged Heckman ordered probit model. Equations 4 and 5 describe how the variables in Column 1 determine the first decision about raising capital (ISSUED) in Column 2; and second decision about the choice of instrument (CHOICE) in Column 3. The dependent variable ISSUED is binary; the dependent variable CHOICE is an ordered variable with values ranging from 1 to 4 where Loan = 1, Bond = 2, Sukuk = 3, Equity = 4. Data ranges from year 2000 to 2015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

	Ordered Probit Model	
VARIABLES	**ISSUED**	**CHOICE**
Concentration		-0.0211***
		(0.0050)
Individual		-0.0020
		(0.0052)
Govt		0.0049
		(0.0079)
Financials		-0.0009
		(0.0028)
CEO duality	-0.2969**	-0.7662
	(0.1421)	(2.2502)
Board independence	-0.0200	-0.1447
	(0.0177)	(0.1746)
Board size	0.0294***	0.1163
	(0.0087)	(0.2187)
Female ratio	0.2431	1.0741
	(0.1563)	(1.8648)
Firm size		-0.1353**
		(0.0593)
Analyst coverage		-0.0018
		(0.0128)
Analyst variance	0.4092***	1.4138
	(0.0414)	(2.9348)
Tangibility	-0.3119***	-0.9694
	(0.1074)	(2.2964)
Capex	6.8134***	21.0022
	(1.7398)	(50.0909)
Leverage	0.1043***	0.2681
	(0.0175)	(0.7579)
MBV	-0.0055	0.1168**
	(0.0135)	(0.0515)
ROA	0.1416	1.1683
	(0.2729)	(1.3131)
Cash	-0.7635***	-2.1468
	(0.2054)	(5.6423)
Free cash flow	-0.0717	-0.1627
	(0.0497)	(0.5322)
Interbank rate	-5.4954***	-29.1637
	(0.7738)	(40.5458)
GDP		0.0751
		(0.1057)
Constant		-2.7198
		(18.3210)

Chi-squared	113.40***
Observations	14,176

Table 11: Results excluding records from Singapore

Panel regression results after excluding records from Singapore using two-staged Heckman ordered probit model. Equations 4 and 5 describe how the variables in Column 1 determine the first decision about raising capital (ISSUED) in Column 2; and second decision about the choice of instrument (CHOICE) in Column 3. The dependent variable ISSUED is binary; the dependent variable CHOICE is an ordered variable with values ranging from 1 to 4 where Loan = 1, Bond = 2, Sukuk = 3, Equity = 4. Data ranges from Q12000 to Q42015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

	Ordered Probit Model	
VARIABLES	**ISSUED**	**CHOICE**
Concentration		-0.0070***
		(0.0025)
Individual		0.0057**
		(0.0026)
Govt		-0.0011
		(0.0028)
Financials		0.0026**
		(0.0013)
CEO duality	-0.5754***	-0.3620
	(0.1413)	(0.5593)
Board independence	-0.0139	0.0158
	(0.0096)	(0.0413)
Board size	0.0309***	0.0077
	(0.0046)	(0.0210)
Female ratio	0.3092***	0.4045
	(0.0793)	(0.2646)
Firm size		-0.1470***
		(0.0293)
Analyst coverage		-0.0093
		(0.0066)
Analyst variance	0.4295***	0.1096
	(0.0222)	(0.2370)
Tangibility	-0.0534	-0.3820***
	(0.0553)	(0.1408)
Capex	3.1411**	-4.5540
	(1.4932)	(3.6842)
Leverage	0.0931***	-0.1805***
	(0.0089)	(0.0536)
MBV	0.0153**	0.1391***
	(0.0068)	(0.0227)
ROA	0.1618	-0.0344
	(0.1459)	(0.4151)
Cash	-0.7001***	1.3338***
	(0.1124)	(0.4662)
Free cash flow	-0.1146***	-0.0603
	(0.0271)	(0.0904)
Interbank rate	-5.0275***	-22.3533***
	(0.4370)	(3.6056)
GDP		0.0117
		(0.0620)
Constant		-1.8092***
		(0.0704)
Chi-squared		591.74***
Observations		50,064

Table 12: Results with fixed effects

Panel regression results with *firm-*, *country-*, and *year-fixed effects* using two-staged Heckman ordered probit model. Equations 4 and 5 describe how the variables in Column 1 determine the first decision about raising capital (ISSUED) in Column 2; and second decision about the choice of instrument (CHOICE) in Column 3. The dependent variable ISSUED is binary; the dependent variable CHOICE is an ordered variable with values ranging from 1 to 4 where Loan = 1, Bond = 2, Sukuk = 3, Equity = 4. Data ranges from Q12000 to Q42015. Standard errors are clustered at the country level and are reported in parentheses with *** p<0.01, ** p<0.05, * p<0.1. Variable definitions are given in Appendix B.

	Ordered Probit Model	
VARIABLES	**ISSUED**	**CHOICE**
Concentration		-0.0123***
		(0.0033)
Individual		0.0045
		(0.0031)
Govt		-0.0025
		(0.0040)
Financials		-0.0002
		(0.0018)
CEO duality	4.6306	-0.4828*
	(72.4045)	(0.2786)
Board independence	-0.1290	0.0089
	(0.4264)	(0.0566)
Board size	0.0699	0.0161
	(0.3453)	(0.0189)
Female ratio	-0.8180	0.1115
	(3.2108)	(0.2968)
Firm size		-0.1192***
		(0.0313)
Analyst coverage		-0.0095
		(0.0066)
Analyst variance	0.1231***	0.1265**
	(0.0431)	(0.0509)
Tangibility	0.1213	-0.1636
	(0.1329)	(0.1372)
Capex	1.1410	-1.7005
	(1.8136)	(2.0317)
Leverage	0.0492***	-0.1530***
	(0.0177)	(0.0262)
MBV	0.0186	0.1134***
	(0.0121)	(0.0149)
ROA	0.1103	0.1961
	(0.2251)	(0.2965)
Cash	0.1861	0.6381**
	(0.2106)	(0.2680)
Free cash flow	0.0968**	-0.0279
	(0.0421)	(0.0497)
Interbank rate	-4.6127***	-8.3255***
	(1.2727)	(1.2310)
GDP		0.0597
		(0.0534)
Mills ratio		0.1611**
		(0.0762)

Constant	-1.9852	4.5061***
	(4.0622)	(0.7998)
Firm Effect		YES
Time Effect		YES
Chi-squared	2,991***	333.45***
Observations	20,652	2,031

Appendices

Appendix A: List of studies surrounding the topics of raising capital

The list subdivides the studies into the topics of capital structure, choice of instrument, corporate ownership, and corporate governance. I compare the estimation models, the choice of dependent and independent variables, and the findings.

Author	Model	Dependent variable	Independent variable	Findings
Capital Structure				
Modigliani and Miller (1958) *(Irrelevance Theory)*	[Theory]	NA	NA	A firm's relative proportions of debt and equity do not matter; firms with a greater proportion of debt are more valuable because of an interest tax shield.
Kraus and Litzenberger (1973) *(Static Tradeoff Theory)*	[Theory]	NA	NA	Optimal capital structure is achieved where there are significant benefits from tax shields and costs of bankruptcy.
Myers and Majluf (1984) *(Pecking Order Theory)*	[Theory]	NA	NA	Internal funds are the best source of funding for firms. External financing using debt is better than financing by equity.
Jensen and Meckling (1976) *(Agency Theory)*	[Theory]	NA	NA	It is generally impossible for the principal or agent, at zero cost, to ensure that the agent will make optimal decisions from the principal's viewpoint.
Masulis (1988)	OLS regression	Announcement in stock period return	Stock returns, oversubscriptions and cash distributions, recapitalizations, stock returns of opposite sign to leverage.	Changes in stock prices are positively related to leverage. Changes in firm values are positively related to changes in debt. Changes in non-convertible senior security prices are negatively related to leverage.

Lemma and Negash (2014)	Dynamic partial adjustment models, GMM	Change in leverage	Firm size, profitability, growth opportunities, asset tangibility, dividend payout, tax shield, common law/French law, taxation, inflation, size/growth of economy, size/liquidity of stock market, size of banking industry, creditor/shareholder rights.	More profitable firms rapidly adjust their capital structure than less profitable ones. Adjustment speeds are faster in high risk industries, and in countries with common law tradition, and weaker institutions.
Faulkender et al. (2012)	OLS regression	Change in book and market leverage	Target leverage, book leverage, cash flows.	Firms with large (positive or negative) operating cash flow make more aggressive changes in their capital ratios. Firms that pay dividends or have a high credit rating adjust faster when they are under leveraged than constrained firms. Larger firms adjust excess leverage more slowly, consistent with the costs of excess leverage being smaller for larger firms.
Öztekin and Flannery (2012)	Separate and pooled regression	Book value and market value leverage	Profitability, MBV, depreciation, size, tangibility, R&D, industry mean, taxes, liquidity, regulation, inflation, GDP growth.	Firms in different countries do not have the same capital structure adjustment speed. A country's legal and financial institutions significantly affect the costs and benefits of moving toward target leverage levels.
Kayo and Kimura (2011)	Hierarchical linear modelling (multilevel analysis)	Market long-term leverage	Firm level: Growth, profitability, bankruptcy, size, tangibility. Industry level: Munificence, dynamism, HH index. Country level: Stock/bond market development, financial system, GDP growth.	Time and firm level explain 78 percent of firm leverage variances. Other factors include industry and country.
Lemmon et al. (2008)	ANCOVA; Akaike Information Criterion (AIC); Bayesian Information Criterion (BIC); Pooled OLS; Firm fixed effects; GMM.	Leverage	Historical leverage; firm level variables.	Capital structures are stable over long periods. Firms with high leverage tend to remain highly leveraged over extended periods of time i.e. over 20 years. Variation in capital structure is primarily determined by factors that remain stable for long periods. Variation in capital structure is time-invariant. Initial leverage is important in determining future leverage levels. Active management of leverage ratios is partially responsible for mean reversion in leverage ratios.

Kayhan and Titman (2007)	Tobit regression, OLS regression Bootstrapping	Difference of target debt ratio and debt ratio at the beginning of the period	Financial deficit (external capital raised), timing, stock returns, profitability, leverage deficit.	Stock price changes and financial deficits strongly influence capital structure changes. In the long run, capital structures tend to move toward target debt ratios. Changes in leverage due to stock price returns do not frequently revert to their previous levels.
Leary and Roberts (2005)	Semiparametric duration model (Duration analysis)	Leverage change	Size, MBV, capital expenditures, cash, depreciation, tangible assets, operating income, change in net income, selling expenses, cumulative 4-quarter stock return.	Firms tend to make capital structure adjustments relatively infrequently (on average once a year) but in clusters. Firms respond to equity issuance and equity price shocks by rebalancing their leverage over the following two to four years.
Welch (2004)	Fama-Macbeth	Leverage change	Target debt ratio, stock return, merger activity, profitability, tax rate, industry deviation, assets, market cap, MBV.	Over a 1-5 year horizon, stock returns can explain 40 percent of debt ratio dynamics. Variables like tax costs, bankruptcy costs, earnings, profitability, MBV ratios, uniqueness, undervaluation, timing etc. fail to explain much of capital structure dynamics. However, stock returns are the primary component of capital structure changes.
Korajczyk and Levy (2003)	OLS regression	Optimal leverage ratio	Target - actual leverage, price reaction to equity announcement, term spread, default spread, one year nominal return, target deficit variation, macroeconomic variation.	Macroeconomic conditions are significant for issue choice for unconstrained firms but less for constrained firms. Unconstrained firms time their issue choice to coincide with periods of favourable macroeconomic conditions.
Choice of instrument				
Dong et al. (2012)	OLS, multinomial probit regressions.	Equity/debt issue (binary), stock returns	MBV, Tobin Q, Kaplan and Zingales (KZ) index [financial constraints], information asymmetry, capex, issue size, tangibility, profitability.	When firms are overvalued, the incentive for them to exploit market overvaluation distorts the pecking order prediction that firms prefer debt to equity. Firms are more likely to time their equity issues and repurchases when they are least financially unconstrained, giving support to market timing theory. Pecking order theory is mostly applicable when firms are financially constrained.
Gatchev et al. (2009)	Asset-weighted seemingly unrelated regression (SUR)	Changes in cash holdings, short-term debt issues, long-term debt issues, equity issues, share repurchases, investment in net working assets, investment in net fixed assets, income available	LTDA, MBV, shareholder equity, earning to asset, firm size, R&D, tangible assets.	No evidence that asymmetric information about the value of a firm's assets causes equity to be used only as a last resort (unlike pecking order theory). In fact, equity is the predominant source of finance in situations where informational asymmetries and debt agency costs are high. The use of equity is more pronounced in the case of small firms, high growth firms, and low profit firms. Results suggest that in financing investments and profit shortfalls firms are guided more by potential agency and contracting costs of debt than by potential adverse selection concerns associated with equity issues.

		to common and preferred shareholders, and dividends.		
Loughran (2008)	Logit regression	Equity issuance (binary)	Rural (dummy), small city (dummy), distance from city center, Nasdaq listed (dummy), market value, book-to-market, tangibility, analyst coverage, returns, industry (dummy).	Information asymmetries between rural firms and investors are large; firms appear to avoid issuing equity in the presence of these asymmetries. Seasonal equity offerings (SEOs) are significantly less common for rural firms, even after adjusting for differences in size, prior stock returns, book-to-market ratios, and other factors. Firms with lengthy driving times to the nearest major airport are less likely to issue equity. Furthermore, underwriters used by rural firms and firms located far from major airports tend to be less prestigious as measured by lower Carter-Manaster rankings.
Hovakimian (2006)	OLS regression	Leverage	Size, tangibility, profitability, market-to-book, weighted average MBV (timing).	Historical average market-to-book ratios have significantly affected current financing and investment decisions. Average equity issuer's market-to-book ratio is significantly higher than that of average debt issuer.
Suchard and Singh (2006)	Bivariate logit model, multinomial logit model	Security choice (dummy – convertible debt, warrant, preference shares)	Tax shield; financial risk (LTDA); growth options (MVE/Assets); profitability (cash flows); firm risk; pre-announcement performance; financial slack; use of proceeds; industry; term structure; post-announcement performance; firm size, issue size.	When the choice is restricted to warrants and convertible debt, firms with high firm risk and financial risk are more likely to issue warrants. Firms offering larger issue sizes, with higher tax shields and profitability, are more likely to issue convertible debt. With the choice for Australian issuers of warrants, convertible debt, and preference shares, firms with high firm risk are more likely to choose warrants than convertible debt or preference shares. Firms offering a relatively large issue, with higher tax shields and profitability and when long term yields are higher than short term yields, are more likely to issue convertible debt. Firms with higher financial risk and growth options are less likely to issue convertible debt. Financial risk and profitability variables are not strong predictors of security choice decisions in a multinomial framework as they are in the bivariate model.
Tawatnuntachai and Yaman (2007)	Logit analysis; Matched sample method; OLS regression.	Bonds (global/local) [binary variable]	Issue size, assets, MVE, foreign income, interest rate, GDP, exchange rates, bond rating.	The decision to issue global bonds is positively related to the issue size, firm size and the amount of foreign income and negatively related to the level of US GDP.
Lewis et al. (2003)	Logistic regression model	Convertible debt issuer, debt issuer, equity issuer (binary)	MBV, ROA, change in total assets, LTDA, firm size, slack, volatility, price.	Firms issue convertible debt in response to a combination of costly debt and equity-related financing problems, such as high leverage costs in the case of debt and adverse selection in equity issuance. Convertible debt security design decisions depend on which combination of debt and equity-related financing problems the offer is designed to mitigate. Average price reactions to convertible debt offer announcements are higher in hot markets than normal or cold markets. The relations between firm value, financial leverage, investment opportunities, and the rate of future growth are more complex among convertible debt issuers than situations where firms issue standard financial securities.

Graham and Harvey (2001)	Survey	Decision to issue debt or equity	Bond: financial flexibility, credit rating, earnings and cash flow volatility, insufficient internal funds, level of interest rates, interest tax savings, transaction cost and savings, equity undervaluation/overvaluation, comparable firm debt levels, bankruptcy costs, customer/supplier comfort Equity: EPS dilution, price undervalued/overvalued, stock option plans, target debt-to-equity ratio, risk, profitability, market access, transaction costs.	Credit ratings, interest rate, and financial flexibility determine whether to issue bonds. EPS dilution and stock price overvaluation influence equity issuance decisions.
Walsh and Ryan (1997)	OLS regression	Debt/Equity issues	Effective tax rates, tax shields, free cash flows, tangible assets, volatility of assets, R&D, market timing (dummy).	Agency and tax considerations are equally important, and taken together, they result in a robust model of actual debt and equity issues during the sample period. However, when a subsample of firms of a similar size is considered, the agency effects appear to dominate tax considerations.
Jung et al. (1996)	Logistic regression, cross sectional regression	Equity issues (binary)	Tax payments, LT debt, MB ratio, cash flow, stock return volatility, cash-to-liquid assets, total assets, 11-month cumulative excess return, gross proceeds to market value of equity ratio.	Findings strongly support the agency model. Equity issues made by firms without valuable investment opportunities are best explained by the agency model. Equity issues by such firms enhance managerial discretion as opposed to shareholders views. Such equity issues are met with negative stock price reactions.
Choe et al. (1993)	OLS regression, Cochrane-Orcutt procedure	Frequency of equity issues	Change in business cycle, stock price, interest rates.	Equity issues rise during business cycle expansions. No significant impact from interest rates.
MacKie-Mason (1990)	Probit model	Equity and debt issues (binary)	Taxes, financial distress, moral hazard, signalling, total assets, D/A, change in D/A.	There is strong evidence that there is an important relationship between tax shields and marginal tax rates and that marginal tax rates do affect financing decisions. Firms with high tax loss carry forwards (TLCF) are less likely to use debt. Firms with investment tax credits (ITC) are more likely to issue debt. Tax shields affect financing when they are likely to change the marginal tax rate on interest deductions.
Bayless and Chaplinsky (1996)	Weighted-least-squares regression	1. High equity volume period issuers, low equity volume period	1. Free cash flow, capital expenditures, ROA, cash, leverage, target	Windows of opportunity exist when otherwise identical firms receive favorable prices for new seasoned equity. Equity issues rise during windows of reduced information asymmetry (e.g. economic expansions).

		issuers. 2. Announcement date prediction error	leverage, tobin Q, size, price risk, proceeds from issue. 2. High/low volume period (binary), 3-month moving average of equity issue volume, price returns, proceeds, size, tobin Q.	
Rajan (1992)	[Theory]	NA	NA	There exists a fundamental trade-off between bank debt and arm's-length debt, since banks can monitor the firm and its investment decisions.
Zeghal (1984)	OLS regression	Informational value	Firm size	There exists an inverse relationship between firm size and the information content of financial statements at the time of announcement.
Corporate ownership				
Borisova et al. (2015)	Heckman treatment effect two-stage model (probit), OLS regression	1. Government ownership 2. Credit spread	1. Total investment, unemployment rate, civil law, left wing (political) financial crisis, leverage, size. 2. Govt ownership, crisis, rating, maturity, callable bond, secured bond, leverage, MBV, ROE, size, GDP, growth, individual/institutional ownership.	Government ownership is generally associated with higher cost of debt except during a financial crisis when there is lower cost of debt.
Liu et al. (2011)	OLS regression	D/A, STD/A, LTD/A, B/A (bank financing-to-total assets)	State ownership (binary), largest sharholder ownership, Top two-five shareholders' ownership, institutional environment index, state minority shareholding (binary).	State Owned Enterprises (SOE) in China have higher leverage ratios than non-SOEs.
Su (2010)	OLS regression	Leverage	Firm diversity, profitability, asset tangibility, tax shield, growth opportunities, state ownership, ownership concentration, board size, duality, firm size, firm age.	Government controlled firms use less debt financing.
Zou and Xiao (2006)	Probit model, OLS regression	Leverage; voting rights offering applied (binary)	Leverage: size, tangibility (FA), growth (MBV), profitability (ROA), risk	State ownership, legal person ownership and foreign ownership have no important influence on capital structure choices of Chinese firms. Positive relationship of firm size, asset tangibility with leverage endorses static tradeoff theory.

			(earning volatility), state/foreign ownership Equity issuance: growth, internal financing deficit, size, leverage, profitability.	
Farooq (2015)	Pooled regression analysis	Leverage	Ownership concentration, legal (common law binary variable), size, EPS, tangibility, growth, dividends, complexity (inventories and receivables/TA).	Ownership concentration leads to information asymmetry that weakens the ability of firms to raise debt.
Santos et al. (2014)	OLS regression, GMM estimation	Leverage	Ownership concentration, MBV, age, size, ROA, tangibility, tax, non-debt tax shield.	There exists a negative relationship between ownership concentration and firm leverage. Family firms are averse to increases in leverage levels, however, it varies depending on the legal framework and institutional environment.
Mitton (2002)	OLS regression	Stock returns	ADR (binary), big six auditor (binary), size, leverage, largest blockholder concentration, summed ownership concentration, largest management/ non-management blockholder (%), largest management/ non-management voting rights (%), diversified (binary).	Better stock performance is associated with firms having ADRs and big six auditors, higher outside ownership concentration and focused rather than diversified business.
Corporate governance				
Fama and Jensen (1983) *(Agency theory)*	[Theory]	NA	NA	Independent non-executive directors fill a control and monitoring role. Separation of decision management and decision control helps to control agency problems.
Donaldson and Davis (1991) *(Stewardship theory)*	Difference of means	ROE	Board with Chairs independent of CEO, Boards with CEO duality.	Shareholder interests are maximised by shared incumbency of these roles. ROE returns to shareholders are improved by combining, rather than by separating, Chair and CEO positions.
Sundaramurthy and Lewis (2003)	[Theory]	NA	NA	Several frameworks discussed, including stewardship theory as an alternate to agency theory and a collaborative approach where the Board acts in an advisory role.

Daily et al. (1998)	Structural equation model	CEO pay (contingent, non-contingent, total pay)	Affiliated directors, interdependent directors, proportion of CEOs serving on the compensation committee.	No evidence that executive board members led to greater levels of CEO compensation.
Vafeas and Theodorou (1998)	OLS regression	Market-to-book value	Percentage of non-executive directors on board, ownership by executive/non-executive board members, CEO duality (binary), percentage of non-executive directors in audit, renumeration and audit committee.	No evidence of linkage between director affiliation with ownership and firm performance. No evidence of linkage between chairperson affiliation and committee composition with performance.
Brickley et al. (1997)	OLS regression	1. CEO compensation 2. Promotion	1. Duality (dummy), sales, CEO tenure, stock returns. 2. CEO stock return, CEO return on capital, sales.	The cost of separating the CEO and chairperson outweigh the benefits for most large firms.
Boyd (1994)	LISREL analysis	CEO total compensation	CEO duality, insider ratio, percent of stock owned by directors, number of directors representing ownership groups, director compensation, firm size, ROE.	CEO compensation is greater in firms with lower levels of board control. Ratio of insiders is negatively related to CEO compensation.
Pi and Timme (1993)	OLS regression	ROA, cost efficiency	CEO duality (binary), CEO ownership, size, concentration ratio loans/assets.	Cost efficiency and ROA is lower for CEO dual banks and higher for non-CEO dual banks. Performance for either CEO-Chair duality or non-CEO-Chair duality banks is generally unrelated to ownership by institutions or large block holders, and the proportion of inside board members.
Heng et al. (2012)	OLS regression	Debt ratio	Board size, CEO duality, presence of non-executive directors, existence of independent directors.	Higher board size has a negative relationship with D/A ratio in Malaysian firms. No significant relationship between independent directors, CEO duality, and capital structure.

Mak and Kusnadi (2005)	OLS regression	Tobin Q (firm value) = (MVE+Liabilities)/BV Assets	No. of directors, CEO duality (binary), proportion of executive directors, proportion of independent directors, independent chairman (dummy), no. of directors on the audit committee, independent directors in audit ownership by directors, ownership by blockholders, largest blockholder ownership, financial institution ownership, govt ownership.	Negative relationship between board size and firm value in Malaysia and Singapore. All other board and ownership variables are insignificant.
Yermack (1996)	Probit model, OLS regression	1. Tobin Q 2. Stock return, firm size, CEO retirement age, CEO tenure 3. Board size, proportion of outside directors 4. CEO leaves position (dummy)	1. Board size, ROA, firm size, capex/sales, proportion of outside directors. 2. Director appointment, director departure, change in board size. 3. Sales/Asset, ROA, ROS. 4. CEO age, CEO ownership, stock return, stock return board size.	Negative relationship between board size and market valuation in the US.
Eisenberg et al. (1998)	OLS regression	1. ROA, board size (endogenous) 2. ROA, solvency, board size, age, new CEO (dummy), bankrupt (dummy) 3. Board size	1. ROA, board size, board member payment disturbances, assets, firm age. 2. Director appointment, director departure, change in board size. 3. Assets, firm age, floating debt (dummy), corporate group (dummy).	Negative relationship between board size and market valuation in Finnish firms. Poor performance is associated with higher levels of director appointments and departures. Board size is negatively correlated with the presence of floating charge debt. Firm size, presence in a corporate group, and age all have a positive correlation with board size.

Pearce and Zahra (1992)	Canonical analysis	Board size, affiliated/unaffiliated outsiders	Environmental uncertainty, stability strategy, internal/ external strategy, retrenchment strategy, diversification strategy, leverage, ROA, ROE, EPS, net profit margin.	Reliance on leverage rises with large board size. Positive association between performance and outsiders' representation.
Falaye et al. (2011)	Logistic regression	CEO turnover, firm value	Monitoring intensive board, board size, board independence, CEO duality, CEO age, CEO ownership, firm size, institutional ownership, ROA, Tobin Q.	Monitoring quality improves when a majority of independent directors serve on at least two of the three monitoring committees. Firm value suffers when the board's monitoring duties increase without a corresponding increase in the number of directors.
Sila et al. (2016)	Dynamic panel system GMM, probit regressions, 2SLS	Firm risk (standard deviation of returns): total risk, systematic risk, idiosyncratic risk	Board size, proportion of women on the board, board independence, firm size, MBV, R&D expense, capex, leverage, ROA.	There is no evidence that female boardroom representation affects firm risk. A board with a higher proportion of female directors is not more or less risk-taking than a more male-dominated board.
Adams and Funk (2012)	OLS regression	Risk (investment)	Female director, age, married, number of kids, degrees, board size.	Female directors in Sweden are more tolerant of risk than their male counterparts. Male and female directors have different priorities that may lead gender diverse boards to behave differently.
Matsa and Miller (2013)	Difference-in-differences, triple difference	Leverage (debt/asset ratio)	Female board share, board size.	There is an insignificant relationship between female board members and the D/A in Norwegian firms. The weak association with leverage suggests that risk aversion may not be a distinctive part of women's approach to corporate decision making.

Appendix B: Variable descriptions

List of variables with their descriptions, accompanied by expected sign showing effect on firms' decision to raise capital and their choice of instrument. Positive sign in *Issuance* column implies an expectation of frequent security issuance by firms. Positive sign in *Choice* column implies an expectation of instrument choice with greater risk-sharing. Numerically, risk-sharing scale of the chosen securities follows the order of loan = 1, bond = 2, sukuk = 3, and equity = 4.

Variable	Description	Expected Sign		Relevant Study
		Issuance	Choice	
Concentration	Percentage ownership of highest shareholder		-	Rajan and Zingales (1995); Admati et al., (2018)
Individual	Percentage ownership by individuals/families		+/-	Santos et al. (2014)
Govt	Percentage ownership by government		+/-	Borisova et al. (2015); Liu et al. (2011)
Financials	Percentage ownership by financial institutions		+/-	
CEO duality	Binary variable indicating CEO and Chairman are the same person	-	-	Pi and Timme (1993); Brickley et al. (1997); Shliefer and Vishny (1997)
Board independence	BvD indicator value for board independence	-	+/-	Heng et al. (2012); Anderson et al. (2003);
Board size	Number of directors on the board	-	+/-	Pearce and Zahra (1992); Eisenberg et al. (1998)
Female ratio	Percentage of females on the board of directors	+/-	+/-	Sila et al. (2016); Adams and Funk (2012)
Firm size	Logarithm function applied to total assets	-	-	Zou and Xiao (2006); Faulkender et al. (2012)
Leverage	Total debt-to-equity ratio	+	-	Öztekin and Flannery (2012); Faulkender et al. (2012)

Profitability	Return-on-assets	+	+	Lemma and Negash (2014)
Cash	Cash-to-asset ratio	-	-	Bayless and Chaplinsky (1996)
Free cash flow	Binary variable indicating whether the firm has positive free cash flows	-	-	Wei and Zhang (2008)
MBV	Market-to-book value of equity	+	+	Dong et al. (2012)
Capex	Ratio of capital expenditure to total assets	+/-	+	Dong et al. (2012)
Tangibility	Ratio of plant, property and equipment to assets	+	-	Frank and Goyal (2009)
Analyst coverage	Number of analysts that gave a forecast on firm performance	+	+	Gomes and Phillips (2012)
Analyst variance	Standard deviation among analyst recommendations	-	-	Gomes and Phillips (2012)
GDP	Logarithm function applied to the GDP of the firm's country in millions of US dollars	+/-	+/-	Tawatnuntachai and Yaman (2007); Choe et al. (1993)
Interbank rate	Three-month interbank rate of the country where the firm is based where the company is based	+/-	-	Flannery (1986); Graham and Harvey (2001)

Chapter 3

Raising capital under economic uncertainty: an empirical investigation

3.1 Introduction

Economic uncertainty not only affects the profitability of firms but also hampers corporate investment decisions (Baker et al., 2016; Gulen and Ion, 2016). The uncertainty in economic policy may also affect firms' decisions to meet their capital requirements. For example, firms may raise funds using equity to avoid bankruptcy costs (Glover, 2016; Fama, 1980). However, as economic uncertainty leads to high information asymmetry (Nagar et al., 2019), investors may require higher risk premium for equity (Pástor and Veronesi, 2013); this would lead firms to resort to debt financing – particularly short-term debt (Waisman et al., 2015; Bradley et al., 2016; Pan et al., 2019). Furthermore, the intervention of central banks through asset purchase programs during uncertain economic periods prompts risk-averse firms to invest more frequently by issuing relatively "safe" bonds (Giambona et al., 2020), resulting in misallocation of firms' resources (Kurtzman and Zeke, 2017).

In this chapter I empirically investigate how economic uncertainty affects firms' decisions to raise capital by using a sample of US firms over the period beginning January 1, 2000 until December 31, 2018. I test the effects of economic uncertainty, along with firm ownership and governance, on three interrelated decisions: the decision to raise capital, the choice of financing instrument, and the volume of capital to raise.

The motivation for the analysis stems from the rapidly changing economic environment in the past two decades and how it affects the financing choices to raise capital. Divergent theories exist about firms' decision to raise capital under uncertain economic conditions. Studies by Zeira (1990) and Pindyck (1982) find that businesses tend to raise capital less frequently during

periods of economic uncertainty. This view is supported by Colak et al. (2018), who offer evidence of less frequent issuance of debt and equity because of elevated market frictions generated by economic and political uncertainty. In contrast, several studies suggest that uncertainty raises firms' capital requirements for investment as well as internal financing (Atta-Mensah, 2004; Abel, 1983; Klein, 1977; Hartman, 1972). Furthermore, the financial flexibility to raise capital using alternative sources (bank loans, bonds, and equity) has additional costs and, depending upon the level of information asymmetry, riskier firms may prefer bank loans, less risky firms tap the bond markets, and the firms in between prefer to issue both equity and bonds (Bolton and Freixas, 2000). Alternatively, firms may use debt financing as gap-filling arrangements (Badoer and James, 2016) or increase investment due to a higher demand for "safe" bonds (Giambona et al., 2020).

The selection of financing instrument to raise capital has profound implications on the ownership structure and financial stability of firms. For example, raising capital using equity may pose little stability risk. But it may lead to dilution of ownership and loss of control over the firm (Ellul, 2008). Hence, corporate ownership structure (Boubakri and Saffar, 2019; Ben-Nasr et al., 2015), especially ownership concentration (Holderness, 2009), and corporate governance mechanisms (Korkeamäki et al., 2017; John et al., 2015) are vital in the decision to raise capital owing to shareholders' desire for control and the presence of agency costs. Therefore, in addition to economic uncertainty, this chapter examines the role of ownership structure and governance mechanisms in the context of the control hypothesis to raise capital.

Empirical literature on the determinants of security choice focuses on evaluating firms' choice of debt versus equity (Badoer and James, 2016; Dong et al., 2012; Jung et al., 1996; MacKie-Mason, 1990), plain vanilla instruments versus hybrid securities (Lewis et al., 2003), or a specific class of instruments such as debt or bank loans (Boubakri and Saffar 2019; Crouzet, 2018). There is a need to analyze a wider set of securities available for financing. This chapter fills this gap by analyzing a range of instruments including bank loans, bonds, convertible

bonds, preferred equity, and common equity. I assert that the decisions of whether to raise capital, the instrument to choose, and the amount of capital to raise are sequential and reflect firms' policy choices. Hence, I use a simultaneous equation framework to cater for the sequential decision-making process. The application of a simultaneous decision framework is a significant contribution of this chapter.

I use the economic policy uncertainty index developed by Baker et al. (2016) as a proxy of economic uncertainty. The index is constructed by using news search results, tax code expiration data, and dispersion in forecasts by the Federal Reserve. This index is preferred over single indicators due to the diversity of factors used in its construction that allow it to capture a wider range of political and economic uncertainty issues[13]. As an alternative to this index, I use the implied volatility index (VIX) by the Chicago Board Options Exchange (CBOE). The VIX index measures the market's expectation of volatility. To measure political uncertainty, I use a binary variable to indicate the presence of a divided government in the US. This variable interacts with the economic policy index measure to observe the joint effect of political and economic uncertainty.

By using a sample of 45,635 firm-year records with 13,308 instances of external capital financing for the period beginning January 1, 2000 until December 31, 2018 I find a positive relation of economic uncertainty with the decision of firms to raise capital. This supports the strand of literature asserting that the demand for capital is stirred by economic uncertainty. I also find that high economic uncertainty is associated with debt as firms' preferred choice of instrument. This is in line with the control hypothesis suggesting that shareholders, particularly institutional investors, prefer to raise capital using debt instruments to avoid ownership dilution and encourage additional external monitoring (Admati et al., 2018; Badoer and James, 2016;

[13] Empirical literature reports several proxies for economic uncertainty including inflation variation (Klein, 1977), investment uncertainty (Cabarello, 1991), exchange rates, and interest rate volatility (Maggiori et al., 2020, Atta-Mensah, 2004).

Ellul, 2008; Levy, 2019). Following the decision to raise capital and debt as the choice of instrument, firms raise larger capital volumes under higher economic uncertainty. Large firms tend to raise lower volumes of capital in the presence of political uncertainty, indicating their risk aversion. Further, I find that governance mechanisms play a significant role during the three stages of raising capital.

As a robustness check I adopt an alternative empirical methodology and alternative proxies for economic uncertainty. I use the multinomial logit model with sample selection for the choice decision variable. The model assigns no specific order to the instruments; this compares with the strict ordered categorical variable – that takes values based on pecking order theory – in the ordered probit model. By treating financing instruments as independent of each other, the multinomial logit model helps to analyze the appeal for each instrument. In addition, I apply the Heckman selection model in which the volume decision depends on the initial decision to raise capital, treating the decision for the choice of instrument as redundant. Finally, I replace the economic policy uncertainty index by the VIX index as a measure of market uncertainty. The results remain robust after the use of alternative methodologies and measures for uncertainty.

This study contributes to the literature on corporate finance and political economy by offering evidence as to how economic policy uncertainty, ownership structure, and governance mechanisms affect the decisions to raise capital. The use of simultaneous estimation methodology, a three-step sequential framework with a wide range of instruments, is another important contribution of this chapter. The model helps to remove sample selection endogeneity concern. It also helps to establish that the three decisions are not independent and should be analyzed sequentially. Besides improving the empirical methodology, this study contributes to the literature by quantifying the difference between the average volumes of financing that firms carry out by using either debt or equity securities during the sample period.

The findings have policy implications for investors and policymakers. In several recent op-eds like Vandevelde (2020) and Warsh (2020), it is highlighted – in the context of the Covid-19 pandemic – that a loose monetary policy environment and direct intervention by central banks in the secondary markets may induce moral hazard for issuers and investors, which may hamper real economic recovery. The empirical evidence, suggesting that higher political and economic uncertainty is associated with a higher demand for debt instruments, implies that there is a need for careful scrutiny of such policies as they may pose a threat to the safety of the financial system.

The remainder of the paper is organized as follows. In the next section I present the methodology used to support this research. In Section 3, I present the definitions of the variables used in this chapter. Section 4 describes the data and its sources along with summary statistics. In Section 5, I discuss the results of the empirical analysis; robustness tests are discussed in Section 6. Concluding remarks are given in Section 7.

3.2 Methodology

The decisions to raise capital through a specific financing instrument and the amount thereof are not only directly related but also indirectly related through firm-specific factors including ownership and governance mechanisms. The determinants for instrument choice and volume of capital can differ from each other. Most studies on the determinants for the volume of capital assume there is no link between the choice of instrument and the volume decision. These studies model the relationship as a single equation model such as Ordinary Least Squares (OLS) regression for volume and a probit model for the choice of instrument (Zhang and Zhou, 2018; Suchard and Singh, 2006; Lewis et al., 2003; Jung et al., 1996), except for Boubakri and Saffar (2019) who use the Heckman Two Stage model to investigate determinants of loan issuance. Empirical work suggests that firms' financing policy choices not only differ due to firm-specific attributes such as size, profitability, and growth but also depend on their leverage and ownership structure (Sun et al., 2016; Jensen et al., 1992). Hence, using a system of

equations is desirable for policy decisions that may be applied to a common relationship with real choices. A simultaneous equation model addresses endogeneity concerns due to sample selection bias and accounts for policy choices at the appropriate level of the decision-making process.

In this study the empirical methodology is based on the premise that a firm's policy decision to raise capital follows a three-step sequential decision process shown in Figure 1. In the basic financing model, once a firm makes a policy decision to raise capital, the firm chooses an instrument *I* among *j* alternatives based on decreasing levels of desired control and higher risk levels. We can only observe the volume of capital raised and the actual choice *Ij*, where $j \in \{1, \ldots, j\}$, not the desired instrument I_j^*, a latent continuous variable reflecting the desired level of control and relative riskiness.

INSERT FIGURE 1 HERE

Under a sequential framework, the process starts with a binary decision to raise capital, followed by the choice of instrument and the volume. Since instrument choice and issuance volume can only be observed for firms that raise funds, analyzing the decisions separately generates a sample selection bias (Heckman, 1979). To cater for this selection bias, I apply the triple selection model based on Heckman et al. (2006) that helps alleviate endogeneity concerns by applying exclusion restrictions at the appropriate steps.

The sequential decision framework can be developed by following a classical form of simultaneous equation models shown below:

Issue equation: $$I_{it}^* = \alpha' \boldsymbol{X_{it}} \quad (1)$$

where $I_{it}^* + \mu_{it} > 0$ if firm *i* raises capital during year *t*, otherwise firm *i* does not raise capital during year *t*.

Choice equation: $$C_{ijt}^* = \beta' \boldsymbol{Y_{it}} + \rho\lambda_{it} + \tilde{\varepsilon}_{it} \quad (2)$$

where $\tilde{\varepsilon}_{it}$ is a random (uncorrelated) disturbance term, λ_{it} is the Mills ratio that corrects the sample selection bias in the choice equation, and $C_{it}^{*} = \gamma Z - V$ which represent the propensity score or choice probability, where $V \perp Z \mid \boldsymbol{Y}$.

Volume equation: $$VLM_{it} = \varphi' \boldsymbol{Z_{it}} + \rho\lambda_{it} + \xi_{it} \quad (3)$$

In Equation 1, I_{it}^{*} is a latent (unobserved) variable, whose magnitude reflects the likelihood of raising capital externally and is assumed to be linear in a vector of covariates $\boldsymbol{X_{it}}$. The disturbance term μ_{it} represents the random element in the issue decision. In Equation 2, C_{ijt}^{*} is an indicator variable under a monotonocity condition, whether a firm chooses among *j* type of instruments where $j = 1, \ldots\ldots, \bar{J}$ associated with the volume of funds raised (VLM_{it}) in Equation 3. $\boldsymbol{X_{it}}, \boldsymbol{Y_{it}}$ and $\boldsymbol{Z_{it}}$ are the vector of covariates. α', $\beta'$and $\varphi'$are the vector of coefficients. Equation 1 is observed over all firms while Equations 2 and 3 are observed only on firms issuing capital. In Equations 1, 2, and 3 the disturbance terms μ_{it}, $\tilde{\varepsilon}_{it}$, and ξ_{it} are assumed to be jointly normally distributed with an unknown coefficient.

For empirical estimations, the dependent variable in the first equation is a binary variable that takes the value of 1 if a firm chooses to raise capital in a certain year, otherwise 0. The dependent variable for the choice equation is a categorical variable that takes a value between 1 and 5 to represent the selection of loan, bond, convertible bond, preferred equity, or common equity, respectively. The order of instruments is based on the pecking order theory (Myers and Majluf, 1984). To account for firms that make multiple instances of raising capital in a year by using more than a single instrument type, the model takes the instrument by which the firm raises the highest volume of capital in the year. Finally, the dependent variable for the volume equation (*Volume*) is the ratio of the amount of capital raised to firm assets. The following section provides the rationale for including the covariates in the empirical estimation. Appendix A lists the variables along with their definitions.

3.3 Factors affecting sequential decisions to raise capital

Corporate finance theory provides several explanations about why firms use certain financing instruments to raise capital (Baker and Wurgler, 2002; Myers and Majluf, 1984; Jensen and Meckling, 1976; Modigliani and Miller, 1958). The empirical literature highlights the importance of economic uncertainty, ownership structure, and governance mechanisms as important factors affecting the decisions related to capital structure. In the following subsections, I discuss these factors and the rationale to include them in the empirical model.

3.3.1 Economic policy uncertainty

Economic policy uncertainty, economic risk that firms face when the economic policy of the government is uncertain, leads to delays in corporate spending and investment (Baker et al., 2016; Gulen and Ion, 2016; Husted et al., 2019; Wang et al., 2014). Consequences of this uncertainty include rising costs (Waisman et al., 2015), wider yield spreads (Bradley et al., 2016), shorter maturities of debt financing (Datta et al., 2019), and elevated risk premia for equity investments (Li, 2017; Pástor and Veronesi, 2013). Uncertainty also hampers a firm's speed of adjustment toward their target capital structure (Çolak et al., 2018). It also influences the tendency of firms to raise capital (Giambona et al., 2020).

Instead of using a binary variable for the global financial crisis often used in empirical studies to capture economic uncertainty, I use the variable *EPU* (economic policy uncertainty) as an end-of-year index value based on the economic policy uncertainty index developed by Baker et al. (2016) and available in Bloomberg Professional Services. A higher index value represents a greater magnitude of uncertainty. The movement of the index values over the sample period can be observed in Figure 2 and Figure 3.

3.3.2 Ownership structure

Capital structure theories, such as pecking order theory (Myers and Majluf, 1984) and agency cost theory (Jensen and Meckling, 1976), suggest that businesses prefer debt to equity when they raise capital due to tax advantages associated with debt, enhanced creditors' monitoring,

and shareholders' desire for control (Admati et al., 2018; Lemmon and Zender, 2019; Crouzet, 2018). Despite the general preference of debt over equity, the choice affects shareholders in different ways. Choosing equity can dilute their ownership stake (Lemmon and Zender, 2019; Admati et al., 2018; Boubakri and Ghouma, 2010; Ellul, 2008; Harris and Raviv, 1998), while choosing debt can increase bankruptcy costs (Glover, 2016; Fama, 1980; Masulis, 1988). Thus, the instrument choice decision is driven by shareholders' desire for control and the management of bankruptcy risk.

An important aspect of ownership structure in the US is the concentration of ownership. Holderness (2009) reports that 96 percent of US firms have blockholders with an average holding of 39 percent of common stocks. Further, Keasey et al. (2015) and Donelli et al. (2013) show that shareholders with significant ownership in a firm prefer debt. Boubakri and Ghouma (2010) suggest that the preference for debt stems from the owners' desire to maintain control and avoid ownership dilution. To account for the impact of ownership concentration, I use the variable *Concentration*, which represents the equity ownership stake of the largest shareholder in the firm.

Bogle (2018) reports that family/individual shareholdings significantly declined in US firms from 92 percent in 1945 to 27 percent in 2018, while institutional ownership by asset management companies has increased from 8 percent in 1945 to above 70 percent in 2018. The empirical literature reports mixed results about the benefits/costs of institutional ownership. He et al. (2019) endorse the view that institutional ownership is beneficial to firms because it improves monitoring and consequently reduces agency costs. However, Bogle (2018) suggests that institutional investors are primarily concerned with the interests of their clients and hence, are not loyal to the firm. Institutional shareholders may prefer to raise leverage, even though it could be detrimental to firm value, in order to capture any benefit from higher leverage (Admati et al., 2018). Similarly, Boubaker et al. (2017) suggest that long-term institutional investors not only prefer debt but also make slower adjustments to capital structure, implying fewer instances

of security issuance. Assuming institutional investors to be a homogenous group may lead to generalized inferences. This is because institutional investors can be subdivided based on their investment motivations and time horizons (Elyasiani et al., 2010; He et al., 2019). There are institutional investors who exert monitoring pressure on the management for better long-term performance while others seek short-term returns; it is the former that reduce agency costs of debt (Zhang and Zhou, 2018). Institutional investors, such as insurance companies, banks, and other corporate shareholders, that invest on behalf of their customers, can also influence firms' financial decisions (Goergen et al., 2019).

Given the dominance of institutional investors in the US and differences in their underlying investment objectives, beneficiaries, and time horizons, I divide institutional investors into two sub-categories using the classification by Zhang and Zhou (2018). I term the first sub-group as *Institutional investor*, which includes institutional investors that manage funds on behalf of their clients, and whose decisions are often guided by the desire for short-term returns. These include mutual funds, hedge funds, private equity funds, and venture capital funds. The other category is termed *Long-term investor*, which includes institutions that make long-term investments for their portfolio; these include endowments, pension funds, sovereign-wealth funds, and financial institutions such as insurance companies, banks, and other corporates. I expect the former to prefer debt as it would enable them to gain short-term returns through tax-shield benefits from debt which increase after-tax profits and positive share price effects, while the latter to prefer equity to avoid risk in the long run.

Besides institutional investors, various other categories of shareholders, such as the government and individuals/families, may affect the decisions to raise capital. Evidence suggests that firms with a higher share of government ownership prefer to raise capital using debt financing due to implied guarantees by the government (Boubakri and Saffar, 2019; Liu et al., 2011; Li and Zhang, 2010). Su (2010) and Borisova et al. (2015) suggest that government ownership has a significant impact on firms' financing behaviour. Similarly, individual or

family-controlled firms may prefer debt financing to maintain control and extract benefits at the cost of bondholders' interests (Lin et al., 2013).

Since the decisions of instrument choice and issuance volume directly affect firm ownership, I include ownership-related variables in Equations 2 and 3 but not in Equation 1 that deals with the initial decision to raise capital. This is based on the premise that the decision to raise capital is purely technical and based on the skills and expertise of management (Shibata and Nishihara, 2010). Hence, the issuance decision rests with management due to their information advantage (Myers and Majluf, 1984). Figure 1 describes the three steps of the decision-making process.

3.3.3 Corporate governance mechanisms

It is widely agreed in both theory and practice that the independence of boards of directors helps to reduce agency costs, especially in the absence of monitoring by shareholders. Ideally, a strong and independent board is better positioned to protect the interests of shareholders (Ferreira and Laux, 2016). However, the agency costs can be high in firms where CEOs have greater control; this is the case with CEO duality where the CEO is also the chairperson of the board of directors (Korkeamäki et al., 2017). Besides elevated agency costs, CEO duality may also lower cost efficiency and profitability (Pi and Timme, 1993) and encourage equity issuance (Jung et al., 1996). However, Brickley et al. (1997) find that CEO duality results in lowering agency costs and firms can benefit from issuing debt. I include *CEO duality* as a binary variable to indicate if the firm's CEO is also the chairperson of the board of directors. Besides CEO duality, board size may also affect the choice of instrument. Berger et al. (1997) find a negative association between board size and firm leverage. The literature focuses on the board size and leverage relationship without considering the efficiency of the financing process and the choice of security. Hence, I keep *Board size* as a control variable that represents the number of members in the firms' board of directors.

Mansi et al. (2016) find a positive relation between the presence of compensation contracts and the cost of debt. They suggest that severance contracts incentivize CEOs to increase firm risk.

The presence of protection clauses like golden parachutes make debt-based securities more appealing for issuers (Cremers et al., 2007); however, this may increase the costs of debt (Chakravarty and Rutherford, 2017; Wald et al., 2012). I control for the impact of severance contracts by including a dichotomous variable *Golden parachute* that is equal to 1 for firms in which a golden parachute clause is available in the CEO severance package, 0 otherwise.

Investors analyze the trading transactions of firms' insiders – such as the CEO, chairperson, and other key members of the management and the board – to assess the prospects of the firms. For example, investors respond more favourably to insider purchases (Goergen et al., 2019) and consider them as positive signals (Chang and Watson, 2015). To measure the level of optimism of firm insiders, I generate a variable *Insider optimism* by using the formula below:

$$\textit{Insider optimism} = max\{0, (MVP_t - MVS_t)/MVP_t\} \quad (4)$$

where MVP_t and MVS_t represent the market value of shares purchased and sold, respectively by insiders during year *t*. The *Insider optimism* variable ranges between 0 and 1, with higher values indicating greater level of optimism. For the computation of *Insider optimism*, I use the purchase and sale of shares and exclude all other transactions such as vesting of stock options. I expect a positive association between *Insider optimism* and the volume of equity issuance.

3.3.4 Other control factors

Autore and Kovacs (2010) report that higher equity issuance is common in firms with low information asymmetry. Chang et al. (2006) report that firms covered by fewer analysts are less likely to issue equity; however, when they do so, it is in large volumes. As a proxy for information asymmetry, I include the variable *Analyst coverage* that represents the number of analyst recommendations reported for the firm. I also include the variable *Analyst variance*, which represents the standard deviation of the analyst earnings estimates divided by price per share. Higher values of *Analyst variance* imply greater information asymmetry (Gomes and Phillips, 2012).

Prior studies suggest several firm-specific factors that help explain a firm's capital raising decisions (Altunbaş et al., 2010; Dong et al., 2012; Lewis et al., 2003). I include *Firm size*, which is the logarithm of total assets to control for the size of the firm (Altunbaş et al., 2010; Sakai et al., 2010). The *Leverage* variable is the ratio of debt-to-equity to account for firm leverage (Berlin and Loeys, 1988; Altunbaş et al., 2010), *Profitability* is the after-tax return-on-assets used to control for profitability, and the *Market optimism* variable is represented by the market-to-book ratio (Dong et al., 2012).

Firms raise capital either to meet internal financing needs or to invest in profitable opportunities. To control for the need of external financing, I use *Cash* (ratio of cash-to-total-assets) and a binary variable *Free cash flow* that is equal to 1 if the firm has positive free cash flows, 0 otherwise. I expect a negative association of both variables with the initial decision to raise capital as firms with excess internal resources are likely to avoid external financing. To control for macroeconomic conditions, I include the *GDP growth* variable, which reflects the annual growth in US GDP and variable *Interbank rate*, which is a proxy for the US Federal funds rate (Mendoza, 2010; Altunbaş et al., 2010).

3.4 Data and sources

The sample is comprised of all non-financial US listed firms[14] on the NYSE, Nasdaq, and AMEX exchanges for the period beginning January 1, 2000 until December 31, 2018. The financial statement data of sample firms are acquired from the Compustat database. The data for volume of capital raised are extracted from the SDC Platinum database. Records of all privately-owned firms are dropped. The issuance data is merged with that of listed firms, including firms with issuance records. This led to a sample containing 2,545 issuers and 4,289 non-issuers.

[14] Firms belonging to the financial sector with SIC codes in the range 6000-6799 are removed from the sample.

Ownership data for sample firms are acquired from the Thomson Reuters Institutional Ownership database, and corporate governance data is from the Datastream ASSET4 database. The data is merged by matching firm tickers from Compustat. I also locate records with missing governance data. The missing data on governance variables are hand-collected from the proxy statement filed with EDGAR. Data on the economic policy uncertainty index and other macroeconomic variables are obtained from Bloomberg Professional Services. Further, the data for insider transactions are extracted from Thomson Reuters Insider Filings database. Finally, the Institutional Broker's Estimate System (I/B/E/S) database is used to collect data on analyst coverage and dispersion. I remove all records with missing observations of firm assets, debt, and common equity. Further, I drop records with missing information of ownership and governance attributes. The final sample has 45,635 firm-year records.

3.4.1 Descriptive statistics

Figures 2 and 3 depict the relationship between *EPU* and issuance of capital. The *EPU* index shows a relatively high standard deviation, which is largely because of the spikes in economic uncertainty during the crises periods of 2000-01 (dotcom) and 2007-09 (global financial crisis). Figure 2 shows a comparison of the volume issuance trend of the instrument types. A major takeaway is that debt has been the major source of capital, which is in line with the literature (Myers and Majluf, 1984; Admati et al., 2018). Common equity lagged by a wide margin, although the gap has narrowed in recent years. Convertible bonds and preferred equity are not among the major instruments used by firms. Interestingly, the rate of growth in debt, on average, is higher during periods of economic uncertainty.

INSERT FIGURE 2 HERE

Figure 3 displays the pattern of the count of issuance classified by instrument type. Debt-based instruments continue to be the preferred source for raising capital. The figure shows a trend of frequent security issuance during the crisis years. Years 2000-01 accompany a sharp rise in

issuance frequency. Similarly, the years 2008-13 witness relatively high *EPU* levels accompanied by a consistent rise in issuance of securities, particularly bonds and loans.

INSERT FIGURE 3 HERE

Although Figures 2 and 3 indicate a preference for either equity- or debt-like instruments, they do not explain the extent to which firms prefer one over the other. I measure this difference in quantity of issuance volume between equity and debt by applying the Blinder-Oaxaca decomposition procedure (Jann, 2008). The procedure divides the total issued volume into two groups: equity and debt. The *equity* group includes common and preferred equity while the *debt* group includes loans, bonds, and convertible bonds.

The results for the Blinder-Oaxaca decomposition procedure are shown in Table 1. The geometric mean of the volume issuance in a year through debt-based instruments amounts to US$584.73 million; this compares with US$488.33 million raised through equity-based instruments. This corresponds to an average difference of 27.63 percent. The coefficient for this difference is significant at the 1 percent level. Further, adjusting coefficients of equity to the level of debt would lead to a rise in issuance volume in equities by a factor of about 19.73 percent, while the difference of 7.09 percent remains unexplained. The adjusted coefficients are shown in Appendix B. The results follow from Figure 2 and Figure 3 regarding the general preference for debt.

INSERT TABLE 1 HERE

Table 2 reports the descriptive statistics for non-dummy variables in three panels for all firms (issuers and non-issuers) followed by the differences in means analysis between issuers and non-issuers. The ownership structure variables show that institutional investors, such as asset management companies and fund managers, form the single dominant group of shareholders with an average of 83 percent ownership in the sample firms.

INSERT TABLE 2 HERE

Notable differences exist between issuers and non-issuers. The differences-in-means analysis suggests that the ownership variables are significantly different across issuers and non-issuers; issuers are likely to have higher institutional ownership as compared to non-issuers. Insider optimism is more pronounced among issuing firms who are not only larger in size but are also more leveraged and posit higher growth potential than non-issuing firms that are more liquid with larger boards of directors. The difference-in-means analysis shows that large firms with higher institutional ownership are more likely to raise capital due to lower information asymmetry, better economies of scale, and better access to the capital market.

3.5 Empirical results

Before proceeding with the three-stage model, I investigate whether the model would be appropriate for sequential analysis. The model has several independent variables and there is a possibility of multicollinearity in the sample. I conduct the Variance Inflation Factor (VIF) test to check for the presence of multicollinearity. Since ownership variables are not part of the first equation, I account for variables on economic policy uncertainty, governance mechanisms, information asymmetry, and other firm-specific control variables. Table 3 shows that the VIF estimates are less than 4, indicating the absence of multicollinearity among the regressors (O'Brien, 2007).

INSERT TABLE 3 HERE

Table 4 reports the empirical results based on the simultaneous equation framework discussed in Section 2. Before presenting the estimation results, it is pertinent to discuss how the sample selection framework is appropriate for empirical analysis. Wald test results are reported at the bottom of Table 4; the null hypothesis is that the disturbance terms in the two equations, including issue and choice equation and issue and volume equation, are uncorrelated *(H_0: ρ = 0)*. A positive estimate for ρ shows that the unobservable variables that affect the issuance decision tend to occur with those affecting the choice decision. Although there is some

difference between the size of these tests, they indicate the presence of endogenous sample selection bias and support the use of the sample selection model. The residuals in the volume equation are found to be heteroscedastic; hence I perform statistical inference with robust standard errors. The empirical estimations are presented after controlling for year-fixed effects and firm-fixed effects. However, the results are reported only for the variables of interest.

Table 4 reports the empirical results in three panels: Issue, Choice and Volume. The panels report results of the corresponding decision in the capital-raising process. The *Issue* panel reports the results for the first equation, the *Choice* panel reports the results for the second equation, and the *Volume* panel reports the results for the third equation. The variable *Choice* assigns values to the chosen instrument based on the pecking order theory. Therefore, coefficients in the choice equation with positive signs imply a tendency towards common and preferred equity while a negative coefficient reflects the inclination towards debt instruments such as loans and bonds.

INSERT TABLE 4 HERE

From Table 4, it is evident that *EPU* plays a significant role in the initial decision to raise capital. The coefficient of *EPU* is positive and significant in the *Issue* equation, suggesting that firms raise capital frequently during periods of higher economic policy uncertainty. This is in line with findings of Atta-Mensah (2004) and Abel (1983) that uncertainty increases the demand for capital. Conditional upon the issuance decision, I find that firms prefer to choose debt instruments as suggested by the negative and significant coefficient in the *Choice* equation. This implies that higher market uncertainty leads to higher premium requirements from investors for raising capital through equity (Pástor and Veronesi, 2013). This result endorses the pecking order theory that equity is less favorable under high information asymmetry, which increases during high economic uncertainty (Nagar et al., 2019). The finding also complements Pan et al. (2019) that higher uncertainty leads to greater debt financing. The

negative and significant coefficient of *EPU* in the *Volume* equation suggests that an appetite for debt financing does not follow higher volumes of issuance. This suggests that firms avoid exacerbating financial risk through substantial leverage increases during periods of higher economic policy uncertainty.

The coefficients for both categories of institutional investors are negative and significant in *Choice* and *Volume* equations, suggesting that firms with higher proportions of institutional ownership are more likely to raise capital through debt financing and, conditional on the choice decision, prefer to raise capital in lower volumes. The relationship highlights the risk-averse nature of these investors. The sample firms simultaneously attempt to keep a check on ownership dilution and curtail financial risk. This is in line with Bogle (2018) who suggests that institutional owners play an active role in firms' decision-making. The inclination towards debt as the source of capital, albeit in lower volumes, lends support to the ownership control hypothesis that shareholders prefer debt over equity to avoid ownership dilution (Lemmon and Zender, 2019; Boubakri and Ghouma, 2010; Ellul, 2008). These findings also support Admati et al. (2018) and Boubaker et al. (2017) that institutional investors prefer debt and make slower adjustments to capital structure, as suggested by the negative sign in the *Volume* equation. The *Concentration* variable has insignificant coefficients in the three equations, implying there is insufficient evidence to suggest that a rise in concentration of shareholder ownership affects the decision-making process at any stage.

Among governance variables, I do not find significant influence of the concentration of power on the *Issue* and *Choice* decisions. This is suggested by the insignificant coefficients of the *CEO duality* variable; it has a negative coefficient in the *Volume* equation. This indicates that firms with CEO duality do not consistently follow a unique pattern of raising capital. This contradicts the findings of Korkeamäki et al. (2017) that CEOs with dual roles enhance their control by increasing leverage but strengthens the argument of Jensen (1993) that boards find it difficult to perform their functions in the presence of CEO duality. The insignificant

coefficient of *Golden parachute* in the *Issue* equation, and positive and significant coefficient in the *Choice* equation suggest that the existence of a golden parachute clause can significantly drive firms to raise capital by using equity. These results endorse the findings of Mansi et al. (2016) and Chakravarty and Rutherford (2017) that severance contracts incentivize firms to make risky decisions.

The coefficients of the *Insider optimism* and *Market optimism* variables are positive and significant in the *Issue* and *Choice* equations. This signals insiders' faith in the stability and growth of firms. These findings are in line with market timing theory that firms prefer to raise capital when there is an optimism for growth (Baker and Wurgler, 2002). In addition, the *Insider optimism* variable has a negative relation with the *Volume* decision. It can be inferred that optimistic insiders prefer to hold on to their control by avoiding large issuance volumes, which would otherwise lead to ownership dilution.

Among the variables proxying for information asymmetry, the negative and significant coefficient of *Analyst coverage* in the *Issue* equation suggests that firms covered by a larger number of analysts tend to raise capital less frequently. The results for the firm-specific control variables are also in line with the expectations. I do not discuss them here for brevity.

3.5.1 Political uncertainty

The economic policy uncertainty index is frequently used in the literature as a measure for policy uncertainty. Another efficient way to measure policy uncertainty is by analyzing political uncertainty. Partisan political uncertainty rises in the US when the executive and legislative bodies of the government are controlled by separate political parties – a phenomenon termed as 'divided government'. Divided governments in the US have historically failed to generate important legislation because of the President and the legislature having opposite views (Edwards et al., 1997; Rogers, 2005). The expectations of businesses and their executives in terms of legislative outcome are barely met during such conditions, leading to uncertainty.

The partisan differences between Democrats and Republicans is one of the key factors for political uncertainty in the US (Waisman et al., 2015).

To account for political uncertainty, I introduce an interactive variable (*PU)* to measure political uncertainty. *PU* is a binary variable equal to 1 if the President belongs to the minority party in the House. I also use the *Size* variable to measure the effect of large firms under economic uncertainty. Both the *PU* and *Size* variables are interacted with the *EPU* variable. These two interactive variables are meant to control for the impact of political uncertainty and firm size in the sequential decision framework.

Table 5 reports the empirical results after incorporating both interactive variables. Interestingly, the interactive term of the *EPU* and *Size* variables is insignificant in all three equations, suggesting that the decisions of large firms is not associated with higher economic policy uncertainty. However, political uncertainty coupled with economic policy uncertainty affects the issuance and the subsequent choice decision. Together, the findings suggest that firms prefer to raise capital during political uncertainty coupled with economic uncertainty by using debt instruments. This is in line with the previous finding that higher policy uncertainty results in a rise in information asymmetry, leading to higher premium requirements from investors when raising equity capital (Pástor and Veronesi, 2013). This finding implies that firms view political uncertainty, coupled with economic policy uncertainty, as a challenge which leads them to raise capital for internal financing. However, this finding should be interpreted with caution because it is plausible that political divergence may not fully reflect the behaviour of firms towards political risk. Regarding the results for other variables, I do not see major shifts in the results after incorporating the dummy variables, except for the insignificant coefficient of the *EPU* variable in the *Issue* equation. Overall, there is no major deviation from previous findings.

INSERT TABLE 5 HERE

3.6 Robustness checks

I apply additional models to test for robustness of the empirical findings. The results are discussed in the following sub-sections.

3.6.1 Multinomial logit model

The strict ordered categorical variable in the choice model is based on the pecking order theory, which assumes that firms select instruments with a declining order of preference from debt to equity. However, it is possible that firms' choice of instrument to raise capital may not be ordered; instead firms may choose instruments based on the economic circumstances, ownership and governance structure, or financial stability. Removing the order helps to witness every instrument's appeal to the firm. I test this by applying the multinomial logit model presented by Dubin and McFadden (1984) and revisited by Bourguignon et al. (2007). The model is applied with sample selection in the *Choice* equation.

Table 6 reports the estimation results after replacing the ordered probit model with a multinomial logit model in the *Choice* equation. There is no major difference in the empirical findings for the *Issue* and *Choice* equations. The results suggest a greater tendency to raise capital with a preference for loans and bonds under economic and political uncertainty. The coefficients of the interaction variables with *EPU* in the *Volume* equation imply that there is a general trend to raise lower volumes of capital, except in large firms, under economic and political uncertainty. In addition, I find that firms with more long-term institutional investors avoid equity financing. Overall, the results complement previous findings.

INSERT TABLE 6 HERE

3.6.2 Heckman selection model

The underlying hypothesis with the above empirical estimation is that firms are concerned with shareholders' desire for control and/or financial stability when making their instrument choice decision. However, if a firm's decision to raise capital is unaffected by the instrument choice, it still presents a sample selection problem even after controlling for firm-fixed effects for the

time-invariant factors. To test for the robustness of the results, I adopt the classic Heckman sample selection model (Heckman, 1979; Heckman et al., 2006). By adopting this model, I focus on the *Issue* and *Volume* equations after controlling for sample selection bias and applying the exclusion restriction.

Table 7 reports the results based on the Heckman selection model. The empirical findings are generally in line with the main models for the *Issue* and *Volume* decisions in Tables 4 and 5. A slight exception is the negative effect of uncertainty coupled with firm size in the *Issue* equation. However, the coefficient is very small and significant at the 10 percent level.

INSERT TABLE 7 HERE

3.6.3 Implied volatility index to measure uncertainty

As an alternate to the economic policy uncertainty index, I use the implied volatility index (VIX) to measure market volatility to understand if firms' capital-raising behaviour is significantly different during uncertain market conditions. Table 8 reports the results after replacing the EPU index with the VIX index in the ordered probit model. I observe a continuation of the trend that firms prefer debt financing as the variable coefficient in the *Choice* decision is negative and significant. There are deviations from previous findings in the *Issue* and *Volume* decisions as the VIX coefficient is insignificant. However, this can be attributed to the fact that the stock market is relatively more volatile than EPU (Liu and Zhang, 2015). Hence, businesses do not respond to changes in market volatility for raising capital more frequently. For the same reason, the decision about *Volume* is not significantly affected.

INSERT TABLE 8 HERE

3.7 Conclusion

The demand for debt instruments during periods of political and economic uncertainty – like the current Covid-19 pandemic, the dotcom crisis, and the global financial crisis – may pose a threat to the safety of the financial system. The response in the form of loose monetary policy

and direct intervention by central banks in the capital markets may induce increased borrowing by firms either due to a higher need for working capital or the departure for safety. In this chapter, I investigate how economic policy uncertainty drives the three stages of firms' decisions in the capital-raising process: the decision to raise capital, the decision about the choice of financing instrument, and the decision about the volume of capital to raise. Instead of analyzing the three decisions separately, I apply a three-step sequential decision-making framework through a simultaneous equation model.

Findings suggest that under high economic uncertainty, firms raise capital with higher frequency, choose debt-based instruments, and raise higher volumes of capital. When economic uncertainty is coupled with political uncertainty, larger firms abstain from raising capital in higher volumes. The proportion of ownership by long-term institutional investors (including endowment funds, pension funds, and sovereign-wealth funds) as well as asset management firms (including hedge funds, advisory firms, private equity, and venture capital) is positively associated with the issuance of debt in lower volumes. In addition, high insider optimism is associated with greater instances of raising capital; this decision follows the choice of equity to raise capital. The findings also highlight the significance of the golden parachute severance clause as a significant driver for firms to choose equity to raise capital.

These findings support the theory that the appetite of businesses for capital rises under uncertain economic conditions. Results also support the pecking order theory that debt is the preferred means of raising capital in the presence of high information asymmetry. This chapter also establishes the significant roles of ownership structure and governance mechanisms in the decision-making process of raising capital. It also highlights the role that insider optimism plays in the capital-raising process. In the next chapter, I investigate insider trading in more detail by analyzing how economic uncertainty, ownership structure and governance mechanisms affect the trading practices of firm insiders.

References

Abel, A. B. (1983). Optimal investment under uncertainty. *American Economic Review, 73*(1), 228-233.Admati, A. R., Demarzo, P. M., Hellwig, M. F. and Pfleiderer, P. (2018). The leverage ratchet effect. *The Journal of Finance, 73*, 145-198. https://doi.org/10.1111/jofi.12588

Admati, A. R., Demarzo, P. M., Hellwig, M. F. and Pfleiderer, P. (2018). The leverage ratchet effect. *The Journal of Finance, 73*, 145-198. https://doi.org/10.1111/jofi.12588

Altunbaş, Y., Kara, A., and Marques-Ibanez, D. (2010). Large debt financing: Syndicated loans versus corporate bonds. *The European Journal of Finance,16*(5), 437-458. https://doi.org/10.1080/13518470903314394

Atta-Mensah, J. (2004). *Money demand and economic uncertainty* (No. 2004-25). Bank of Canada.

Autore, D. M., and Kovacs, T. (2010). Equity issues and temporal variation in information asymmetry. *Journal of Banking & Finance, 34*(1), 12-23. https://doi.org/10.1016/j.jbankfin.2009.06.016

Badoer, D. C., and James, C. M. (2016). The determinants of long-term corporate debt issuances. *The Journal of Finance, 71*(1), 457-492. https://doi.org/10.1111/jofi.12264

Baker, M., and Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*(1), 1-32. https://doi.org/10.1111/1540-6261.00414

Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics, 131*(4), 1593–1636. https://doi.org/10.1093/qje/qjw024

Ben-Nasr, H., Boubaker, S., and Rouatbi, W. (2015). Ownership structure, control contestability, and corporate debt maturity. *Journal of Corporate Finance, 35*, 265-285. https://doi.org/10.1016/j.jcorpfin.2015.10.001

Berger, P. G., Ofek, E., and Yermack, D. L. (1997). Managerial entrenchment and capital structure decisions. *The Journal of Finance, 52*(4), 1411-1438. https://doi.org/10.2307/2329441

Berlin, M., and Loeys, J. (1988). Bond covenants and delegated monitoring. *The Journal of Finance, 43*(2), 397-412. https://doi.org/10.2307/2328467

Bogle, J. (2018). The modern corporation and the public interest. *Financial Analysts Journal, 74*(3), 8-17. https://doi.org/10.2469/faj.v74.n3.1

Bolton, P., and Freixas, X. (2000). Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information. *Journal of Political Economy, 108*(2), 324–351. https://doi.org/10.1086/262121

Borisova, G., Fotak, V., Holland, K., and Megginson, W. L. (2015). Government ownership and the cost of debt: Evidence from government investments in publicly traded firms. *Journal of Financial Economics, 118*(1), 168-191. https://doi.org/10.1016/j.jfineco.2015.06.011

Boubaker, S., Rouatbi, W., and Saffar, W. (2017). The role of multiple large shareholders in the choice of debt source. *Financial Management, 46*(1), 241-274. https://doi.org/10.1111/fima.12148

Boubakri, N., and Ghouma, H. (2010). Control/ownership structure, creditor rights protection, and the cost of debt financing: International evidence. *Journal of Banking & Finance, 34*(10), 2481-2499. https://doi.org/10.1016/j.jbankfin.2010.04.006

Boubakri, N., and Saffar, W. (2019). State ownership and debt choice: Evidence from privatization. *Journal of Financial and Quantitative Analysis*, 1-34. https://doi.org/10.1017/s0022109018000881

Bourguignon, F., Fournier, M., and Gurgand, M. (2007). Selection bias correction based on the multinomial logit model: Monte-Carlo comparisons. *Journal of Economic Surveys*, *21*(1), 174–205. https://doi.org/10.1111/j.1467-6419.2007.00503.x

Bradley, D., Pantzalis, C., and Yuan, X. (2016). Policy risk, corporate political strategies, and the cost of debt. *Journal of Corporate Finance, 40*, 254-275. https://doi.org/10.1016/j.jcorpfin.2016.08.001

Brickley, J. A., Coles, J. L., and Jarrell, G. (1997). Leadership structure: Separating the CEO and chairman of the board. *Journal of Corporate Finance*, 3(3), 189-220. https://doi.org/10.1016/s0929-1199(96)00013-2

Caballero, R. J. (1991). Earnings uncertainty and aggregate wealth accumulation. *The American Economic Review*, 859-871.

Chakravarty, S., and Rutherford, L. G. (2017). Do busy directors influence the cost of debt? An examination through the lens of takeover vulnerability. *Journal of Corporate Finance, 43*, 429-443. https://doi.org/10.1016/j.jcorpfin.2017.02.001

Chang, M., and Watson, I. (2015). Delayed disclosure of insider trades: Incentives for and indicators of future performance? *Pacific-Basin Finance Journal*, *35*, 182–197. https://doi.org/10.1016/j.pacfin.2014.12.007

Chang, X., Dasgupta, S., and Hilary, G. (2006). Analyst Coverage and Financing Decisions. *The Journal of Finance*, *61*(6), 3009–3048. https://doi.org/10.1111/j.1540-6261.2006.01010.x

Çolak, G., Gungoraydinoglu, A., and Öztekin, Ö. (2018). Global leverage adjustments, uncertainty, and country institutional strength. *Journal of Financial Intermediation*, *35*, 41–56. https://doi.org/10.1016/j.jfi.2018.01.010

Cremers, K., Nair, V., and Wei, C. (2007). Governance Mechanisms and Bond Prices. *The Review of Financial Studies, 20*(5), 1359-1388. https://doi.org/10.1093/revfin/hhm006

Crouzet, N. (2018). Aggregate Implications of Corporate Debt Choices. *The Review of Economic Studies, 85*(3), 1635-1682. https://doi.org/10.1093/restud/rdx058

Datta, S., Doan, T., and Iskandar-Datta, M. (2019). Policy uncertainty and the maturity structure of corporate debt. *Journal of Financial Stability*, *44*, 100694. https://doi.org/10.1016/j.jfs.2019.100694

Donelli, M., Larrain, B., and Urzua I., Francisco. (2013). Ownership dynamics with large shareholders: An empirical analysis. *Journal of Financial and Quantitative Analysis*, *48*(2), 579-609. https://doi-org/10.1017/S0022109013000173

Dong, M., Loncarski, I., Horst, J., and Veld, C. (2012). What drives security issuance decisions: Market timing, pecking order, or both? *Financial Management, 41*(3), 637-663. https://doi.org/10.1111/j.1755-053x.2012.01213.x

Dubin, J. A., and McFadden, D. (1984). An Econometric Analysis of Residential Electric Appliance Holdings and Consumption. *Econometrica*, *52*(2), 345–362. https://doi.org/10.2307/1911493

Edwards III, G. C., Barrett, A., and Peake, J. (1997). The legislative impact of divided government. *American Journal of Political Science*, 545-563. https://doi.org/10.2307/2111776

Ellul, A. (2008). Control motivations and capital structure decision. *Available at SSRN 1094997*.

Ellul, A., and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage? *Journal of Financial and Quantitative Analysis, 53*(1), 203-241. https://doi.org/10.1017/s0022109017000990

Elyasiani, E., and Jia, J. (2010). Distribution of institutional ownership and corporate firm performance. *Journal of Banking & Finance, 34*(3), 606-620. https://doi.org/10.1016/j.jbankfin.2009.08.018

Fama, E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy, 88*(2), 288. https://doi.org/10.1017/cbo9780511817410.022

Ferreira, M., and Laux, P. (2016). Corporate boards and SEOs: The effect of certification and monitoring. *Journal of Financial and Quantitative Analysis, 51*(3), 899-927. https://doi.org/10.1017/s0022109016000405

Giambona, E., Matta, R., Peydró, J.-L., & Wang, Y. (2020). *Quantitative Easing, investment, and safe assets: The corporate-bond lending channel* (Working Paper). Kiel, Hamburg. Retrieved from http://hdl.handle.net/10419/217049%0AStandard-Nutzungsbedingungen:

Glover, B. (2016). The expected cost of default. *Journal of Financial Economics, 119*(2), 284-299. https://doi.org/10.1016/j.jfineco.2015.09.007

Goergen, M., Renneboog, L., and Zhao, Y. (2019). Insider trading and networked directors. *Journal of Corporate Finance, 56*, 152-175. https://doi.org/10.1016/j.jcorpfin.2019.02.001

Gomes, A., and Phillips, G. (2012). Why do public firms issue private and public securities? *Journal of Financial Intermediation, 21*(4), 619-658. https://doi.org/10.3386/w11294

Gulen, H., and Ion, M. (2016). Policy uncertainty and corporate investment. *The Review of Financial Studies*, *29*(3), 523–564. https://doi.org/10.1093/rfs/hhv050

Harris, M., and Raviv, A. (1998). Capital budgeting and delegation. *Journal of Financial Economics, 50*(3), 259-289. https://doi.org/10.1016/S0304-405X(98)00038-5

Hartman, R. (1972). The effects of price and cost uncertainty on investment. *Journal of Economic Theory*, *5*(2), 258-266.

He, J. J., Huang, J., and Zhao, S. (2019). Internalizing governance externalities: The role of institutional cross-ownership. *Journal of Financial Economics*. https://doi.org/10.1016/j.jfineco.2018.07.019

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of Econometric Society*, 153-161. https://doi.org/10.2307/1912352

Heckman, J. J., Urzua, S., and Vytlacil, E. (2006). Understanding Instrumental Variables in Models with Essential Heterogeneity. *The Review of Economics and Statistics, 88*(3), 389-432. https://doi.org/10.1162/rest.88.3.389

Holderness, C. G. (2009). The myth of diffuse ownership in the United States. *The Review of Financial Studies*, *22*(4), 1377–1408. https://doi.org/10.1093/rfs/hhm069

Husted, L., Rogers, J., and Sun, B. (2019). Monetary policy uncertainty. *Journal of Monetary Economics, 2017*(1215), 1–56. https://doi.org/10.1016/j.jmoneco.2019.07.009

Jann, B. (2008). The Blinder–Oaxaca Decomposition for Linear Regression Models. *The Stata Journal: Promoting Communications on Statistics and Stata, 8*(4), 453-479. https://doi.org/10.1177/1536867x0800800401

Jensen, G. R., Solberg, D. P., and Zorn, T. S. (1992). Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies. *The Journal of Financial and Quantitative Analysis*, 27(2), 247. https://doi.org/10.2307/2331370

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *The Journal of Finance, 48*(3), 831-880. https://doi.org/10.2307/2329018

Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*, 305–360. https://doi.org/10.1016/0304-405x(76)90026-x

John, K., Knyazeva, A., and Knyazeva, D. (2015). Governance and payout precommitment. *Journal of Corporate Finance, 33*, 101-117. https://doi.org/10.1016/j.jcorpfin.2015.05.004

Jung, K., Kim, Y., and Stulz, R.M. (1996). Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Economics, 42*(2), 159-185. https://doi.org/10.1016/0304-405x(96)00881-1

Keasey, K., Martinez, B., and Pindado, J. (2015). Young family firms: Financing decisions and the willingness to dilute control. *Journal of Corporate Finance*, *34*(C), 47-63. http://dx.doi.org/10.1016/j.jcorpfin.2015.07.014

Klein, B. (1977). The demand for quality-adjusted cash balances: Price uncertainty in the US demand for money function. *Journal of Political Economy*, *85*(4), 691-715.

Korkeamäki, T., Liljeblom, E., and Pasternack, D. (2017). CEO power and matching leverage preferences. *Journal of Corporate Finance, 45*, 19-30. https://doi.org/10.1016/j.jcorpfin.2017.04.007

Kurtzman, R., and Zeke, D. (2020). Misallocation costs of digging deeper into the central bank toolkit. *Review of Economic Dynamics*. https://doi.org/10.1016/j.red.2020.03.006

Lemmon, M. L., and Zender, J. F. (2019). Asymmetric information, debt capacity, and capital structure. *Journal of Financial and Quantitative Analysis, 54*(1), 31-59. https://doi.org/10.1017/s0022109018000443.

Levy, J. (2019). Primal Capital, *Critical Historical Studies*, 6(2), 61-93

Lewis, C. M., Rogalski, R. J., and Seward, J. K. (2003). Industry conditions, growth opportunities and market reactions to convertible debt financing decisions. *Journal of Banking & Finance, 27*(1), 153-181. https://doi.org/10.1016/s0378-4266(01)00212-6

Li, W., and Zhang, R. (2010). Corporate Social Responsibility, Ownership Structure, and Political Interference: Evidence from China. *Journal of Business Ethics, 96*(4), 631-645. https://doi.org/10.1007/s10551-010-0488-z

Li, X. M. (2017). New evidence on economic policy uncertainty and equity premium. *Pacific-Basin Finance Journal, 46*, 41–56. https://doi.org/10.1016/j.pacfin.2017.08.005

Lin, C., Ma, Y., Malatesta, P., and Xuan, Y. (2013). Corporate ownership structure and the choice between bank debt and public debt. *Journal of Financial Economics, 109*(2), 517-534. https://doi.org/10.1016/j.jfineco.2013.03.006

Liu, Q., Tian, G., and Wang, X. (2011). The effect of ownership structure on leverage decision: new evidence from Chinese listed firms. *Journal of the Asia Pacific Economy*, *16*(2), 254. https://doi.org/10.1080/13547860.2011.564755

Liu, L., and Zhang, T. (2015). Economic policy uncertainty and stock market volatility. *Finance Research Letters, 15*, 99-105.

MacKie-Mason, J. (1990). Do Taxes Affect Corporate Financing Decisions? *The Journal of Finance, 45*(5), 1471.

Maggiori, M., Neiman, B., and Schreger, J. (2020). International Currencies and Capital Allocation, *Journal of Political Economy*, 128 (6), 2019-2066. https://doi.org/10.1086/705688

Mansi, S. A., Wald, J. K., and Zhang, A. J. (2016). Severance agreements and the cost of debt. *Journal of Corporate Finance, 41*, 426-444.

Masulis, R. W. (1988). *The Debt/Equity Choice.* Cambridge, Mass.: Ballinger.

Mendoza, E. G. (2010). Sudden stops, financial crises, and leverage. *American Economic Review, 100*(5), 1941-66. https://doi.org/10.1257/aer.100.5.1941

Modigliani, F., and Miller, M. (1958). The cost of capital, corporation finance and the theory of finance. *American Economic Review, 48*(3), 291-297.

Myers, S. C., and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221. https://doi.org/10.3386/w1396

Nagar, V., Schoenfeld, J., and Wellman, L. (2019). The effect of economic policy uncertainty on investor information asymmetry and management disclosures. *Journal of Accounting and Economics, 67*(1), 36-57. https://doi.org/10.1016/j.jacceco.2018.08.011

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*(5), 673-690.

Pan, W.-F., Wang, X., & Yang, S. (2019). Debt maturity, leverage, and political uncertainty. *The North American Journal of Economics and Finance, 50*, 100981. https://doi.org/10.1016/j.najef.2019.04.024

Pástor, Ľ., and Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520–545. https://doi.org/10.1016/j.jfineco.2013.08.007

Pi, L. and Timme, S. G. (1993). Corporate control and bank efficiency. *Journal of Banking & Finance, 17*(2), 515-530. https://doi.org/10.1016/0378-4266(93)90050-n

Pindyck, R. S. (1982). Adjustment costs, uncertainty, and the behavior of the firm. *American Economic Review, 72*(3), 415-427.

Rogers, J. R. (2005). The impact of divided government on legislative production. *Public Choice, 123*(1-2), 217-233. https://doi.org/10.1007/s11127-005-0261-5

Sakai, K., Uesugi, I., and Watanabe, T. (2010). Firm age and the evolution of borrowing costs: Evidence from Japanese small firms. *Journal of Banking & Finance, 34*(8), 1970-1981. https://doi.org/10.1016/j.jbankfin.2010.01.001

Shibata, T., and Nishihara, M. (2010). Dynamic investment and capital structure under manager–shareholder conflict. *Journal of Economic Dynamics and Control, 34*(2), 158-178.

Su, L. D. (2010). Ownership structure, corporate diversification and capital structure. *Management Decision*, 48(2), 314-339. https://doi.org/10.1108/00251741011022644

Suchard, J. A., and Singh, M. (2006). The determinants of the hybrid security issuance decision for Australian firms. *Pacific-Basin Finance Journal*, *14*(3), 269-290.

Sun, J., Ding, L., Guo, J. M., & Li, Y. (2016). Ownership, capital structure and financing decision: Evidence from the UK. *The British Accounting Review*, *48*(4), 448–463.

Vandevelde, M. (2020, July 10). The leveraging of America: how companies became addicted to debt. *The Financial Times*. Retrieved from https://www.ft.com/content/c732fded-5252-4333-a3f8-80b767508bbc

Waisman, M., Ye, P., and Zhu, Y. (2015). The effect of political uncertainty on the cost of corporate debt. *Journal of Financial Stability, 16*, 106-117.

Warsh, K. (2020, February 26). The Fed Can't Wait to Respond to the Coronavirus. *Wall Street Journal*. Retrieved from https://www.wsj.com/articles/the-fed-cant-wait-to-respond-to-the-coronavirus-11582763355

Wald, J., Mansi, S., and Nguyen, A. (2012). *Golden Parachutes, Incentives, and the Cost of Debt* (No. 0008).

Wang, Y., Chen, C. R., and Huang, Y. S. (2014). Economic policy uncertainty and corporate investment: Evidence from China. *Pacific-Basin Finance Journal*, *26*, 227–243. https://doi.org/10.1016/j.pacfin.2013.12.008

Zeira, J. (1990). Cost uncertainty and the rate of investment. *Journal of Economic Dynamics and Control*, *14*(1), 53-63.

Zhang, X., and Zhou, S. (2018). Bond covenants and institutional blockholding. *Journal of Banking & Finance*, *96*, 136-152. https://doi.org/10.1016/j.jbankfin.2018.09.006

Figures

Figure 1: The sequential decision-making framework

A sequential framework of the decision-making process to raise capital. The figure shows that during periods of uncertainty, firms may come across opportunities to invest in projects with positive Net Present Values (NPV) or require capital because of negative Free Cash Flows (FCF). Shareholders delegate the first decision to exploit management skills (Shibata and Nishihara, 2010). Once the decision is made, the subsequent decisions about security choice and dollar volume incorporate shareholder interests represented by the board of directors.

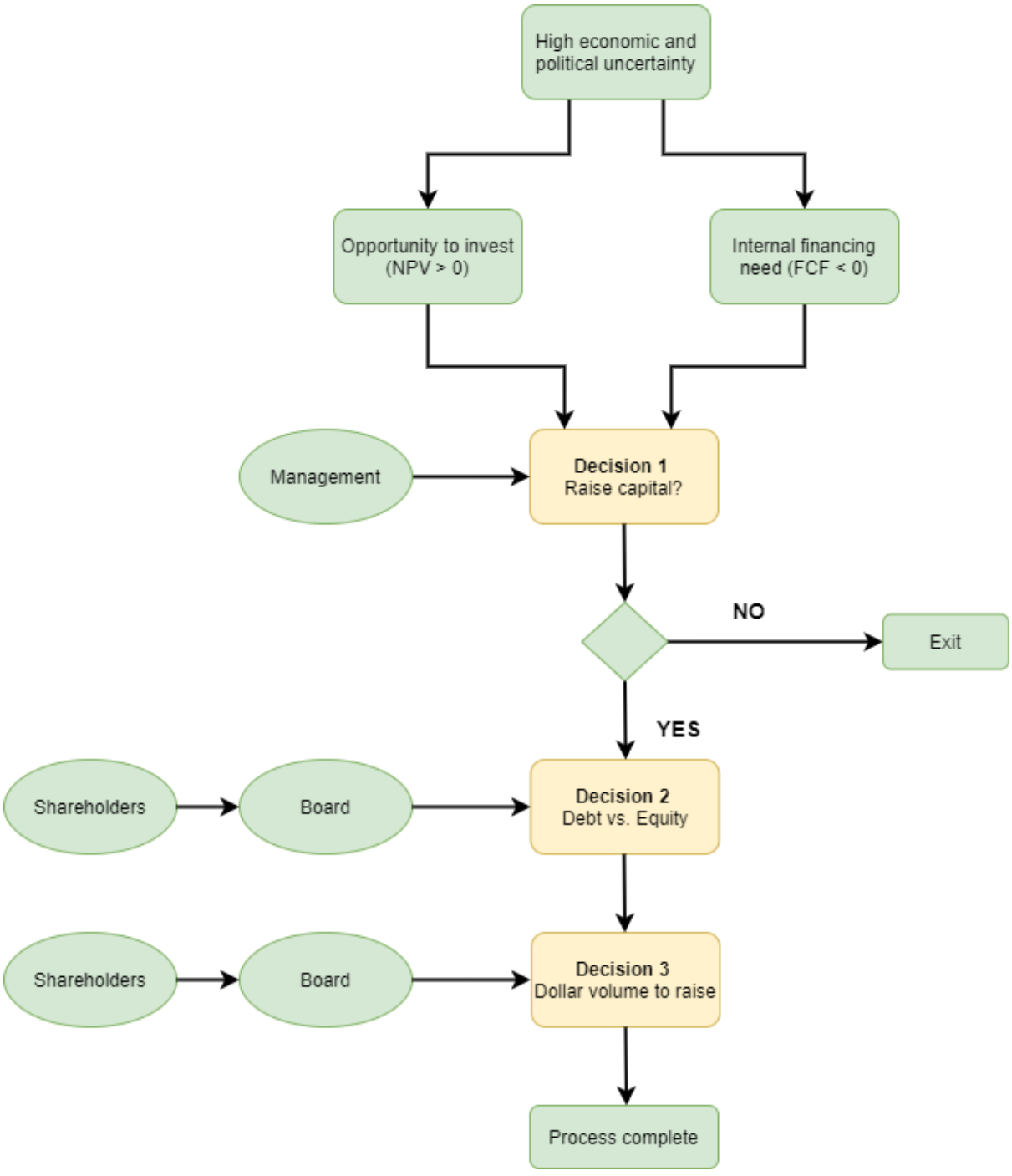


Figure 2: Economic uncertainty and issuance volume

Volume issuance data of sample firms from 2000-2017 (2018 is omitted because of incomplete data for that year). EPU index is scaled to match the issuance trend in volume. The y-axis on the left shows the scaling for the EPU index, while the y-axis on the right shows the dollar volume of capital raised.

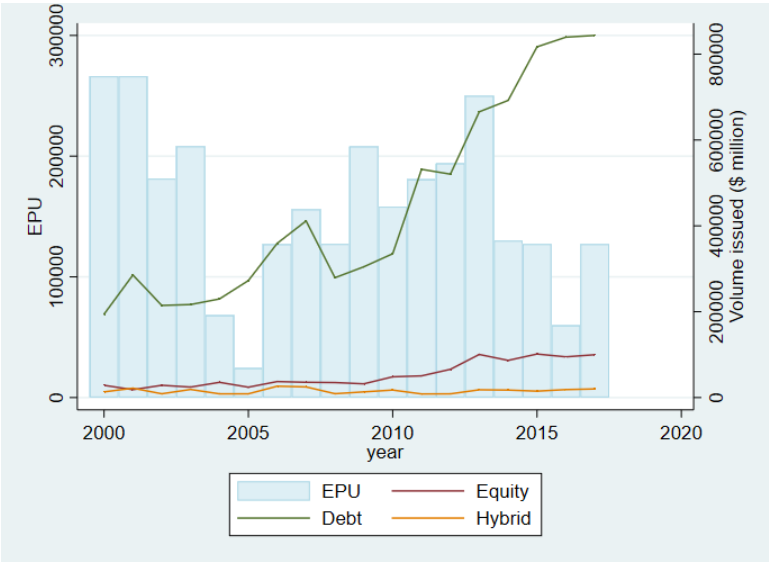
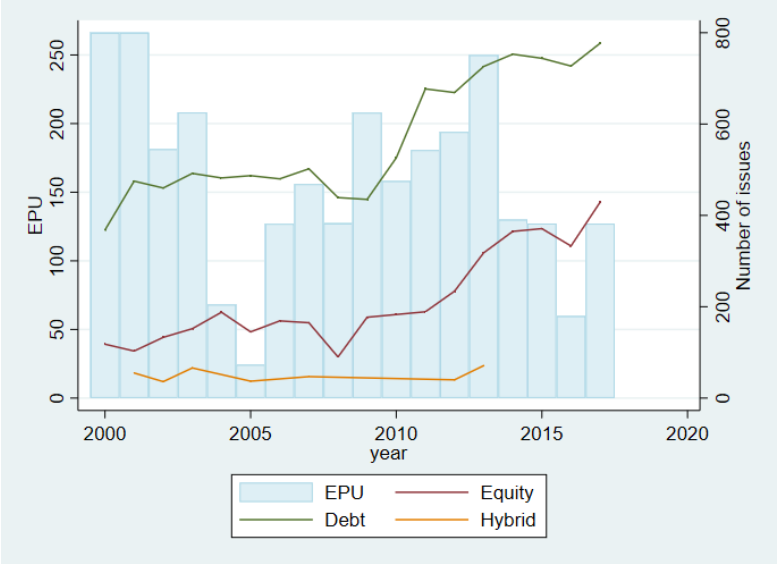


Figure 3: Economic uncertainty and number of issues

The number of instruments used by the sample firms from 2000-2017 (2018 is omitted because of incomplete data for that year). The y-axis on the left shows the scale for the EPU index, while the y-axis on the right shows the number of issues made by a certain instrument.



Tables

Table 1: Blinder-Oaxaca decomposition

Blinder-Oaxaca decomposition of equity and debt issuance applied to a sample of 6,834 publicly listed US firms over the sample period starting January 2000 until December 2018. Dependent variable *Volume* is the logarithm of the dollar volume of capital raised. The coefficients are generated after retransforming them into the original scale of millions of US dollars. The row 'Explained' indicates the proportion of increase in equity to the level of debt issuance that would be generated by an adjustment in the list of determinants shown in Appendix B. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1[***].

Volume	Overall	Adjusted
Debt	584.73***	584.73***
	(1.8897)	(1.8897)
Equity	488.33***	458.16***
	(4.8059)	(23.598)
Difference	1.1974***	1.2763**
	(0.0124)	(0.0659)
Explained		1.1973***
		(0.0164)
Unexplained		1.0709***
		(0.0461)
Observations		9,726

Table 2: Summary statistics

Summary statistics of non-dummy variables representing public US firms over the sample period January 2000 until December 2018. Panel A shows the summary statistics of variables for firms that have raised capital during the sample period. Panel B shows the statistics of variables for firms that did not raise any capital during the sample period. Panel C shows the mean differences of issuer and non-issuer characteristic variables with significance levels *** p<0.01, ** p<0.05, * p<0.1. Mean difference analysis for macroeconomic variables does not apply to individual firms and, consequently, are not presented.

	All- Firms			Panel A: Issuers		Panel B: Non-issuers		Panel C: Difference
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Obs.**	**Mean**	
EPU	45,635	154.456	63.245					
Institutional investor	39,780	82.922	21.737	29,060	83.982	10,720	80.051	3.931***
Long-term investor	39,780	8.463	14.251	29,060	8.382	10,720	8.682	0.300*
Individual	39,780	5.696	16.506	29,060	5.018	10,720	7.536	-2.518***
Government	39,780	0.014	0.885	29,060	0.005	10,720	0.038	-0.033***
Concentration	39,780	87.020	12.658	29,060	87.061	10,720	86.911	-0.150
Insider optimism	45,635	0.152	0.358	32,228	0.181	13,407	0.083	0.098***
Market optimism	38,748	3.188	6.404	29,687	3.295	9,061	2.837	0.458***
Board size	30,386	8.789	3.242	24,125	8.704	6,261	9.117	-0.413***
Firm size	45,617	6.397	2.428	32,223	6.601	13,394	5.904	0.697***
Analyst coverage	31,686	9.310	7.892	25,231	10.057	6,455	6.388	3.669***
Analyst variance	31,686	0.704	0.378	25,231	0.727	6,455	0.617	-0.109***
Leverage	45,452	0.189	0.210	32,111	0.206	13,341	0.147	0.059***
Cash	45,149	0.163	0.199	31,875	0.153	13,274	0.185	-0.032***
Profitability	45,354	-0.076	0.398	32,140	-0.069	13,214	-0.092	0.023***
GDP growth	45,635	1.961	1.429					
Interest rate	45,635	1.619	1.943					

Table 3: Variance Inflation Factor (VIF) test

Variance Inflation Factor (VIF) test for multicollinearity. The table includes variables on governance, information asymmetry, and firm-specific factors. The sample selection model does not include firm ownership variables in the first equation on capital issuance and, consequently, are excluded from VIF analysis.

Variable	**VIF**
Firm Size	2.89
Analyst coverage	1.91
Cash	1.39
Board size	1.33
Leverage	1.23
Profitability	1.19
EPU	1.11
Interest rate	1.11
Golden parachute	1.09
GDP growth rate	1.08
Market optimism	1.05
Insider optimism	1.03
CEO duality	1.02
Board attendance	1.02
Mean VIF	1.3

Table 4: Heckman ordered probit model

Empirical estimations based on the Heckman 3-stage ordered probit model with firm- and year- fixed effects and robust standard errors. The sample includes data from 6,834 publicly listed firms in the US. The sample period is from January 2000 until December 2018. Firms' decisions follow the sequence shown in Figure 1. The first decision on issuance is represented by the binary dependent variable *Issue*. The *Choice* categorical variable in the second column takes up values following pecking order theory as follows: Loan = 1; Bond = 2; Convertible bond = 3; Preferred equity = 4; Common equity = 5. The selectivity bias variable indicates the presence of sample selection bias. *P* indicates the correlation between error terms in output and participation equations. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1[***]. Year fixed-effects and firm fixed-effects are included; however, the estimated coefficients are not reported. Variable definitions are given in Appendix A.

Variables	Issue	Choice	Volume
EPU	0.0010***	-0.0183***	-0.0006***
	(0.0002)	(0.0053)	(0.0002)
Long-term investor		-0.0354***	-0.0042
		(0.0077)	(0.0065)
Institutional investor		-0.0056**	-0.0106*
		(0.0027)	(0.0058)
Individual		0.0032	-0.0035
		(0.0031)	(0.0052)
Government		-0.0530	-0.1566*
		(0.2710)	(0.0941)
Concentration	0.0008	0.0040	-0.0002
	(0.0010)	(0.0035)	(0.0078)
Golden parachute	0.0379	0.3079***	-0.1421***
	(0.0321)	(0.0558)	(0.0310)
CEO duality	0.0024	0.0222	-0.0579***
	(0.0183)	(0.0419)	(0.0213)
Insider optimism	0.0653***	0.1073***	-0.1221***
	(0.0221)	(0.0375)	(0.0320)
Market optimism	0.0056***	0.0063***	-0.0006
	(0.0016)	(0.0024)	(0.0043)
Board size	0.0250***	0.0053	0.0244***
	(0.0036)	(0.0126)	(0.0044)
Analyst coverage	-0.0072***	0.0060	0.0233***
	(0.0015)	(0.0042)	(0.0030)
Analyst variance	0.0382	-0.1092*	-0.3229***
	(0.0294)	(0.0616)	(0.0553)
Firm size	0.2431***	-0.0396	-0.5863***
	(0.0092)	(0.0462)	(0.0451)
Leverage	0.8245***	0.4202***	-0.4395***
	(0.0539)	(0.1423)	(0.1199)
Cash	0.0435	1.2362***	2.1627***
	(0.0796)	(0.2257)	(0.2119)
Free cash flow	-0.0841***		
	(0.0259)		
Profitability	-0.8910***		
	(0.0805)		
Interest rate	0.0077	0.0302	0.0003
	(0.0049)	(0.0623)	(0.0057)
GDP Growth rate	0.0736***	1.5626***	-0.0406***
	(0.0066)	(0.5085)	(0.0120)
Constant	-2.6434***		6.6998***
	(0.1208)		(0.8157)
P			-0.6268***

			(0.1594)
Selectivity bias			-0.1081**
			(0.0530)
Firm – fixed effects	YES	YES	YES
Year – fixed effects	YES	YES	YES
Wald test of indep. eqns. ($\rho = 0$) $\chi^2(1)$			15.47***
Observations	20,976	20,976	20,969

Table 5: Heckman model with interaction terms

Empirical estimations based on Heckman 3-stage ordered probit model with firm- and year- fixed effects and robust standard errors. The sample includes data from 6,834 publicly listed firms in the US. The sample period is from January 2000 until December 2018. Firms' decisions follow the sequence shown in Figure 1. The first decision on issuance is represented by the binary dependent variable *Issue*. The *Choice* categorical variable in the second column takes up values following the pecking order theory as follows: Loan = 1; Bond = 2; Convertible bond = 3; Preferred equity = 4; Common equity = 5. The selectivity bias variable indicates the presence of sample selection bias. *P* indicates the correlation between error terms in output and participation equations. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1***. Year fixed-effects and firm fixed-effects are included; however, the estimated coefficients are not reported. Variable definitions are given in Appendix A.

Variables	Issue	Choice	Volume
EPU	0.0002	-0.0192***	0.0015
	(0.0007)	(0.0053)	(0.0020)
EPU×SIZE	0.0001	0.0001	-0.0003
	(0.0001)	(0.0001)	(0.0002)
EPU×PU	0.0002*	-0.0076***	0.0001
	(0.0001)	(0.0028)	(0.0002)
Long-term investor		-0.0356***	-0.0037
		(0.0077)	(0.0066)
Institutional investor		-0.0056**	-0.0105*
		(0.0027)	(0.0058)
Individual		0.0032	-0.0035
		(0.0031)	(0.0052)
Government		-0.0521	-0.1590*
		(0.2699)	(0.0944)
Concentration	0.0008	0.0040	-0.0003
	(0.0010)	(0.0035)	(0.0078)
Golden parachute	0.0298	0.3098***	-0.1500***
	(0.0325)	(0.0559)	(0.0316)
CEO duality	0.0037	0.0252	-0.0625***
	(0.0183)	(0.0421)	(0.0215)
Insider optimism	0.0657***	0.1079***	-0.1238***
	(0.0221)	(0.0375)	(0.0319)
Market optimism	0.0056***	0.0063***	-0.0007
	(0.0016)	(0.0024)	(0.0042)
Board size	0.0251***	0.0051	0.0246***
	(0.0036)	(0.0126)	(0.0045)
Analyst coverage	-0.0072***	0.0060	0.0232***
	(0.0015)	(0.0042)	(0.0031)
Analyst variance	0.0358	-0.1086*	-0.3235***
	(0.0294)	(0.0615)	(0.0552)
Firm size	0.2288***	-0.0556	-0.5448***
	(0.0162)	(0.0545)	(0.0572)
Leverage	0.8280***	0.4202***	-0.4397***
	(0.0540)	(0.1423)	(0.1204)
Cash	0.0390	1.2405***	2.1575***
	(0.0796)	(0.2258)	(0.2112)
Free cash flow	-0.0826***		
	(0.0259)		
Profitability	-0.8927***		
	(0.0806)		
Interest rate	0.0118**	0.0309	0.0010
	(0.0053)	(0.0624)	(0.0065)
GDP Growth rate	0.0710***	1.5717***	-0.0419***
	(0.0068)	(0.5066)	(0.0119)
Constant	-2.5211***		6.3812***
	(0.1561)		(0.8735)
P			-0.6288***
			(0.1589)
Selectivity bias			-0.0963*
			(0.0493)
Firm – fixed effects	YES	YES	YES
Year – fixed effects	YES	YES	YES
Wald test of indep. eqns. ($\rho = 0$) $\chi^2(1)$			15.67***

Observations	20,976	20,976	20,969

Table 6: Multinomial logit model

Empirical estimation based on a multinomial logit model for the *Choice* equation. The model includes firm- and year- fixed effects and robust standard errors. The sample includes data from 6,834 publicly listed firms in the US. The sample period is from January 2000 until December 2018. Firms' decisions follow the sequence shown in Figure 1. The first decision on issuance is represented by the binary dependent variable *Issue*. The *Choice* columns indicates a firm's choice of instrument without any order. The selectivity bias variables indicates the presence of sample selection bias. The selectivity bias (equation 3) estimates are for separate variables for each *Choice* category but shown in a single row for brevity. *P* indicates the correlation between error terms in output and participation equations. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1[***]. Year fixed-effects and firm fixed-effects are included; however, the estimated coefficients are not reported. Variable definitions are given in Appendix A.

Variables	Issue	Choice					Volume
		Loan	Bonds	Convertible Bonds	Preferred equity	Common equity	
EPU	0.0002	0.0054	0.0076	-0.0090	0.0198	0.0021	0.0020
	(0.0007)	(0.0127)	(0.0128)	(0.0132)	(0.0159)	(0.0127)	(0.0018)
EPU×SIZE	0.0001	-0.0004	-0.0004	0.0016	-0.0029	-0.0003	-0.0011***
	(0.0001)	(0.0013)	(0.0013)	(0.0014)	(0.0018)	(0.0013)	(0.0003)
EPU×PU	0.0002**	0.0067**	0.0049*	0.0025	0.0029	0.0043	0.0025***
	(0.0001)	(0.0028)	(0.0028)	(0.0029)	(0.0034)	(0.0028)	(0.0003)
Long-term investor		0.0571	0.0646	0.0121	-0.0065	-0.1218***	-0.0738***
		(0.0403)	(0.0399)	(0.0442)	(0.0668)	(0.0425)	(0.0115)
Institutional investor		0.0230	0.0188	0.0416	0.0524	0.0192	-0.0044
		(0.0290)	(0.0289)	(0.0326)	(0.0583)	(0.0291)	(0.0039)
Individual		-0.0052	-0.0117	-0.0191	-0.0104	-0.0052	0.0094**
		(0.0380)	(0.0380)	(0.0393)	(0.0491)	(0.0379)	(0.0039)
Government		-0.3194	-1.2884	-14.0662	-15.8856	-0.0986	1.7348***
		(9.9629)	(9.9822)	(969.15)	(3,443.01)	(9.9539)	(0.2869)
Concentration	0.0008	-0.0400	-0.0419	-0.0593	-0.0623	-0.0418	0.0076
	(0.0010)	(0.0400)	(0.0399)	(0.0432)	(0.0679)	(0.0400)	(0.0057)
Golden parachute	0.0297	0.1946	0.0655	0.2378	0.3660	-0.0357	0.0658**
	(0.0330)	(0.6371)	(0.6356)	(0.6652)	(0.8790)	(0.6449)	(0.0278)
CEO duality	0.0036	0.1703	0.2058	0.0459	-0.0779	-0.2217	-0.2653***
	(0.0183)	(0.4432)	(0.4431)	(0.4516)	(0.5203)	(0.4443)	(0.0336)
Insider optimism	0.0655***	-0.1975	-0.2029	0.0504	-0.4025	-0.1189	0.0402
	(0.0222)	(0.5772)	(0.5774)	(0.5848)	(0.6689)	(0.5779)	(0.0329)
Market optimism	0.0056***	0.0167	0.0224	0.0184	-0.0206	0.0116	-0.0134***
	(0.0015)	(0.0210)	(0.0210)	(0.0213)	(0.0304)	(0.0208)	(0.0034)
Board size	0.0251***	0.1872**	0.2040**	0.0188	0.0386	0.0853	-0.0867***
	(0.0035)	(0.0916)	(0.0916)	(0.0928)	(0.1068)	(0.0918)	(0.0069)
Analyst coverage	-0.0072***	-0.0010	0.0186	0.0768**	-0.0107	0.0685**	0.0140**

	(0.0015)	(0.0315)	(0.0314)	(0.0322)	(0.0423)	(0.0317)	(0.0057)
Analyst variance	0.0358	0.3051	0.4623	0.0685	0.1052	-0.1047	-0.5530***
	(0.0297)	(0.8403)	(0.8421)	(0.8534)	(0.9297)	(0.8396)	(0.0609)
Firm size	0.2288***	1.1497***	1.3221***	-0.2229	0.3870	-0.2588	-1.3918***
	(0.0163)	(0.2767)	(0.2807)	(0.2879)	(0.3711)	(0.2756)	(0.0977)
Leverage	0.8285***	7.4758***	8.8602***	7.3853***	3.6881***	4.8665***	-3.6041***
	(0.0515)	(0.8705)	(0.8924)	(0.9022)	(1.1532)	(0.8390)	(0.4564)
Cash	0.0393	-2.3805	-1.3334	2.2095	0.9291	0.6766	-0.5516**
	(0.0757)	(1.7130)	(1.7265)	(1.7153)	(1.9151)	(1.6982)	(0.2787)
Free cash flow	-0.0803***						
	(0.0240)						
Profitability	-0.8934***						
	(0.0634)						
Interest rate	0.0117**	0.2808**	0.2431**	0.2828**	0.2925**	0.2030*	0.0305***
	(0.0053)	(0.1222)	(0.1222)	(0.1247)	(0.1427)	(0.1225)	(0.0065)
GDP Growth rate	0.0709***	0.7634***	0.6134***	0.4675**	0.3451*	0.4817***	0.1360***
	(0.0068)	(0.1790)	(0.1790)	(0.1818)	(0.2034)	(0.1792)	(0.0170)
Constant	-2.5231***	-26.5117***	-27.8902***	-12.6266***	-14.4169***	-8.2984*	19.0410***
	(0.1562)	(4.3367)	(4.4142)	(4.4205)	(5.3824)	(4.2568)	(1.3393)
P							-0.2339**
							(0.0943)
Selectivity bias (equation 2)		33.4769***	31.8580***	27.8274***	24.7157***	27.3773***	
		(1.6244)	(1.6480)	(1.6338)	(1.7285)	(1.5961)	
Selectivity bias (equation 3)		7.2401***	-5.6055***	1.8063**	-3.0184*	5.9013***	
		(0.3815)	(0.8186)	(0.7456)	(1.7204)	(0.6259)	
Firm – fixed effects	YES			YES			YES
Year – fixed effects	YES			YES			YES
Wald test of indep. eqns. ($\rho = 0$) $\chi^2(1)$							6.15**
Observations	20,976	20,994	20,994	20,994	20,994	20,994	20,968

Table 7: Heckman 2-stage model

Empirical estimation based on the Heckman 2-stage model without the *Choice* equation with firm- and year-fixed effects and robust standard errors. The sample includes data from 6,834 publicly listed firms in the US. The sample period is from January 2000 until December 2018. Firms' decisions follow the sequence shown in Figure 1. The first decision on issuance is represented by the binary dependent variable *Issue*. The selectivity bias variable indicates the presence of sample selection bias. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1[***]. Year fixed-effects and firm fixed-effects are included; however, the estimated coefficients are not reported. Variable definitions are given in Appendix A.

Variables	Issue	Volume
EPU	0.0007	0.0029
	(0.0034)	(0.0018)
EPU×SIZE	-0.0002*	-0.0004**
	(0.0001)	(0.0002)
EPU×PU	0.0005	0.0003***
	(0.0018)	(0.0001)
Long-term investor		0.0009
		(0.0074)
Institutional investor		-0.0062*
		(0.0038)
Individual		-0.0008
		(0.0046)
Government		-0.0782
		(0.0804)
Concentration	-0.0010	0.0027
	(0.0015)	(0.0054)
Golden parachute	0.0428	0.1224***
	(0.0539)	(0.0286)
CEO duality	-0.0509	0.0392**
	(0.0387)	(0.0196)
Insider optimism	0.0159	-0.0278
	(0.0271)	(0.0224)
Market optimism	0.0040*	0.0003
	(0.0021)	(0.0030)
Board size	0.0071	0.0375***
	(0.0120)	(0.0069)
Analyst coverage	-0.0077**	0.0183***
	(0.0032)	(0.0035)
Analyst variance	-0.0534	-0.1992***
	(0.0377)	(0.0424)
Firm size	0.3412***	-0.6048***
	(0.0327)	(0.0639)
Leverage	1.1334***	0.1367
	(0.1018)	(0.1204)
Cash	0.5953***	0.6622***
	(0.1303)	(0.2175)
Free cash flow	-0.0834**	
	(0.0341)	
Profitability	-0.1835*	
	(0.1019)	
Interest rate	0.0534	-0.0037

	(0.0445)	(0.0042)
GDP Growth rate	0.1178	-0.0109*
	(0.3211)	(0.0058)
Constant	-2.8323***	5.0286***
	(0.5228)	(0.6763)
Selectivity bias		0.1853***
		(0.0467)
Firm – fixed effects	YES	YES
Year – fixed effects	YES	YES
Wald $\chi^2(21)$		710***
Observations	18,307	9,504

Table 8: Robustness using VIX index

Empirical estimations based on the Heckman 3-stage ordered probit model with firm- and year- fixed effects and robust standard errors. Economic uncertainty is measured by the implied volatility index (VIX). The sample includes data from 6,834 publicly listed firms in the US. The sample period is from January 2000 until December 2018. Firms' decisions follow the sequence shown in Figure 1. The first decision on issuance is represented by the binary dependent variable *Issue*. The *Choice* categorical variable in the second column takes up values following the pecking order theory as follows: Loan = 1; Bond = 2; Convertible bond = 3; Preferred equity = 4; Common equity = 5. The selectivity bias variable indicates the presence of sample selection bias. *P* indicates the correlation between error terms in output and participation equations. Probability of estimates greater than standard statistics are provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1[***]. Year fixed-effects and firm fixed-effects are included; however, the estimated coefficients are not reported. Variable definitions are given in Appendix A.

Variables	Issue	Choice	Volume
VIX	-0.0008	-0.0337***	-0.0001
	(0.0016)	(0.0090)	(0.0020)
Long-term investor		-0.0354***	-0.0045
		(0.0077)	(0.0065)
Institutional investor		-0.0056**	-0.0106*
		(0.0027)	(0.0058)
Individual		0.0032	-0.0035
		(0.0031)	(0.0053)
Government		-0.0529	-0.1550
		(0.2704)	(0.0945)
Concentration	0.0006	0.0040	-0.0001
	(0.0010)	(0.0035)	(0.0078)
Golden parachute	0.0288	0.3082***	-0.1362***
	(0.0320)	(0.0558)	(0.0303)
CEO duality	0.0000	0.0224	-0.0561***
	(0.0183)	(0.0419)	(0.0213)
Insider optimism	0.0692***	0.1070***	-0.1238***
	(0.0221)	(0.0375)	(0.0325)
Market optimism	0.0055***	0.0063***	-0.0006
	(0.0016)	(0.0024)	(0.0043)
Board size	0.0256***	0.0052	0.0240***
	(0.0036)	(0.0126)	(0.0045)
Analyst coverage	-0.0068***	0.0060	0.0231***
	(0.0015)	(0.0042)	(0.0030)
Analyst variance	0.0280	-0.1088*	-0.3173***
	(0.0293)	(0.0616)	(0.0549)
Firm size	0.2405***	-0.0402	-0.5850***
	(0.0092)	(0.0446)	(0.0451)
Leverage	0.8188***	0.4177***	-0.4343***
	(0.0539)	(0.1419)	(0.1200)
Cash	0.0399	1.2364***	2.1638***
	(0.0795)	(0.2255)	(0.2118)
Free cash flow	-0.0854***		
	(0.0258)		
Profitability	-0.8748***		
	(0.0798)		
Interest rate	0.0150***	0.2865***	-0.0035
	(0.0054)	(0.0625)	(0.0064)
GDP Growth rate	0.0611***	-0.2130**	-0.0340***
	(0.0072)	(0.1039)	(0.0112)
Constant	-2.4087***		6.5781***
	(0.1208)		(0.7877)
P			-0.6248***
			(0.1608)
Selectivity bias			-0.0451**
			(0.0207)
Firm – fixed effects	YES	YES	YES
Year – fixed effects	YES	YES	YES

Wald test of indep. eqns. ($\rho = 0$) $\chi^2(1)$			15.10***
Observations	20,976	20,976	20,969

Appendices

Appendix A: List of variables with their definitions and database sources.

Variable	Definition	Source
Issue	Binary variable which takes the value of 1 if the firm raises capital, 0 otherwise.	SDC Platinum
Choice	Categorical variable assigned value based on the firm's choice of security. Following are the possible choices: Loan = 1; Bond = 2; Convertible bond = 3; Preferred equity = 4; Common equity = 5	SDC Platinum
Volume	Ratio of dollar volume of capital raised by the firm with total assets.	SDC Platinum
EPU	End-of-year index value of the Economic Policy Uncertainty Index.	Bloomberg
Concentration	Percentage of ownership by the highest shareholder in the firm.	Thomson Reuters Ownership
Institutional investor	Percentage of ownership in the firm by institutional investors. These include mutual funds, hedge funds, advisors, private equity, and venture capital firms.	Thomson Reuters Ownership
Long-term investor	Percentage of ownership in the firm by long-term institutional investors. These include endowments, pension funds, sovereign-wealth funds, and banks.	Thomson Reuters Ownership
Individual	Percentage of ownership in the firm by individuals and families.	Thomson Reuters Ownership
Government	Percentage of ownership in the firm held by the government.	Thomson Reuters Ownership
Golden parachute	Binary variable which takes the value of 1 if the firm has a golden parachute or other restrictive clauses with a compensation plan for accelerated pay-out, 0 otherwise.	Datastream
Board size	Number of members on the board of directors.	Datastream
CEO duality	Binary variable which takes the value of 1 if the CEO is also the chairperson of the board, 0 otherwise.	Datastream
Insider optimism	Level of optimism of a firm insider, calculated as: $\max(0, \frac{\text{volume purchased} - \text{volume sold}}{\text{volume purchased}})$	Thomson Reuters Insiders
Market optimism	Market-to-book value.	Compustat
Analyst coverage	Number of analyst recommendations for the firm.	I/B/E/S
Analyst variance	Standard deviation in earnings estimates by analysts covering a firm divided by price per share.	I/B/E/S
Firm size	Log of total assets of the firm.	Compustat
Profitability	Return-on-assets.	Compustat

Leverage	Debt-to-assets ratio.	Compustat
Cash	Cash-to-asset ratio.	Compustat
Free cash flow	Binary variable equal to 1 if the firm has positive cash flows, 0 otherwise.	
GDP growth	Percentage change in annual GDP.	Bloomberg
Interbank rate	End-of-year Federal Funds rate.	Bloomberg

Appendix B: Blinder-Oaxaca estimation results

Empirical estimation results from the Blinder-Oaxaca model breaking down the geometric mean difference between equity and debt issuance volume. The column titled, 'Explained' shows the adjustment in coefficients that explain a rise of equity issuance volume to the level of debt. The 'Unexplained' column shows the unexplained coefficients. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1***.

Variables	Explained	Unexplained
EPU	-0.0008	-0.0084
	(0.0012)	(0.0908)
EPU*size	0.0053	0.0222
	(0.0183)	(0.1028)
EPU*PU	-0.0002	-0.0131
	(0.0007)	(0.0083)
Concentration	-0.0024**	-0.2224*
	(0.0012)	(0.1141)
Long-term investor	-0.0115**	0.0302**
	(0.0047)	(0.0135)
Institutional investor	-0.0006	0.1264
	(0.0007)	(0.0934)
Individual	0.0017	0.0010
	(0.0023)	(0.0023)
Government	-0.0000	0.0001
	(0.0001)	(0.0003)
Golden parachute	-0.0002	0.0018
	(0.0020)	(0.0330)
CEO duality	-0.0036	0.0181*
	(0.0023)	(0.0101)
Insider optimism	-0.0032*	-0.0083**
	(0.0017)	(0.0040)
Market optimism	-0.0025**	-0.0055
	(0.0012)	(0.0045)
Board size	-0.0016	0.0008
	(0.0052)	(0.0365)
Firm size	0.1922***	-0.2803**
	(0.0228)	(0.1290)
Analyst coverage	0.0098*	-0.0063
	(0.0054)	(0.0226)
Analyst variance	0.0026	-0.0228
	(0.0017)	(0.0260)
Leverage	0.0027*	0.0046
	(0.0015)	(0.0155)
Cash	-0.0150***	-0.0036
	(0.0051)	(0.0047)
Interest rate	0.0027**	-0.0131
	(0.0013)	(0.0092)
GDP Growth rate	-0.0000	-0.0151
	(0.0004)	(0.0147)
Constant		0.4621**
		(0.1871)
Observations	9,726	9,726

Chapter 4

How economic uncertainty explains insider trading in an endogenous framework

4.1 Introduction

The effects of insider trading and underlying beliefs of shareholders on post-trade performance of firms is a major topic of debate among academics and practitioners. It is argued that insider trades improve price efficiency because outside investors can extract private information from voluntary trades. Further, the market treats insider transactions and a subsequent corporate announcement (such as dividend changes) as complementary signals instead of independent ones (Chao and Vayanos, 2008; Bagnoli and Khanna, 1992; John and Mishra, 1990; John and Lang, 1991). On the contrary, empirical evidence suggests that insider trades either push the management to take inefficient actions or trade based on private information to earn trading profits (Fishman and Hagerty, 1992; Khanna et al., 1994; Leuz et al., 2003). The associated literature has focused on understanding the determinants of insider trading by relating their access to private information. For example, Ellul and Panayides (2018) show that insider trades are driven by information asymmetry and firm ownership structure. Similarly, Ke et al. (2003) illustrate how sales of firm shares by insiders are motivated by foreknowledge of a potential drop in earnings. Bade (2016) finds that heterogeneously informed insiders trade more aggressively and profitably than monopolistic insiders by exploiting their knowledge from multiple sources. Goergen et al. (2019) highlight the importance of non-firm specific private information by suggesting that connected directors from multiple companies trade more profitably.

Previous studies on the determinants of insider trading have not considered the impact of economic uncertainty as a factor either to signal about private information or to extract trading gains. Studying the impact of economic policy uncertainty (EPU) on firm behaviour is not

uncommon. Prior studies suggest that during higher economic policy uncertainty firms incur higher costs of debt, face wider yield spreads, pay higher equity risk premia, and delay spending and investment (Husted et al., 2019; Baker et al., 2016; Gulen and Ion, 2016; Baker and Wurgler, 2002; Pástor and Veronesi, 2013; Waisman et al., 2015; Bradley et al., 2016). Further, Nagar et al. (2019) provide evidence that higher EPU increases information asymmetry. Since it is documented that a rise in information asymmetry results in higher insider trades, we can expect periods of high EPU to offer greater incentives for insider trading. This chapter analyzes the relationship between insider trading and economic policy uncertainty.

Strong control over the firm – reflected by ownership structure and governance mechanisms – can affect the nature of insider trading by alleviating the information gap between insiders and other shareholders. For example, ownership concentration, that includes a large blockholder and/or a higher proportion of long-term institutional investors, alleviates information asymmetry and reduces insider trading (Bushee, 2010; Gaspar et al., 2005). Similarly, governance attributes also affect insider trades, whereby executives with greater control feel empowered to trade. Such attributes could include CEO duality, a phenomenon where CEOs have the additional role of Chairman (Korkeamäki et al., 2017), and the presence of a golden parachute clause in severance contracts (Mansi et al., 2016). Furthermore, higher analyst coverage bridges the information gap between firm management and investors, reducing insiders' motivation to trade (Ellul and Panayides, 2018). This study provides evidence on how ownership structure and governance mechanisms, in addition to EPU, are associated with insider trading.

Using the market value of insider trades, I develop a unique measure for insider trading. I believe this measure is more suitable than the ones often used in the literature as it captures the market value of each of the buy and sell transactions as a proportion of total shares purchased and sold. Previously, authors employed insider holdings as a representation of overall insider

stake at different points in time (Ellul and Payandies, 2018), net shares purchased by insiders (Dai et al., 2016), purchase and sale transactions analyzed independently (Fidmurc et al., 2006), and the difference between shares purchased and sold (Ke et al., 2003). My measure determines the change in insider stakes by incorporating the market value of purchase and sale transactions. It offers an enhanced understanding of insiders' confidence by measuring the proportional increase in the market value of purchases after aggregating it with sales. As a robustness check, I use two more proxies for insider trading to capture the level of insiders' belief depicted through voluntary trades about the firm's economic performance. These proxies are designed to capture CEO trading (focused on CEO trades rather than all insiders) and the volume of shares traded.

Besides using a broader range of proxies for insider trading, I consider the simultaneous nature of the relationship between the insider trading and EPU due to endogeneity concerns. By using a simultaneous equations model with a sample of over 45,635 firm-year records of publicly held US firms over the period from 2000 until 2018, I find evidence of a relation between insider trading and EPU after controlling for endogeneity. The 2SLS estimation helps control for the endogeneity bias.

The empirical results show that EPU is positively associated with insider trading, suggesting that firm insiders trade increasingly in the presence of higher EPU because of greater information asymmetry under these circumstances. This can be interpreted as during the period of higher information asymmetry caused by the increase in EPU (Nagar et al., 2019), insiders trade more frequently by exploiting their information advantage; this sends positive signals to the market about the future performance of the firm. Regarding ownership variables, I find that blockholding owners and institutional investors generally encourage insider share investment in firms but, importantly, reduce the value of share purchasing by insiders during periods of high economic uncertainty, suggesting that blockholders and institutional investors closely

monitor the firm management and minimize the degree of information asymmetry and advantageous trading opportunities during such periods. This reduces opportunities for insiders to gain by exploiting their information advantage over outsiders. These findings endorse Ellul and Payandies (2018). Also, I find that firms with CEO duality are not associated with greater insider trading. This implies that CEO duality does not provide additional information that would otherwise allow incremental trading benefits on top of that associated with just being an insider. Further, firms with a golden parachute clause in executive contracts witness significantly fewer insider trades, implying that the protection such clauses provide for CEOs results in a decline in their tendency to benefit through share trading from information asymmetry. The findings remain consistent in empirical estimations with alternate measures of insider trading and economic uncertainty.

This chapter contributes to the literature by showing that periods of higher economic policy uncertainty affect insider trading. It provides evidence that higher information asymmetry associated with increased economic uncertainty affects the trading pattern of corporate insiders. I also provide evidence that influential shareholders in the form of large blockholders or institutional investors play an important role in price discovery of firms. Ownership by long-term as well as short-term institutional investors, particularly in small-sized firms, can play an important role in share price efficiency and reducing the degree of insider trades through effective monitoring. Another contribution of this study is that it highlights the role of executive control and their trades. This is useful for shareholders in that greater influence or control offered to executives – such as through CEO duality – does not lead them to significantly raise their stake within the firm, although it is not clear whether this may have agency alignment or entrenchment consequences.

The remainder of the paper is structured as follows. The next section presents the hypotheses. In Section 3, I discuss the methodology and the variables. Section 4 describes the data and

summary statistics, and Section 5 presents empirical results. Finally, concluding remarks are offered in Section 6.

4.2 Hypotheses development

In a hypothetical scenario where there is no difference in the information held by firm insiders and outsiders, the former will have little opportunity to exploit their position to make profitable trades. However, as indicated by Ke et al. (2003) and Ellul and Panayides (2018), information asymmetry allows insiders to benefit from their knowledge by timing their trades. In this section, I develop hypotheses about how uncertainty in economic policy, ownership structure, and governance mechanisms affect insider trading.

4.2.1 Economic policy uncertainty and insider trading

Factors affecting price discovery and informed trading have been of research interest in financial economics. Studies by Ederington and Lee (1993), Ederington and Lee (1995) and Fleming and Remolona (1999) show a relationship between macroeconomic announcements and share price adjustment. Erenburg et al. (2006) offer evidence that traders with quick access to the market (locals) react faster and make profitable trades immediately following macroeconomic announcements on factors such as employment, gross domestic product (GDP), and consumer price index (CPI).

The theory on divergence of beliefs (Harris and Raviv, 1993; Karpoff, 1986) asserts that different investors interpret the same information differently, and hence place opposing bets on the same stock, leading to improved liquidity and eventual price adjustments. Since macroeconomic information has no element of advantage to firm insiders, they would not be better off trading than outsiders upon announcement of macroeconomic news. In fact, the interpretation of news and trading bets could go either way for insiders.

However, Nagar et al. (2019) suggest that uncertainty in economic policy has a direct and positive relation with information asymmetry. It is also documented that variation in

information asymmetry correlates with changes in insider trading pattern (Ellul and Panayides, 2018). We can infer that since variation in the magnitude of EPU affects information asymmetry, it incentivizes firm insiders to adjust their trading frequency. In other words, high EPU is associated with a wider information gap between firm insiders and potential investors, leading to a rise in insider trading. My null hypothesis is that EPU has no impact on insider trading with two possible alternatives, with the expectation being that insiders will exploit their information advantage by trading more frequently during the high EPU periods to earn higher trading profit in future. It may also be feasible, alternatively, that a rise in EPU increases the doubt about insiders' perception of firm valuation or the benefits of trading, potentially leading to lower insider trading.

4.2.2 Ownership structure and insider trading

I further investigate the role of information asymmetry in influencing insider trading. Literature suggests that shareholders with large ownership stakes increasingly provide monitoring of management (Admati et al., 1994). They are also incentivized to scrutinize firms through their voting power (Maug, 1998). This increase in monitoring intensity is likely to benefit all shareholders by reducing information asymmetry between the firm and investors. Two types of shareholders are of interest in the context of insider trading: blockholders and institutional investors.

Fidrmuc et al. (2006) argue that ownership concentration helps alleviate the motivation of insiders' trading based on their foreknowledge. They find that insiders' trades in firms owned by outside blockholders has less informational value for insiders. This is because concentration of ownership could help reduce information asymmetry, driving down insider trading. Based on this premise, my second hypothesis is that higher ownership concentration moderates the effect of EPU on insider trading due to the decline in information asymmetry.

Institutional investors are more informed than other categories of shareholders due to their superior knowledge of the market, skills, and resources (Bogle, 2018). The role of institutional owners in the US has amplified in recent years. This is evident as their ownership, particularly through asset management companies, exceeded 70% in publicly held US firms in 2018 (Bogle, 2018). Further, Amihud and Li (2006) assert that large stakes acquired by institutional investors allows them to collect private information about the underlying company, allowing them to compete with insiders. This is particularly true for institutional investors with a long-term horizon (Chen et al., 2007). Institutional investors may be classified into long-term and short-term investors based on differences in their investment objectives and time horizons (Khawaja et al., 2019; Elyasiani and Jia, 2010; He et al., 2019). Long-term institutional investors exert monitoring pressure on management, resulting in lowering agency costs and information asymmetry with other shareholders (Zhang and Zhou, 2018; Chen et al., 2007; Gaspar et al., 2005). Short-term institutional investors, on the other hand, seek price returns over a shorter span of time. It is under weak monitoring conditions in the presence of larger proportions of short-term shareholders when management finds opportunities for trading gains. Based on this assertion, I hypothesize that the proportion of long-term institutional investors in the ownership structure moderates the effect of EPU on insider trading. Equivalently, greater levels of short-term institutional investor ownership are expected to aggravate the effect of EPU on insider trading.

4.2.3 Governance mechanisms and insider trading

Efficient governance mechanisms reduce the ability to trade on inside information (Dai et al., 2016). This is because well-governed firms align the interests of shareholders with those of managers, limiting managerial incentives to profit from insider transactions. Lee et al. (2014) add that information asymmetry is significantly lower in firms with restriction policies on insider trading and that governance mechanisms play an important role in the adoption of such

policies. Although several governance attributes can affect insider trading, I focus on those that could empower executives in corporate decision-making. This is because executives with greater control would be increasingly able to defy governance standards in favor of insider trades. Three such standards or attributes include CEO duality, the existence of a golden parachute clause, and board size.

Adams et al. (2005) show that firm performance is more variable in the presence of powerful CEOs. It is further documented that CEOs are better informed about the company's prospects (Fidmurc et al., 2006). CEOs are also found to trade more frequently than other insiders (Seyhun, 1986; Lin and Howe, 1990). CEO duality, a leadership structure in which the CEO is also the chairperson of the board of directors, indicates the presence of greater control (Chen et al., 2012; Hazarika et al., 2012; Masulis et al., 2012); this makes them more likely to extract benefit from insider transactions. Hence, I postulate that governance structure associated with strong executive control, as measured by the presence of CEO duality, is aligned with higher insider trading.

A golden parachute clause in severance contracts can act as a barrier to restrict insider trading. Falaschetti (2002) argues that golden parachutes promote firm efficiency by enhancing the credibility with which owners can commit against undertaking opportunistic actions. This would lead to a lower frequency of insider trades. However, literature suggests that golden parachute clauses are associated with CEO entrenchment (Almazan and Suarez, 2003) and reduced likelihood of takeover bids (Agrawal, 1998), empowering CEOs. Hence, I expect the presence of golden parachute contracts to result in greater insider trading.

I also include board size as an additional control for the effects of governance on insider trading. Literature suggests that large boards are less likely to function effectively, giving CEOs greater control over decision-making (Jensen, 1993). Hence, I expect a positive relation between board size and insider trading.

4.3 Empirical methodology and covariate definitions

Removing endogeneity is a major concern in my choice of empirical model. I expect that insider trading and EPU are jointly endogenous variables, implying that some of the factors that affect insider trading also determine EPU. In order to deal with endogeneity, I follow Wooldridge (2010) by using the two stage least square (2SLS) model for the empirical estimations. In the model, the observed changes in insider trading consists of two components: a discretionary adjustment and a change caused by factors exogenous to firms. The exogenous changes in insider trading could be the result of the interaction of various factors including changes in ownership structure and governance mechanisms, profitability, unanticipated shocks to the national or local economy, and EPU. The developed model used for regression estimation is as follows:

$$y_{it} = \boldsymbol{Y}_{it}\gamma + \boldsymbol{X}_{it}\beta + \mu_i + \vartheta_{it} = \boldsymbol{Z}_{it}\boldsymbol{\delta} + \mu_i + \vartheta_{it} \qquad (1)$$

where y_{it} represents insider trading of shares in firm *i* at time *t*, $\boldsymbol{Y}_{it}$ represent the EPU and is an $1 \times h_2$ vector of observations on h_2 endogenous variables included as covariates, and these are allowed to be correlated with ϑ_{it}. h_2 contains macroeconomic variables used as instruments in the first stage of the 2SLS regression structure; these variables include interest rate, GDP growth, and unemployment rate as they are volatile during recession periods, for instance, that generate high economic uncertainty (Bloom, 2014). $\boldsymbol{X}_{it}$ is an $1 \times k_1$ vector of observations on the exogenous variables consisting of ownership structure, governance mechanisms and firm-specific variables included as covariates; $\boldsymbol{Z}_{it} = [\boldsymbol{Y}_{it}\ \boldsymbol{X}_{it}]$; γ is a $h_2 \times 1$ vector of coefficients; β is a $k_1 \times 1$ vector of coefficients; and $\boldsymbol{\delta}$ is a $K + 1$ vector of coefficients, where $K = h_2 + k_1$; μ_i represents firm-fixed effects, while ϑ_{it} is the error term.

The following is a discussion about the variables used in this study. A tabulated description of the variables with their definitions is shown in Appendix A.

4.3.1 Insider trading

Prior studies use different proxies to investigate insider trades. Ellul and Payandes (2018) use daily data to analyze the impact of insider trades on liquidity. Dai et al. (2016) use daily price movements and traded volume to evaluate how efficiency in governance mechanisms restrict insider trades. Fidmurc et al. (2006) investigate market reaction to insider transactions by using daily data of purchase and sales. Erenburg et al. (2006) use hourly frequency data about macroeconomic announcements and insider trades. They also mention that studies on macroeconomic news and equity market reaction often employ lower frequency data because major equity markets are closed when most of the US macroeconomic news is released. Since my data incorporates macroeconomic uncertainty as well as ownership and governance variables which change less frequently, the sample has annual frequency. This helps to build a measure that aggregates yearly purchase and sale transactions by insiders. My first measure of insider trading is calculated using the formula below:

$$IT_{it} = \frac{(MVP_{it} - MVS_{it})}{(MVP_{it} + MVS_{it})} \qquad (2)$$

where $MVP_{i,t}$ and $MVS_{i,t}$ represent the market value of shares purchased and sold by insiders of firm *i* during year *t*. The IT_{it} ranges between -1 and 1 showing an insider's trading perspective in terms of lowering or raising their stake within the firm.

Fidmurc et al. (2006) emphasize the importance of the power and control that CEOs enjoy relative to other major insiders. Studies by Seyhun (1986) and Lin and Howe (1990) find CEO trades to be larger than those of other insiders, resulting in stronger price reactions. Hence, I develop a measure to capture CEO trading as follows:

$$ITC_{it} = \frac{(MVP_{c,it} - MVS_{c,it})}{(MVP_{c,it} + MVS_{c,it})} \qquad (3)$$

where ITC_{it} is a proxy for CEO trading, $MVP_{c,it}$ and $MVS_{c,it}$ are the market value of shares purchased and sold by the CEO *c* of firm *i* during year *t*. One of the limitations of $ITC_{it,}$ is the

underlying assumption that CEOs reflect the behaviour of all the insiders. A CEO may not be as heavily invested as some of the other investors and may not trade to keep the status quo. Furthermore, the human capital of the CEO is also vested in the firm. Hence, the decision of CEOs to trade could be biased. Besides, the above two measures do not incorporate the number of shares purchased and sold. Following Ke et al. (2003), I create another measure using the following formula:

$$ITS_{it} = \frac{(P_{it} - S_{it})}{(P_{it} + S_{it})} \qquad (4)$$

where ITS_{it} represents insider trading, P_{it} and S_{it} represent number of shares purchased and sold by insiders of firm *i* during time *t* respectively. Essentially, it is the excess in the number of shares purchased as compared to the total number of shares sold by insiders of firm *i* in year *t*. In years with no records of trading, the variable is kept at zero.

4.3.2 Economic policy uncertainty

A commonly used proxy for variation in economic uncertainty due to policy variation is the EPU index by Baker et al. (2016)[15]. The EPU index is constructed by extracting information from different sources[16]. An important component of the index is searches of newspapers about key terms such as "policy uncertainty" or "economy". A second component includes the temporary tax code provisions reported by the US Congressional Budget Office, as these measures indicate uncertainty for businesses and households. The third major component of the index is about dispersion in forecasts from the central bank about consumer prices and purchases of goods and services by state and federal governments. These variables are taken as indicators of monetary and fiscal policy movements. The variable EPU_t reflects the value of

[15] Some of the recent studies to have employed the EPU index include Xu (2020), Goodell et al. (2020), Nagar et al. (2019), Pham (2019), and Ashraf and Shen (2019).
[16] Economic Policy Uncertainty Index
https://www.policyuncertainty.com/us_monthly.html

the economic policy uncertainty index in year *t*. The value of EPU_t is the same for each firm and insider observation in a given year.

I also incorporate macroeconomic variables that could have an endogenous relationship with EPU. Bloom (2014) suggests that although the causality of uncertainty and growth is unclear, uncertainty arises from bad news shocks. He identifies macroeconomic indicators of uncertainty, including economic growth, exchange rate, and unemployment rate. I include variables as proxies for the interest rate ($INTEREST_t$), GDP growth (GDP_t), and the unemployment rate ($UNEMP_t$).

4.3.3 Ownership variables

To capture the impact of ownership structure on insider trading, I introduce three variables. $CONC_{it}$ indicates the percentage ownership level held by the largest shareholder in firm *i* in year *t*. Following Zhang and Zhou (2018), I classify institutional investors into two categories: long-term investors (LTI_{it}) and short-term investors (STI_{it}). The former comprises of endowments, pension funds, sovereign-wealth funds, and banks. The latter group consists of asset management firms that are interested in generating returns for their clients and are likely to have a short-term investment horizon. These include mutual funds, hedge funds, advisors, private equity, and venture capital firms. I calculate institutional ownership by taking the sum of the ownership percentage of all shareholders classified in each category. I create interaction terms of each ownership variable with EPU to examine whether the firm ownership structure moderates the relation between EPU and insider trading.

4.3.4 Governance variables

It is documented that efficient governance mechanisms can reduce the motivation for insider trading (Dai el al., 2016). My choice of variables for governance mechanisms stems from their ability to affect a firm's deficiency in the internal governance system that may provide incentives to engage in transactions for trading gains. CEO_{it}, a binary variable indicating a

unitary management system where the CEO serves as the chairperson of the board of directors, is associated with greater executive control (Korkeamäki et al., 2017). Jensen (1993) discusses how CEO duality can make it difficult for the board to perform its functions effectively. I also incorporate the presence of severance contracts using the binary variable $GOLDEN_{it}$. This variable indicates the presence of a golden parachute clause in firms' executive contracts, which is suggested to improve firm efficiency by increasing the credibility with which owners can commit against opportunism (Falaschetti, 2002), but have also been associated with CEO entrenchment and takeover protection (Almazan and Suarez, 2003; Agrawal, 1998).

The structure of the board of directors can also affect governance efficiency. Jensen (1993) suggests that large boards lead to greater CEO control. I use the variable $BOARD_{it}$, which represents the total number of board members, to control for board size.

4.3.5 Other variables

Literature suggests several firm- and macroeconomic-specific variables as candidates for covariates in explaining the nature of insider trading. Following Ellul and Panayides (2018), I use analyst coverage ($ANLST_{it}$) to control for information asymmetry. $ANLST_{it}$ is the sum of the number of financial analysts covering the firm. A higher degree of analyst coverage would imply lower information asymmetry. To control for the dispersion in opinion among analysts, following Gomes and Phillips (2012), I include $DISP_{it}$, representing the standard deviation of the analyst earnings estimates divided by price per share. A higher value for this variable implies higher information asymmetry as the dispersion indicates greater uncertainty or variation with analysts' forecast accuracy about firms' disclosures (Lang and Lundholm, 1996). To control for firm-specific factors, I include $SIZE_{it}$, represented by the natural logarithm of the total employees of the firm (Angelini and Generale, 2008; Beck et al., 2005). Firm profitability also provides incentives for insider trading as suggested by Ellul and Panayides (2018). I include $PROFIT_{it}$, calculated as the after-tax return on assets. To capture the nature

of market optimism particularly in regard to growth opportunities and future value creation, I use the market-to-book ratio (MBV_{it}) as a proxy following Dai et al. (2016). Further, I incorporate the variable $LEVERAGE_{it}$, calculated as the debt-to-asset ratio to control for the impact of capital structure on the nature of insider trading (Ellul and Panayides, 2018).

4.4 Sample and statistics

The sample represents all publicly listed non-financial firms in the US over the period beginning January 1, 2000 until December 31, 2018 taken from Compustat. Data on the economic policy uncertainty index, GDP growth and interest rates are taken from Bloomberg Professional Services, while economic data on the US unemployment rate is extracted from the US Bureau of Labor Statistics. The data related to ownership information is gathered from the Thomson Reuters Institutional Ownership database while the corporate governance data is obtained from the Datastream ASSET4 database. I use the Institutional Broker's Estimate System (I/B/E/S) database to collect data on analyst coverage and dispersion in their opinion about sample firms.

Data for insider trading activity is extracted from the Thomson Reuters Insiders database. The transactions include all voluntary trades by the chairperson of the board of directors, CEO, president, director vice chairman, executive vice president, beneficial owner of more than 10% of a class of security, and other insiders such as directors, chief financial officer (CFO), chief operating officer (COO), controller, limited partners etc.[17] Since the focus of this study is to estimate the level of insider trading, all those transactions that are not voluntary are dropped. These include the conversion of derivative securities, grants, awards, conversion of securities into another class etc. Transactions by insiders to achieve a minimum mandatory ownership level are treated as purchase transactions.

[17] A complete list of insiders is available in US Insider Filing Feed Specification document by Thomson Reuters.

Since the sample data is acquired from multiple sources, I use the company exchange tickers to merge individual firms' records. After the merging of data sources, all records with missing data on firm assets, debt, and common equity are dropped. I also drop records with missing information for ownership and governance variables. The final sample consists of 45,635 firm-year observations.

Table 1 presents a summary of the number of transactions classified by the insider category and the type of transaction. The table shows a general preference for purchasing by insiders. Among the major categories of insiders, CEOs are engaged in a greater number of transactions, followed by presidents, board chairpersons, and directors. This trend is in line with Seyhun (1986) and Lin and Howe (1990) that the volume and size of transactions by CEOs are greater than other executives and directors. In the share purchases category, CEOs are followed by chairpersons in both volume and count. In addition, although presidents' share sale transaction count is higher than that of chairpersons, their market size is smaller, suggesting a low dollar value of trades by firm presidents during share selling activity. Overall, the table suggests that purchase transactions are much higher – in both number as well as size – as compared to sale transactions, implying a trend towards net purchasing of securities over the period.

INSERT TABLE 1 HERE

Table 2 reports the descriptive statistics of non-binary variables. Among the ownership variables, high ownership concentration is visible; this endorses the findings of Holderness (2009). Combined institutional ownership levels of short-term and long-term investors adds up to about 90%, on average, which is in line with Elyasiani and Jia (2010). The variation among macroeconomic variables is comparable, indicative of their inherent relationship and co-movement.

INSERT TABLE 2 HERE

Table 3 shows the correlation matrix and it can be observed that the direction of the correlations is as per the hypotheses albeit with some exceptions. The three measures of insider trading show positive correlation with each other. The most notable is the correlation coefficient of 0.92 between insider trading based on number of shares traded as computed by Equation 2 and market value of trading as computed by Equation 3. Among other variables, EPU_t is positively correlated with each of the three dependent variables, albeit with smaller correlation coefficients. This offers weak support for the proposition that higher EPU is associated with higher insider share trading. The correlation coefficients for LTI_{it} and STI_{it} with IT_{it} are negative, although the coefficients are very small. The coefficients for LTI_{it} are consistently higher than those of STI_{it}. Both the governance variables of CEO_{it} and $GOLDEN_{it}$ have positive correlation coefficients with IT_{it} suggesting a possibility of higher insider trading activity associated with greater control by executives. The correlation relationships for variables proxying for information asymmetry are in line with my expectations.

INSERT TABLE 3 HERE

4.5 Empirical results

Before presenting the estimations results, I believe it is pertinent to ensure that the estimation methodology is appropriate. One of the potential problems in a larger dataset is the presence of multicollinearity due to the variety of exogenous variables including ownership, governance, firm-specific and macroeconomic factors. I conduct the variance inflation factor (VIF) test to detect evidence of multicollinearity in the sample. Table 4 reports the VIF estimates of the individual variables. The VIF values reported in Table 4 are less than 5 and the mean VIF is 1.63. These results suggest the absence of multicollinearity in the sample (O'Brien, 2007).

INSERT TABLE 4 HERE

Another concern with the empirical estimation is that EPU may not be exogenous as some of the unobserved macroeconomic characteristics could determine both EPU and insider trading simultaneously. To test for the presence of simultaneity bias and the need for a simultaneous estimation model, I use the Hausman test (Hausman 1978, Nakamura and Nakamura, 1981). Test statistics from the Hausman test are reported at the bottom of Table 5, rejecting the null hypothesis of no correlation. This indicates that use of instrumental variables and two-stage least squares (2SLS) model estimation is preferred to OLS. The p-values for the rk LM underidentification test confirm the relevance of the instruments. The f-test coefficients in Table 5 further confirm that the model efficiently explains the relationship of the regressors with insider trading. In empirical estimation using the 2SLS model, I use the US Gross Domestic Product growth rate (GDP_t), the Federal Funds rate ($INTEREST_t$), and unemployment rate ($UNEMP_t$) variables as the determinants for EPU_t as discussed by Bloom (2014) and Wisniewski and Lambe (2015). Appendix B shows the first stage results with significant $INTEREST_t$ and $UNEMP_t$ coefficients but an insignificant GDP_t coefficient.

Table 5 reports the estimation results for the second stage in three panels with IT_{it} computed from Equation 2. Panel A accounts for macroeconomic, ownership, and governance variables. Panel B controls for macroeconomic and firm-specific variables. Panel C reports the results of the complete model after incorporating all of the explanatory variables.

Table 5 reports that the coefficient of EPU_t is positive and significant in all of the three models. This suggests that during periods of higher economic policy uncertainty, insiders exploit their information advantage for future trading profit and increase the purchase of company shares. This supports the hypothesis that high EPU yields greater insider trading. We can attribute the rise in insider trading to the increase in information asymmetry under high EPU (Nagar et al., 2019). The coefficient of EPU_t is 2.32, which corresponds to a standardized beta of 3.75,

indicating that a one unit rise in the EPU index is associated with an average rise in insider trading volume by a factor of 3.75.

INSERT TABLE 5 HERE

I find support for the monitoring hypothesis with regard to the moderating effect of long-term institutional investors as depicted by the negative and significant coefficient of the interaction term with IT_{it}, suggesting that higher shareholdings by long-term investors moderate the effect of EPU on insider trades by reducing the information advantage of insiders. This adds evidence to Bushee (2010) suggesting that information asymmetry is restrained by institutional investors, particularly those with a long-term investment horizon. The coefficient of LTI_{it} itself is positive and significant, suggesting that the presence of long-term institutional investors is generally associated with greater insider share purchasing consistent with the encouragement of insider bonding through share ownership. Furthermore, the interaction term of EPU_t and STI_{it} is also negative albeit with a smaller coefficient, suggesting that short-term institutional investors also are associated with a similar moderating effect of EPU, leading to a reduction in insider trading. This contradicts my expectation that greater levels of short-term institutional ownership are associated with rise in insider trading during periods of high economic uncertainty. However, the coefficient of STI_{it} is insignificant. This implies that institutional investors generally help to reduce insider trades during periods of high economic uncertainty. Regarding the presence of blockholders ($CONC_{it}$) in the ownership structure, the interaction variable coefficient is negative while the $CONC_{it}$ coefficient is positive. This indicates that ownership concentration under high economic uncertainty is associated with lower insider trading due to the intense monitoring by concentrated shareholders, although the effect is opposite in periods when EPU is low. Overall, the results from the ownership variables have two implications. First, blockholding shareholders and long-term institutional investors encourage insiders to increase ownership as an agency mechanism to align their interests with

those of shareholders. Second, blockholding shareholders and institutional investors increase monitoring pressure and discourage insider trading during periods of high economic uncertainty to prevent insiders from exploiting their information advantage, which is elevated by the rise in information asymmetry.

Among the governance variables, the coefficient of CEO_{it} is insignificant in Panel C, suggesting that insiders with greater control, on average, do not opportunistically increase their ownership stake by purchasing stocks from public markets. On the other hand, the coefficient for $GOLDEN_{it}$ is negative and significant, suggesting that the presence of a golden parachute clause is associated with lower insider trading. The finding supports the argument that severance contract clauses help to reduce insider trading; this could be attributed to the relation of the presence of the clause with improvements in governance efficiency (Falaschetti, 2002). Alternatively, the entrenchment benefits provided through the golden parachute may reduce the incentive to extract benefits through insider share trading.

The association between the information asymmetry proxies and insider trading is in line with the hypothesis expectations. The negative and significant coefficient of the $ANLST_{it}$ variable indicates reduced insider trading in the presence of lower information asymmetry. However, the coefficient of the $DISP_{it}$ variable is insignificant. The negative coefficient of $SIZE_{it}$ is in line with my expectation that large firms are associated with lower information asymmetry, resulting in decreased IT_{it}. This complements the finding of Ellul and Panayides (2018) that lower information asymmetry helps reduce insider trades. The results for other control variables, namely $LEVERAGE_{it}$, $PROFIT_{it}$, and MBV_{it} are in line with expectations. For brevity, they are not discussed here.

In summary, I find evidence that during periods of higher economic policy uncertainty, firm insiders exploit their information advantage and send positive signals to the market about the future performance of the firm. This may result in trading gains for the insiders. Furthermore,

long-term institutional investors help in curbing insider trading during these periods, highlighting their role in the intense monitoring of firm executives and reduction of information asymmetry. Also, I find that the presence of a golden parachute clause in severance contracts is associated with lower insider trading.

4.5.1 Alternative insider trading proxies

To ensure the robustness of the findings, I re-estimate Equation 1 by replacing the proxy for insider trading with those developed in Equation 3 and Equation 4. The insider trading proxy (ITC_{it}) in Equation 3 reflects the insider trades by the CEO while the proxy in Equation 4 takes into account only the number of shares traded by the insiders. The following sub-sections report the empirical findings based on these proxies.

4.5.1.1 CEO trading

Table 6 reports the estimation results using ITC_{it} measured based on trade transactions by CEOs as a measure for insider trading. An obvious deviation from the trend in Table 5 is a lower level of significance for most of the variables despite no change in the sign of coefficients. This indicates that ITC_{it} based on CEO trading is a less informative proxy for insider trading.

INSERT TABLE 6 HERE

The coefficient of EPU_t is positive and significant in Panel B, but the coefficients of EPU_t, ownership, and governance attributes are insignificant in Panel C. These findings add partial support for the first hypothesis that insiders (in this case CEOs specifically) attempt to benefit from higher information asymmetry during the high EPU periods. The empirical results concerning the ownership interaction terms and governance variables indicate an insignificant effect on trading by CEOs. Coupled with the findings from Table 5, this implies that other executives and board members are more likely to be deterred in making insider trades than the CEOs. I infer that given the control and importance of the CEO as the most informed insider

(Jeng et al., 1999), their trading practice is less likely to be affected in the wake of reduced information asymmetry than the other insiders.

4.5.1.2 Insider transactions

Table 7 reports results using the dependent variable ITS_{it} from Equation 4. I find consistency in how EPU is associated with insider trading. Each of the three panel models in Table 7 exhibit a positive coefficient for the EPU_{it} variable which are significant at the 1% level. The standardized coefficient in Panel C implies a rise in ITS_{it} by a factor of 2.37 with a unit rise in the EPU index level. This indicates a marginal difference when insider trading is measured by market value of traded shares. Overall, the results are consistent with the main conclusion that higher uncertainty in economic policy offers greater opportunities to the insiders to trade by making use of their knowledge about the firm. This confirms my first hypothesis that insider trading increases with a rise in EPU. Regarding the other variables including the individual ownership structure and interaction terms, governance mechanisms, and firm-specific variables, the empirical results in Table 7 are similar to those in Table 5.

INSERT TABLE 7 HERE

To summarize, I find evidence of increased insider trading (net-buying) as well as trading activity encouraged by a rise in information asymmetry caused by high macroeconomic instability. In addition, institutional ownership is associated with greater monitoring of firm insiders during periods of elevated economic uncertainty, which reduces information asymmetry and decreases the level and value of insider transactions. I also find support for the moderation effect by ownership concentration on EPU, leading to a decline in insider trades. Finally, CEO entrenchment - generated by the presence of a golden parachute clause in firms' severance contracts - is linked with decreases in insider trading.

4.5.2 Alternative economic uncertainty proxy

To test for the robustness of the measure for economic uncertainty, I replace EPU_t with the implied volatility index variable (VIX_t). This index is created by the Chicago Board Options Exchange (CBOE) and it represents the market's expectation of volatility. Table 8 reports the results for the effects of VIX_t on the three insider trading measures. VIX_t has a positive and significant coefficient in the three equations, adding evidence to the finding of a rise in insider trading during periods of high economic uncertainty. The positive and significant coefficient of VIX_t in Panel B offers partial support of a rise in ITC_{it} in the presence of increased information asymmetry. The ownership interaction variables show consistency in their effect on insider trading during times of high economic uncertainty. These results also complement the previous findings of generally greater insider share trading (investment) in the presence of blockholding and long-term institutional investors. The coefficients of the governance variables also endorse the previous findings. I conclude that the results are robust to the use of this alternative proxy of economic (market) uncertainty.

INSERT TABLE 8 HERE

4.6 Conclusion

The nature and determinants of insider trading is a hot topic in academic research. Insider trading can be seen as a signal about firms' prospects (Bagnoli and Khanna, 1992) as well as a source of information in the context of corporate announcements such as raising of capital and earnings outcomes (John and Mishra, 1991; John and Lang, 1990). The trading transactions by insiders are generally more profitable (Ellul and Panayides, 2018); albeit there is no conclusive evidence about whether these transactions add efficiency in pricing (Fishman and Hagerty, 1992; Khanna et al., 1994).

Economic policy uncertainty can affect the performance of firms. Nagar et al. (2019) suggests that increases in EPU lead to rises in information asymmetry and this may provide a motivation

for insiders for the trading of company stock to benefit from their information advantage (Ellul and Panayides, 2018; Ke et al., 2003). This study analyzes how EPU plays a role in explaining insider trades after controlling for endogeneity and omitted variables bias. By using a sample of 6,834 public firms in the US, I find that a unit rise in the EPU index value is associated with an average increase in insider trading by a factor of 3.75. The results are consistent after employing two alternate measures of insider activity.

The results find a negative and significant moderating impact of institutional investors on insider trading during times of high economic uncertainty, indicating a positive monitoring role provided by such investors. Concentration of ownership among shareholders during times of high economic uncertainty is also associated with fewer insider trades. This can be contrasted to the finding that blockholding and long-term institutional investors generally encourage greater insider ownership, which is consistent with an agency or bonding mechanism to align managerial and shareholder interests. I find an insignificant association between CEO duality and insider share trading levels in the analysis. This implies that greater executive control does not lead to increased exploitation of information advantages. Finally, I find evidence that CEO entrenchment, associated with the inclusion of a golden parachute clause, restricts insider trading in terms of both value and magnitude.

The results show that economic uncertainty – elevated by events like the global financial crisis or the Covid-19 pandemic – offers potential incentives to insiders to trade within the firm, implying that shareholders' need to step up monitoring efforts. Literature shows that economic policy uncertainty correlates with low returns (Arouri et al., 2016) while insider trades are usually profitable (Ellul and Panayides, 2018). Further research can evaluate if insider trades generate better returns under high economic uncertainty. In addition, Lee et al. (2014) suggest that although efficient governance mechanisms help reduce information asymmetry and impose policy restrictions on insider trading, the restrictions do not significantly prevent insider

transactions. Hence, it can be inferred that firms should place a greater emphasis on improving or introducing governance mechanisms that could help to reduce information asymmetry. Further research can investigate how some potential attributes including board structure, diversity, and experience of firm board members can help to achieve this goal.

References

Adams, R. B., Almeida, H., and Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies, 18*(4), 1403-1432. https://doi.org/10.1093/rfs/hhi030

Admati, A. R., Pfleiderer, P., and Zechner, J. (1994). Large shareholder activism, risk sharing, and financial market equilibrium. *Journal of Political Economy, 102*(6), 1097-1130. https://doi.org/10.1086/261965

Agrawal, A., and Knoeber, C. R. (1998). Managerial compensation and the threat of takeover. *Journal of Financial Economics, 47*(2), 219-239. https://doi.org/10.1016/s0304-405x(97)00044-5

Almazan, A., and Suarez, J. (2003). Entrenchment and severance pay in optimal governance structures. *The Journal of Finance, 58*(2), 519-547. https://doi.org/10.1111/1540-6261.00536

Amihud, Y., and Li, K. (2006). The declining information content of dividend announcements and the effects of institutional holdings. *Journal of Financial and Quantitative analysis, 41*(3), 637-660. https://doi.org/10.1017/s0022109000002568

Angelini, P., and Generale, A. (2008). On the evolution of firm size distributions. *American Economic Review, 98*(1), 426-38. https://doi.org/10.1257/aer.98.1.426

Arouri, M., Estay, C., Rault, C., and Roubaud, D. (2016). Economic policy uncertainty and stock markets: Long-run evidence from the US. *Finance Research Letters, 18*, 136-141. https://doi.org/10.1016/j.frl.2016.04.011

Ashraf, B. N., and Shen, Y. (2019). Economic policy uncertainty and banks' loan pricing. *Journal of Financial Stability, 44*, 100695. https://doi.org/10.1016/j.jfs.2019.100695

Bade, M. (2016). Insider competition under two-dimensional uncertainty and informational asymmetry. *Finance Research Letters, 19*, 79-82. https://doi.org/10.1016/j.frl.2016.06.006

Bagnoli, M., and Khanna, N. (1992). Insider trading in financial signaling models. *The Journal of Finance, 47*(5), 1905-1934. https://doi.org/10.1111/j.1540-6261.1992.tb04688.x

Baker, M., and Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance, 57*(1), 1-32. https://doi.org/10.1111/1540-6261.00414

Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics, 131*(4), 1593–1636. https://doi.org/10.1093/qje/qjw024

Beck, T., Demirgüç-Kunt, A. S. L. I., and Maksimovic, V. (2005). Financial and legal constraints to growth: does firm size matter? *The Journal of Finance, 60*(1), 137-177. https://doi.org/10.1111/j.1540-6261.2005.00727.x

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of Economic Perspectives, 28*(2), 153-76. https://doi.org/10.1257/jep.28.2.153

Bogle, J. (2018). The modern corporation and the public interest. *Financial Analysts Journal, 74*(3), 8-17. https://doi.org/10.2469/faj.v74.n3.1

Bradley, D., Pantzalis, C., and Yuan, X. (2016). Policy risk, corporate political strategies, and the cost of debt. *Journal of Corporate Finance, 40*, 254-275. https://doi.org/10.1016/j.jcorpfin.2016.08.001

Bushee, B. J., Core, J. E., Guay, W., and Hamm, S. J. (2010). The role of the business press as an information intermediary. *Journal of Accounting Research, 48*(1), 1-19. https://doi.org/10.1111/j.1475-679x.2009.00357.x

Chau, M., and Vayanos, D. (2008). Strong-form efficiency with monopolistic insiders. *The Review of Financial Studies, 21*(5), 2275-2306.

Chen, C. X., Lu, H., and Sougiannis, T. (2012). The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. *Contemporary Accounting Research, 29*(1), 252-282. https://doi.org/10.1111/j.1911-3846.2011.01094.x

Chen, X., Harford, J., and Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279-305. https://doi.org/10.1016/j.jfineco.2006.09.005

Dai, L., Fu, R., Kang, J. K., and Lee, I. (2016). Corporate governance and the profitability of insider trading. *Journal of Corporate Finance, 40*, 235-253. https://doi.org/10.1016/j.jcorpfin.2016.08.002

Ederington, L. H., and Lee, J. H. (1993). How markets process information: News releases and volatility. *The Journal of Finance, 48*(4), 1161-1191. https://doi.org/10.1111/j.1540-6261.1993.tb04750.x

Ederington, L. H., and Lee, J. H. (1995). The short-run dynamics of the price adjustment to new information. *Journal of Financial and Quantitative Analysis, 30*(1), 117-134. https://doi.org/10.2307/2331256

Ellul, A., and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage? *Journal of Financial and Quantitative Analysis, 53*(1), 203-241. https://doi.org/10.1017/s0022109017000990

Elyasiani, E., and Jia, J. (2010). Distribution of institutional ownership and corporate firm performance. *Journal of Banking and Finance, 34*(3), 606-620. https://doi.org/10.1016/j.jbankfin.2009.08.018

Erenburg, G., Kurov, A., and Lasser, D. J. (2006). Trading around macroeconomic announcements: Are all traders created equal? *Journal of Financial Intermediation, 15*(4), 470-493. https://doi.org/10.1016/j.jfi.2005.07.003

Falaschetti, D. (2002). Golden parachutes: credible commitments or evidence of shirking? *Journal of Corporate Finance, 8*(2), 159-178. https://doi.org/10.1016/s0929-1199(01)00032-3

Fidrmuc, J. P., Goergen, M., and Renneboog, L. (2006). Insider trading, news releases, and ownership concentration. *The Journal of Finance, 61*(6), 2931-2973. https://doi.org/10.1111/j.1540-6261.2006.01008.x

Fishman, M. J., and Hagerty, K. M. (1992). Insider trading and the efficiency of stock prices. *The RAND Journal of Economics*, 106-122. https://doi.org/10.2307/2555435

Fleming, M. J., and Remolona, E. M. (1999). Price formation and liquidity in the US Treasury market: The response to public information. *The Journal of Finance, 54*(5), 1901-1915. https://doi.org/10.1111/0022-1082.0017

Gaspar, J. M., Massa, M., and Matos, P. (2005). Shareholder investment horizons and the market for corporate control. *Journal of Financial Economics, 76*(1), 135-165. https://doi.org/10.1016/j.jfineco.2004.10.002

Goergen, M., Renneboog, L., and Zhao, Y. (2019). Insider trading and networked directors. *Journal of Corporate Finance, 56*, 152-175. https://doi.org/10.1016/j.jcorpfin.2019.02.001

Gomes, A., and Phillips, G. (2012). Why do public firms issue private and public securities? *Journal of Financial Intermediation, 21*(4), 619-658. https://doi.org/10.3386/w11294

Goodell, J. W., McGee, R. J., and McGroarty, F. (2020). Election uncertainty, economic policy uncertainty and financial market uncertainty: A prediction market analysis. *Journal of Banking & Finance, 110*, 105684. https://doi.org/10.1016/j.jbankfin.2019.105684

Gulen, H., and Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies, 29*(3), 523–564. https://doi.org/10.1093/rfs/hhv050

Harris, M., and Raviv, A. (1993). Differences of opinion make a horse race. *The Review of Financial Studies, 6*(3), 473-506. https://doi.org/10.1093/rfs/5.3.473

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251-1271. https://doi.org/10.2307/1913827

Hazarika, S., Karpoff, J. M., and Nahata, R. (2012). Internal corporate governance, CEO turnover, and earnings management. *Journal of Financial Economics, 104*(1), 44-69. https://doi.org/10.1016/j.jfineco.2011.10.011

He, J. J., Huang, J., and Zhao, S. (2019). Internalizing governance externalities: The role of institutional cross-ownership. *Journal of Financial Economics*. https://doi.org/10.1016/j.jfineco.2018.07.019

Holderness, C. G. (2009). The myth of diffuse ownership in the United States. *Review of Financial Studies, 22*(4), 1377–1408. https://doi.org/10.1093/rfs/hhm069

Husted, L., Rogers, J., and Sun, B. (2019). Monetary policy uncertainty. *Journal of Monetary Economics*. https://doi.org/10.1016/j.jmoneco.2019.07.009

Jeng, L. A., Metrick, A., and Zeckhauser, R. (1999). *The profits to insider trading: A performance-evaluation perspective* (No. w6913). National Bureau of Economic Research.

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *The Journal of Finance, 48*(3), 831-880. https://doi.org/10.2307/2329018

John, K. and Lang, L.H.P. (1991). Insider trading around dividend announcements: theory and evidence. *The Journal of Finance, 46*, 1361–89. https://doi.org/10.1111/j.1540-6261.1991.tb04621.x

John, K. and Mishra, B. (1990). Information content of insider trading around corporate announcements: the case of capital expenditures. *The Journal of Finance, 45*, 835–55. https://doi.org/10.1111/j.1540-6261.1990.tb05108.x

Karpoff, J. M. (1986). A theory of trading volume. *The Journal of Finance, 41*(5), 1069-1087. https://doi.org/10.1111/j.1540-6261.1986.tb02531.x

Ke, B., Huddart, S., and Petroni, K. (2003). What insiders know about future earnings and how they use it: Evidence from insider trades. *Journal of Accounting and Economics, 35*(3), 315-346. https://doi.org/10.1016/s0165-4101(03)00036-3

Khanna, N., Slezak, S. L., and Bradley, M. (1994). Insider trading, outside search, and resource allocation: Why firms and society may disagree on insider trading restrictions. *Review of Financial Studies, 7*(3), 575-608. https://doi.org/10.1093/rfs/7.3.575

Khawaja, M., Bhatti, M. I., and Ashraf, D. (2019). Ownership and control in a double decision framework for raising capital. *Emerging Markets Review, 41*(C). https://doi.org/10.1016/j.ememar.2019.100657

Korkeamäki, T., Liljeblom, E., and Pasternack, D. (2017). CEO power and matching leverage preferences. *Journal of Corporate Finance, 45*, 19-30. https://doi.org/10.1016/j.jcorpfin.2017.04.007

Lang, M. H., and Lundholm, R. J. (1996). Corporate disclosure policy and analyst behavior. *The Accounting Review*, 467-492.

Lee, I., Lemmon, M., Li, Y., and Sequeira, J. M. (2014). Do voluntary corporate restrictions on insider trading eliminate informed insider trading? *Journal of Corporate Finance, 29*, 158-178. https://doi.org/10.1016/j.jcorpfin.2014.07.005

Leuz, C., Nanda, D., and Wysocki, P. D. (2003). Earnings management and investor protection: an international comparison. *Journal of Financial Economics, 69*(3), 505-527. https://doi.org/10.1016/s0304-405x(03)00121-1

Lin, J. C., and Howe, J. S. (1990). Insider trading in the OTC market. *The Journal of Finance, 45*(4), 1273-1284. https://doi.org/10.1111/j.1540-6261.1990.tb02436.x

Mansi, S. A., Wald, J. K., and Zhang, A. J. (2016). Severance agreements and the cost of debt. *Journal of Corporate Finance, 41*, 426-444. https://doi.org/10.1016/j.jcorpfin.2016.08.012

Masulis, R. W., Wang, C., and Xie, F. (2012). Globalizing the boardroom—The effects of foreign directors on corporate governance and firm performance. *Journal of Accounting and Economics, 53*(3), 527-554. https://doi.org/10.1016/j.jacceco.2011.12.003

Maug, E. (1998). Large shareholders as monitors: Is there a trade-off between liquidity and control? *The Journal of Finance, 53*(1), 65-98. https://doi.org/10.1111/0022-1082.35053

Nakamura, A., and Nakamura, M. (1998). Model specification and endogeneity. *Journal of Econometrics, 83*(1-2), 213-237. https://doi.org/10.1016/s0304-4076(97)00070-5

Nagar, V., Schoenfeld, J., and Wellman, L. (2019). The effect of economic policy uncertainty on investor information asymmetry and management disclosures. *Journal of Accounting and Economics, 67*(1), 36-57. https://doi.org/10.1016/j.jacceco.2018.08.011

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity, 41*(5), 673-690. http://doi.org/10.1007/s11135-006-9018-6

Pástor, Ľ., and Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520–545. https://doi.org/10.1016/j.jfineco.2013.08.007

Pham, A. V. (2019). Political risk and cost of equity: The mediating role of political connections. *Journal of Corporate Finance, 56*, 64-87. https://doi.org/10.1016/j.jcorpfin.2019.01.001

Seyhun, H. (1986). Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics, 16*(2), 189-212. https://doi.org/10.1016/0304-405x(86)90060-7

Waisman, M., Ye, P., and Zhu, Y. (2015). The effect of political uncertainty on the cost of corporate debt. *Journal of Financial Stability, 16*, 106-117. https://doi.org/10.1016/j.jfs.2015.01.002

Wisniewski, T. P., and Lambe, B. J. (2015). Does economic policy uncertainty drive CDS spreads? *International Review of Financial Analysis, 42*, 447-458. https://doi.org/10.1016/j.irfa.2015.09.009

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data, second ed*. The MIT press, Cambridge, MA.

Xu, Z. (2020). Economic policy uncertainty, cost of capital, and corporate innovation. *Journal of Banking & Finance, 111*, 105698. https://doi.org/10.1016/j.jbankfin.2019.105698

Zhang, X., and Zhou, S. (2018). Bond covenants and institutional blockholding. *Journal of Banking and Finance*, *96*, 136-152. https://doi.org/10.1016/j.jbankfin.2018.09.006

Tables

Table 1: Insider transaction statistics

Statistics of trading records by insiders of publicly listed firms in the US from the period starting January 2000 until December 2018. The insiders include executives and members of the board of directors. Statistics in the table show the number of transactions during the sample period, and separately the number of purchase and sale transactions along with the mean of the traded dollar value of the transactions.

Insider	Total transactions	Purchase transactions		Sale transactions	
		Count	Mean Market value ($)	Count	Mean Market value ($)
CEO	11,813	621	160,760.9	73	2,968.6
Chairman	7,650	599	90,710.9	26	5,955.4
President	8,126	359	19,813.6	48	2,389.3
Director	280	89	9,882.4	0	0
Others	346,745	35,579	2,224,447	4,741	499,992.4

Table 2: Descriptive statistics

Summary statistics of the non-binary independent variables used in the study. The variables on macroeconomic data include EPU_t, GDP_t, $INTEREST_t$, and $UNEMP_t$ with annual data starting January 2000 until December 2018. EPU_t is scaled by dividing the EPU index values by 100. All other variables represent attributes of publicly listed firms in the US over the sample period.

	All- Firms		
Variable	**Obs.**	**Mean**	**Std. Dev.**
EPU_t	45,635	1.545	0.632
GDP_t	45,635	1.961	1.429
$INTEREST_t$	45,635	1.619	1.943
$UNEMP_t$	45,635	6.113	1.732
$CONC_{it}$	39,780	87.020	12.658
LTI_{it}	39,780	8.463	14.251
STI_{it}	39,780	82.922	21.737
$BOARD_{it}$	30,386	8.798	3.242
$SIZE_{it}$	45,617	15.863	59.551
$ANLST_{it}$	31,686	9.31	7.892
$DISP_{it}$	31,686	0.70	0.378
MBV_{it}	38,748	3.188	6.404
$LEVERAGE_{it}$	45,452	0.189	0.210
$PROFIT_{it}$	45,354	-0.076	0.398

Table 3: Correlation matrix

Correlation matrix with coefficients representing correlations across both the dependent and major independent variables used in the study. Dependent variables include IT_{it}, ITC_{it}, and ITS_{it}. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018.

	IT_{it}	ITC_{it}	ITS_{it}	EPU_t	STI_{it}	LTI_{it}	$CONC_{it}$	CEO_{it}	$GOLDEN_{it}$	$BOARD_{it}$	$ANLST_{it}$	$DISP_{it}$	$SIZE_{it}$
IT_{it}	1												
ITC_{it}	0.162	1											
ITS_{it}	0.922	0.157	1										
EPU_t	0.039	0.020	0.026	1									
LTI_{it}	-0.025	-0.017	-0.023	0.051	1								
STI_{it}	-0.003	-0.009	-0.006	-0.041	-0.672	1							
$CONC_{it}$	-0.008	-0.010	-0.007	-0.040	-0.474	0.807	1						
CEO_{it}	0.039	0.000	0.037	-0.033	-0.014	0.009	-0.003	1					
$GOLDEN_{it}$	0.040	0.006	0.027	-0.037	-0.050	0.036	0.037	0.096	1				
$BOARD_{it}$	-0.083	-0.031	-0.067	0.025	0.106	0.002	-0.023	-0.015	-0.191	1			
$ANLST_{it}$	0.016	-0.012	-0.006	-0.014	0.102	-0.012	-0.053	0.057	-0.007	0.163	1		
$DISP_{it}$	0.019	0.001	0.010	-0.043	0.000	0.039	0.013	0.024	0.000	0.038	0.243	1	
$SIZE_{it}$	-0.060	-0.015	-0.056	0.003	0.091	-0.045	-0.065	-0.021	-0.218	0.261	0.216	0.050	1

Table 4: Variance Inflation Factor (VIF) test

Results of Variance Inflation Factor (VIF) test of multicollinearity applied to the independent variables in the sample. The sample includes annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018.

Variable	**VIF**
STI_{it}	4.31
$CONC_{it}$	3.05
$UNEMP_{t}$	2.29
LTI_{it}	1.94
$INTEREST_{t}$	1.88
EPU_{t}	1.41
GDP_{t}	1.31
$ANLST_{it}$	1.23
$BOARD_{it}$	1.15
$SIZE_{it}$	1.14
$GOLDEN_{it}$	1.08
$DISP_{it}$	1.08
$LEVERAGE_{it}$	1.05
$PROFIT_{it}$	1.05
MBV_{it}	1.03
CEO_{it}	1.01
Mean VIF	**1.63**

Table 5: Regression results for insider trading volume

Two-stage least squares panel regression results applied using the model shown in Equation 1. Firm-fixed effects are included. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018. Variable definitions are given in Appendix A. Dependent variable is IT_{it}, which is the first measure of insider trading in the study. The independent variable EPU_t (scaled after dividing by 100) is expected to be endogenous as it is driven by macroeconomic factors, which I use as instruments in the first-stage equation. The instruments include $INTEREST_t$, GDP_t, and $UNEMP_t$. Results for the first-stage equation are shown in Appendix B. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	A	B	C
EPU_t	1.8707***	0.0345***	2.3155**
	(0.7159)	(0.0078)	(1.0235)
$CONC_{it}$* EPU_t	-0.0184***		-0.0215**
	(0.0070)		(0.0096)
LTI_{it} * EPU_t	-0.0108**		-0.0148**
	(0.0044)		(0.0068)
STI_{it}* EPU_t	-0.0017		-0.0032*
	(0.0011)		(0.0019)
$CONC_{it}$	0.0295**		0.0342**
	(0.0115)		(0.0156)
LTI_{it}	0.0172**		0.0237**
	(0.0073)		(0.0113)
STI_{it}	0.0029		0.0053
	(0.0019)		(0.0036)
CEO_{it}	-0.0156		-0.0063
	(0.0102)		(0.0125)
$GOLDEN_{it}$	-0.0952***		-0.0873***
	(0.0133)		(0.0165)
$BOARD_{it}$	0.0033		0.0066*
	(0.0021)		(0.0037)
$ANLST_{it}$		-0.0023***	-0.0033***
		(0.0008)	(0.0009)
$DISP_{it}$		0.0031	0.0086
		(0.0086)	(0.0128)
$SIZE_{it}$		-0.0005***	-0.0004**
		(0.0002)	(0.0002)
$LEVERAGE_{it}$		-0.1124***	-0.1866***
		(0.0240)	(0.0317)
$PROFIT_{it}$		0.0717***	0.1276***
		(0.0149)	(0.0294)
MBV_{it}		0.0016***	0.0017***
		(0.0005)	(0.0006)
Observations	26,242	28,026	20,910
Hausman f-stat	4.79^{**}	15.28^{***}	11.57^{***}
p-value of rk LM test	0.0000	0.0000	0.0000
Model f-stat	8.50^{***}	16.69^{***}	10.46^{***}

Table 6: Regression results for CEO trading

Two-stage least squares panel regression results applied using the model shown in Equation 1. Firm-fixed effects are included. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018. Variable definitions are given in Appendix A. Dependent variable is ITC_{it}, which is the second measure of insider trading in the study. The independent variable EPU_t (scaled after dividing by 100) is expected to be endogenous as it is driven by macroeconomic factors, which I use as instruments in the first-stage equation. These include $INTEREST_t$, GDP_t, and $UNEMP_t$. Results for the first-stage equation are shown in Appendix B. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	A	B	C
EPU_t	0.1519	0.0034*	0.1655
	(0.1486)	(0.0018)	(0.2209)
$CONC_{it}$* EPU_t	-0.0016		-0.0018
	(0.0014)		(0.0021)
LTI_{it}* EPU_t	-0.0009		-0.0010
	(0.0009)		(0.0015)
STI_{it}* EPU_t	0.0000		0.0001
	(0.0002)		(0.0004)
$CONC_{it}$	0.0026		0.0029
	(0.0024)		(0.0033)
LTI_{it}	0.0013		0.0013
	(0.0015)		(0.0024)
STI_{it}	-0.0000		-0.0002
	(0.0004)		(0.0008)
CEO_{it}	-0.0029*		-0.0018
	(0.0017)		(0.0022)
$GOLDEN_{it}$	-0.0033*		-0.0013
	(0.0019)		(0.0025)
$BOARD_{it}$	-0.0002		0.0001
	(0.0004)		(0.0007)
$ANLST_{it}$		-0.0003*	-0.0004*
		(0.0002)	(0.0002)
$DISP_{it}$		0.0002	-0.0005
		(0.0019)	(0.0027)
$SIZE_{it}$		-0.0001	-0.0000
		(0.0000)	(0.0000)
$LEVERAGE_{it}$		-0.0093	-0.0178**
		(0.0064)	(0.0083)
$PROFIT_{it}$		0.0019	0.0036
		(0.0028)	(0.0064)
MBV_{it}		0.0001	0.0001
		(0.0001)	(0.0001)
Observations	26,242	28,026	20,910
Hausman f-stat	3.28^{*}	2.68^{***}	3.63^{*}
p-value of rk LM test	0.0000	0.000	0.0000
Model f-stat	2.28^{**}	2.68^{***}	2.06^{***}

Table 7: Regression results for insider shares trading

Two-stage least squares panel regression results applied using the model shown in Equation 1. Firm-fixed effects are included. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018. Variable definitions are given in Appendix A. Dependent variable is ITS_{it}, which is the third measure of insider trading in the study. The independent variable EPU_t (scaled after dividing by 100) is expected to be endogenous as it is driven by macroeconomic factors, which I use as instruments in the first-stage equation. These include $INTEREST_t$, GDP_t, and $UNEMP_t$. Results for the first-stage equation are shown in Appendix B. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	A	B	C
EPU_t	1.9429***	0.0348***	2.3683**
	(0.7179)	(0.0078)	(1.0259)
$CONC_{it}$* EPU_t	-0.0191***		-0.0220**
	(0.0070)		(0.0097)
LTI_{it}* EPU_t	-0.0112**		-0.0152**
	(0.0044)		(0.0068)
STI_{it}* EPU_t	-0.0017		-0.0033*
	(0.0011)		(0.0020)
$CONC_{it}$	0.0306***		0.0350**
	(0.0116)		(0.0156)
LTI_{it}	0.0180**		0.0242**
	(0.0074)		(0.0114)
STI_{it}	0.0030		0.0054
	(0.0019)		(0.0037)
CEO_{it}	-0.0159		-0.0065
	(0.0103)		(0.0125)
$GOLDEN_{it}$	-0.0942***		-0.0863***
	(0.0133)		(0.0165)
$BOARD_{it}$	0.0032		0.0065*
	(0.0021)		(0.0037)
$ANLST_{it}$		-0.0023***	-0.0034***
		(0.0008)	(0.0009)
$DISP_{it}$		0.0029	0.0089
		(0.0086)	(0.0128)
$SIZE_{it}$		-0.0005***	-0.0004**
		(0.0002)	(0.0002)
$LEVERAGE_{it}$		-0.1138***	-0.1890***
		(0.0240)	(0.0318)
$PROFIT_{it}$		0.0720***	0.1279***
		(0.0149)	(0.0289)
MBV_{it}		0.0015***	0.0017**
		(0.0005)	(0.0006)
Observations	26,242	28,026	20,910
Hausman f-stat	5.24^{**}	15.74^{***}	12.09^{***}
p-value of rk LM test	0.0000	0.0000	0.0000
Model f-stat	10.48^{***}	16.82^{***}	8.42^{***}

Table 8: Robustness with VIX index

Two-stage least squares panel regression results applied using the model shown in Equation 1. Firm-fixed effects are included. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018. Variable definitions are given in Appendix A. Dependent variables are $IT_{it,}$ $ITC_{it,}$ *and* ITS_{it}. The independent variable VIX_t (implied volatility index) is expected to be endogenous as it is driven by macroeconomic factors, which I use as instruments in the first-stage equation. These include $INTEREST_t$, GDP_t, and $UNEMP_t$. Results for the first-stage equation are shown in Appendix B. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	IT_{it}	ITC_{it}	ITS_{it}
VIX_t	3.8129***	0.4274**	3.8371***
	(0.9719)	(0.2098)	(0.9721)
$CONC_{it}$* VIX_t	-0.0355***	-0.0043**	-0.0358***
	(0.0091)	(0.0019)	(0.0091)
LTI_{it}* VIX_t	-0.0255***	-0.0028*	-0.0257***
	(0.0068)	(0.0015)	(0.0068)
STI_{it}* VIX_t	-0.0055*	-0.0003	-0.0055*
	(0.0028)	(0.0005)	(0.0028)
$CONC_{it}$	0.0699***	0.0085**	0.0703***
	(0.0179)	(0.0038)	(0.0179)
LTI_{it}	0.0505***	0.0054*	0.0509***
	(0.0137)	(0.0029)	(0.0137)
STI_{it}	0.0110*	0.0004	0.0111*
	(0.0057)	(0.0011)	(0.0057)
CEO_{it}	-0.0035	-0.0011	-0.0038
	(0.0127)	(0.0022)	(0.0127)
$GOLDEN_{it}$	-0.0828***	-0.0009	-0.0818***
	(0.0172)	(0.0027)	(0.0172)
$BOARD_{it}$	0.0076**	0.0002	0.0074*
	(0.0038)	(0.0007)	(0.0038)
$ANLST_{it}$	-0.0039***	-0.0004**	-0.0039***
	(0.0010)	(0.0002)	(0.0010)
$DISP_{it}$	0.0190	0.0010	0.0192
	(0.0147)	(0.0030)	(0.0147)
$SIZE_{it}$	-0.0004**	-0.0000	-0.0004**
	(0.0002)	(0.0000)	(0.0002)
$LEVERAGE_{it}$	-0.1680***	-0.0164*	-0.1699***
	(0.0338)	(0.0085)	(0.0339)
$PROFIT_{it}$	0.1614***	0.0077	0.1620***
	(0.0379)	(0.0072)	(0.0379)
MBV_{it}	0.0021***	0.0001	0.0021***
	(0.0007)	(0.0001)	(0.0007)
Observations	20,910	20,910	20,910
Hausman f-stat	46.74^{***}	14.49^{***}	47.34^{***}
p-value of rk LM test	0.0000	0.0000	0.0000
Model f-stat	9.46^{***}	1.87^{**}	9.47^{***}

Appendices

Appendix A: Variable descriptions

List of variables with their definitions, citations from literature, and database sources. The first three are the dependent variables representing three measures of insider trading. Literature has used different measures of insider trades to understand trading behaviour of firm insiders.

Variable	Definition	Data source
IT_{it}	Insider trades calculated using market value of shares purchased and sold: $\frac{(MV\ purchased\ -\ MV\ sold\ )}{(MV\ purchased\ +\ MV\ sold\ )}$	Thomson Reuters Insiders
ITC_{it}	CEO trades calculated using market value of shares purchase and sold by CEO: $\frac{(MVC\ purchased\ -\ MVC\ sold\ )}{(MVC\ purchased\ +\ MVC\ sold\ )}$	Thomson Reuters Insiders
ITS_{it}	Difference between purchase and sale of shares by insiders, as a percentage of total shares traded. $\frac{(Shares\ purchased\ -\ Shares\ sold\ )}{(Shares\ purchased\ +\ Shares\ sold\ )}$	Thomson Reuters Insiders
EPU_t	End of year index value of the Economic Policy Uncertainty Index.	Bloomberg
$CONC_{it}$	Percentage of ownership by the highest shareholder in the firm.	Thomson Reuters Ownership
STI_{it}	Percentage of ownership in the firm by institutional investors. These include mutual funds, hedge funds, advisors, private equity, and venture capital firms.	Thomson Reuters Ownership
LTI_{it}	Percentage of ownership in the firm by long-term institutional investors. These include endowments, pension funds, sovereign-wealth funds, and banks.	Thomson Reuters Ownership
$GOLDEN_{it}$	Binary variable which takes the value of 1 if the firm has a golden parachute or other restrictive clauses with a compensation plan for accelerated pay-out, 0 otherwise.	Datastream
CEO_{it}	Binary variable which takes the value of 1 if the CEO is also the chairman of the board, 0 otherwise.	Datastream
$BOARD_{it}$	Number of members in the board of directors of the firm.	Datastream
$ANLST_{it}$	Number of analyst recommendations for the firm.	I/B/E/S

$DISP_{it}$	Standard deviation in earning estimates by analysts covering a firm divided by price per share	I/B/E/S
$SIZE_{it}$	Natural logarithm of total employees in the firm	Compustat
$PROFIT_{it}$	Return-on-assets	Compustat
$LEVERAGE_{it}$	Debt-to-assets ratio	Compustat
MBV_{it}	Market-to-book value	Compustat
$INTEREST_t$	End of year federal funds rate in the United States	Bloomberg
GDP_t	Percentage change in annual GDP of the United States	Bloomberg
$UNEMP_t$	Annual unemployment rate in the United States	US Bureau of Labor Statistics

Appendix B: First-stage regression results

Two-stage least squares first-stage equation panel regression results applied using the model shown in Equation 1. The sample includes annual macroeconomic data and annual firm-related data of 6,834 publicly listed firms in the US. Sample period starts January 2000 until December 2018. Variable definitions are given in Appendix A. Dependent variable is EPU_t, which is endogenous. The macroeconomic variables – $INTEREST_t$, GDP_t, and $UNEMP_t$ – are instrumental variables in the first-stage equation. Probability of estimates greater than standard statistics provided in parentheses with *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	EPU_t
$INTEREST_t$	0.1634***
	(0.0024)
GDP_t	-0.0041
	(0.0027)
$UNEMP_t$	0.2201***
	(0.0025)
Observations	20,910
Sanderson-Windmeijer F-stat	3,422***

Chapter 5

Conclusion

5.1 Introduction

Ownership structure and governance practices in publicly held firms have varied over the past several decades. In addition, the nature of economic and political uncertainty has witnessed marked variation because of economic shocks arising out of events like the dotcom bubble, the global financial crisis and, more recently, the Covid-19 outbreak. These changes have accompanied differences in how businesses make decisions. They also affect the trading behaviour of directors and executives of publicly held firms. This thesis empirically investigates the relationship between firm ownership, governance, and economic uncertainty as determinants of firms' decisions to raise capital and insider trading activity.

The major findings of the empirical chapters of the thesis are as follows. In Chapter 2, I find evidence that concentrated ownership and powerful executives and directors are likely to choose debt as the source of capital. Chapter 3 adds to this finding by offering evidence that greater economic and political uncertainty lead firms to choose debt over equity. In Chapter 4, I present evidence that economic uncertainty leads to a rise in insider transactions because of higher information asymmetry. Further, long-term investors and blockholding shareholders are associated with reduced levels of insider trades, particularly during periods of greater uncertainty.

5.2 Contributions to the literature

The thesis contributes to the literature in several ways. Chapter 2 lends support to the control motive theory (Lemmon and Zender, 2019; Admati et al., 2018) by offering evidence that concentrated ownership structure leads firms to raise capital through debt-based securities. This chapter applies a two-step sequential decision-making model, which helps to remove

endogenous sample selection bias (Heckman, 1979). This helps to establish that firms' decisions to raise capital and the subsequent choice of security should be analyzed sequentially. This chapter also incorporates sukuk in the list of securities along with loans, bonds, and equity. The findings highlight that sukuk offer a moderate-to-high level of risk-sharing to the issuing firms.

Findings of Chapter 3 lend support to the proposition that a rise in economic uncertainty stirs the demand for capital (Abel, 1983). This chapter also endorses the pecking order theory since debt is preferred to equity in the presence of greater information asymmetry stemming from high economic uncertainty (Myers and Majluf, 1984; Nagar et al., 2019). In addition, the chapter applies a three-step decision-making model by sequentially analyzing firms' decisions to raise capital, select the preferred financial instrument, and choose the issuance volume, respectively. This shows that the three decisions should be analyzed sequentially.

Chapter 4 adds empirical evidence to the literature that high economic uncertainty leads to a rise in information asymmetry (Nagar et al., 2019), which allows firm insiders to exploit their information advantage. It also endorses findings from the literature that long-term institutional investors and blockholding shareholders exert monitoring pressure and reduce agency costs (Ellul and Panayides, 2018; Amihud and Li, 2006); however, they extract different trading actions from insiders depending on the prevailing level of economic uncertainty.

5.3 Policy implications

The findings of this thesis have implications for shareholders, analysts, investors, and economic policy makers. Chapter 2 implies that investors and analysts can benefit by evaluating firms through their ownership structure and governance practices. Firms with concentrated shareholders can be expected to maintain higher leverage level, making them increasingly vulnerable to bankruptcy risks. Similarly, Chapter 3 has implications for policy makers regarding the supply of capital. An elevated magnitude of economic uncertainty leads to an

increase in demand for debt. This has implications for central banks as their intervention in the secondary markets could generate undesirable leverage among businesses. Chapter 4 has implications for investors since the rise in insider trading under high economic uncertainty offers signals about the price discovery of respective firms.

5.4 Directions for future research

This thesis is focused on how corporate ownership and governance affect two specific aspects of public firms, namely raising capital and insider trades. Prior studies analyze factors surrounding security issuance (Gatchev et al., 2009; Lewis et al., 2003; Jung et al., 1996; MacKie-Mason, 1990). Given the findings of this thesis, further studies can investigate the importance of additional aspects of corporate governance and decision-making. For example, behavioral aspects of the members of the board of directors as well as the CEOs may have implications on firm decisions. Directors and executives with certain educational qualifications, industry experience, or association with a certain sector could have different orientations toward decisions on raising capital. Similarly, studies on the political inclination or macroeconomic ideologies of executives could help determine their preference for decisions on raising capital. In addition to governance features, further studies can highlight the effects of transaction costs in firms' choice of security to raise funds.

Literature suggests that information asymmetry is the central cause for insider trades (Ellul and Panayides, 2018; Ke et al., 2003). Other important causes include concentrated ownership (Fidrmuc et al., 2006), long-term institutional ownership (Chen et al., 2007), and efficient governance practices (Lee et al., 2014). This thesis identifies an important macroeconomic factor that widens the information gap between the firm and investors. Further studies can investigate other causes that could lead to higher information asymmetry, such as efficiency of the market, quality of firm reporting, and firm announcement procedures including the use of social media. Besides information asymmetry, further research can point to certain deterrence

policies that could reduce insider transactions. These could include studies on separate regimes of high and low tax rates to analyze differences in the frequency of insider trades between the two.

References

Abel, A. B. (1983). Optimal investment under uncertainty. *American Economic Review, 73*(1), 228-233.

Admati, A. R., Demarzo, P. M., Hellwig, M. F. and Pfleiderer, P. (2018). The leverage ratchet effect. *The Journal of Finance, 73*, 145-198. https://doi.org/10.1111/jofi.12588

Amihud, Y., and Li, K. (2006). The declining information content of dividend announcements and the effects of institutional holdings. *Journal of Financial and Quantitative analysis, 41*(3), 637-660. https://doi.org/10.1017/s0022109000002568

Chen, X., Harford, J., and Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279-305. https://doi.org/10.1016/j.jfineco.2006.09.005

Ellul, A., and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage? *Journal of Financial and Quantitative Analysis, 53*(1), 203-241. https://doi.org/10.1017/s0022109017000990

Fidrmuc, J. P., Goergen, M., and Renneboog, L. (2006). Insider trading, news releases, and ownership concentration. *The Journal of Finance, 61*(6), 2931-2973. https://doi.org/10.1111/j.1540-6261.2006.01008.x

Gatchev, V.A., Spindt, P.A., and Tarhan, V. (2009). How do firms finance their investments? The relative importance of equity issuance and debt contracting costs. *Journal of Corporate Finance, 15*(2), 179-195. https://doi.org/10.1016/j.jcorpfin.2008.11.001

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society,* 153-161. https://doi.org/10.2307/1912352

Jung, K., Kim, Y., and Stulz, R.M. (1996). Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Economics, 42*(2), 159-185. https://doi.org/10.1016/0304-405x(96)00881-1

Ke, B., Huddart, S., and Petroni, K. (2003). What insiders know about future earnings and how they use it: Evidence from insider trades. *Journal of Accounting and Economics, 35*(3), 315-346. https://doi.org/10.1016/s0165-4101(03)00036-3

Lee, I., Lemmon, M., Li, Y., and Sequeira, J. M. (2014). Do voluntary corporate restrictions on insider trading eliminate informed insider trading? *Journal of Corporate Finance, 29*, 158-178. https://doi.org/10.1016/j.jcorpfin.2014.07.005

Lewis, C.M., and Rogalski, R.J., and Seward, J.K. (2003). Industry conditions, growth opportunities and market reactions to convertible debt financing decisions. *Journal of Banking & Finance, 27*(1), 153-181. https://doi.org/10.1016/s0378-4266(01)00212-6

Lemmon, M. L., and Zender, J. F. (2019). Asymmetric information, debt capacity, and capital structure. *Journal of Financial and Quantitative Analysis, 54*(1), 31-59. https://doiorg/10.1017/S0022109018000443

MacKie-Mason, J. (1990). Do taxes affect corporate financing decisions? *The Journal of Finance, 45*(5), 1471. https://doi.org/10.1111/j.1540-6261.1990.tb03724.x

Myers, S. C., and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221. https://doi.org/10.3386/w1396

Nagar, V., Schoenfeld, J., and Wellman, L. (2019). The effect of economic policy uncertainty on investor information asymmetry and management disclosures. *Journal of Accounting and Economics, 67*(1), 36-57. https://doi.org/10.1016/j.jacceco.2018.08.011