STOCK LIQUIDITY OF MALAYSIAN PUBLIC LISTED FIRMS

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FACULTY OF ECONOMICS AND ADMINISTRATION
UNIVERSITY OF MALAYA
KUALA LUMPUR

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STOCK LIQUIDITY OF MALAYSIAN PUBLIC LISTED FIRMS

ABSTRACT

This thesis is motivated by the limited research on the liquidity of Malaysian public listed firms, the growing number of liquidity horseraces, the recent data commercialization by Bursa Malaysia, and liquidity-enhancing policies being spearheaded mainly by stock exchange regulators in emerging markets. By assembling information that covers 1250 public listed non-financial firms over 2000–2015, the thesis conducts three empirical analyses on the determinants of firm liquidity and the effects of higher liquidity on firm valuation, where liquidity is proxied by the "Closing Percent Quoted Spreads" (*CPQS*). First, the thesis revisits the standard liquidity model and advocates the inclusion of shareholder base as a regressor. While conventional wisdom predicts more shareholders are associated with higher liquidity, the first empirical chapter hypothesizes a nonlinear relationship between the number of shareholders (*NSH*) and liquidity (*CPQS*) because the latter might deteriorate when shareholder base becomes too large. Using pooled ordinary least squares (OLS), the baseline results show that the natural logarithm of *NSH* and its squared terms are highly significant with opposite signs. This nonlinear U-shaped relationship passes the extensive robustness checks. Further analysis reveals that liquidity declines when *NSH* exceeds the threshold level due to higher volatility that is induced by noise trading. Second, the thesis proceeds to show why Malaysian public listed firms should pay attention to the liquidity of their stocks. While firm value premiums have been widely reported, the second empirical chapter hypothesizes a nonlinear liquidity-firm value relationship due to the dynamic interplays of the countervailing effects. Using pooled OLS to examine the effects of liquidity on firm value (proxied by Tobin's *Q*), the baseline quadratic model reveals that *CPQS* and $CPQS^2$ are statistically significant but their coefficients are of opposite signs. The nonlinear relationship between *CPQS* and Tobin's *Q* passes subsequent robustness checks, implying that the firm value benefit can only be attained after firm liquidity surpasses the threshold level. Third, the thesis extends the liquidity-firm value literature by exploring new moderating variables. Political connections, foreign nominee ownership and local institutional ownership are three leading candidates, motivated by the entrenched culture of state patronage in Malaysian businesses, the higher efficiency of stocks with greater foreign nominee ownership and the Malaysian government's mandate for state-backed local institutional funds to spearhead shareholder activism, respectively. The empirical results provide strong support for the moderating effects of political connections and foreign nominee ownership. However, the pooled OLS interaction variables for local institutional ownership are statistically insignificant, challenging the corporate governance channel that motivates the hypothesis of its moderating effect on liquidity-firm value relationship. In terms of policy implications, this thesis provides evidence that public listed firms in Malaysia should play a more active role in boosting their own stock liquidity since the tangible benefit of higher market valuation can only be attained when liquidity is at higher levels, especially for firms with political connections and higher foreign ownership. One effective way is through expanding the firms' shareholder bases which at present are still far below the maximum threshold level.

Keywords: Liquidity; Shareholder base; Firm value; Nonlinearity; Malaysia

SAHAM KECAIRAN FIRMA TERSENARAI AWAM MALAYSIA

ABSTRAK

Tesis ini didorong oleh kajian terhad terhadap kecairan firma tersenarai awam Malaysia, peningkatan jumlah pertandingan kecairan, usaha pengkomersialan data oleh Bursa Malaysia pada kebelakangan ini, dan polisi peningkatan kecairan yang diterajui terutamanya oleh pengawal selia bursa saham di pasaran baru muncul. Dengan mengumpulkan maklumat merangkumi 1250 firma tersenarai awam bukan kewangan pada 2000-2015, tesis ini menjalankan tiga analisis empirik tentang penentu kecairan firma dan kesan kecairan yang lebih tinggi ke atas penilaian firma, di mana kecairan diproksikan oleh "*Closing Percent Quoted Spreads*" (*CPQS*). Pertama, tesis ini mengkaji semula piawaian model kecairan dan menyokong jumlah pemegang saham dimasukkan sebagai pengregrasi. Walaupun kebijaksanaan konvensional meramalkan lebih ramai pemegang saham dikaitkan dengan kecairan yang lebih tinggi, bab empirik pertama mengutarakan hipotesis bahawa hubungan tidak linear wujud di antara bilangan pemegang saham (*NSH*) dan kecairan (*CPQS*) kerana kecairan berkemungkinan merosot apabila asas pemegang saham menjadi terlalu besar. Dengan menggunakan kaedah kuasa dua terkecil (*OLS*) untuk panel terkumpul, keputusan asas menunjukkan bahawa logaritma semulajadi bagi *NSH* dan penggal kuadratnya adalah sangat signifikan dengan tanda yang bertentangan. Hubungan tidak linear berbentuk 'U' ini melepasi pemeriksaan kekukuhan yang meluas. Analisis selanjutnya mendedahkan bahawa kecairan menurun apabila *NSH* melebihi tahap ambang adalah disebabkan oleh kemeruapan tinggi hasil daripada perdagangan bising. Kedua, tesis ini seterusnya menunjukkan mengapa firma tersenarai awam Malaysia harus memberi perhatian terhadap kecairan saham mereka. Walaupun premium nilai firma telah dilaporkan secara meluas, bab empirik kedua mengutarakan hipotesis mengenai kewujudan hubungan tak linear di antara nilai firm dan kecairan yang disebabkan oleh interaksi dinamik kesan timbal balas. Dengan menggunakan OLS terkumpul untuk mengkaji kesan kecairan ke atas nilai firma (diproksikan oleh *Tobin's Q*), model kuadratik asas mendedahkan bahawa *CPQS* dan $CPQS^2$ adalah signifikan secara statistik tetapi pekali mereka bertentangan tanda. Hubungan tidak linear antara *CPQS* dan *Tobin's Q* ini melepasi pemeriksaan kekukuhan berikutnya, yang membawa implikasi bahawa faedah nilai firma hanya boleh dicapai selepas kecairan firma melebihi tahap ambang. Ketiga, tesis ini melanjutkan literatur kecairan dan nilai firma dengan meneroka pembolehubah sederhana yang baru. Hubungan politik, pemilikan penama asing dan pemilikan institusi tempatan adalah tiga calon utama, masing-masing didorong oleh budaya penaungan kerajaan yang mantap di kalangan perniagaan Malaysia, kecekapan tinggi bagi saham dengan pemilikan besar oleh penama asing dan juga mandat kerajaan Malaysia supaya dana institusi tempatan milikan negeri menjadi peneraju aktivisme pemegang saham. Keputusan empirik memberikan sokongan kuat kepada kesan penyederhanaan oleh hubungan politik dan pemilikan penama asing. Namun, pembolehubah interaksi bagi pemilikan institusi tempatan dalam OLS terkumpul adalah tidak signifikan secara statistik, maka mencabar saluran tadbir urus korporat yang mendorong pembentukan hipotesis berkenaan kesan penyederhanaannya ke atas hubungan kecairan dan nilai firma. Dari segi implikasi polisi, tesis ini membekalkan bukti bahawa firma tersenarai awam Malaysia harus memainkan peranan yang lebih aktif dalam meningkatkan kecairan saham masing-masing. Ini adalah kerana faedah nyata daripada penilaian pasaran yang lebih tinggi hanya boleh dicapai apabila kecairan berada pada tahap lebih tinggi, terutamanya bagi firma yang mempunyai hubungan politik dan pemilikan asing yang besar. Salah satu cara yang berkesan ialah melalui pengembangan jumlah pemegang saham firma yang pada ketika ini masih jauh di bawah tahap ambang maksimum.

Kata Kunci: Kecairan; Asas Pemegang Saham; Nilai firma; Hubungan tidak linear; Malaysia

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LIST OF SYMBOLS AND ABBREVIATIONS

AIMR	: Association for Investment and Management Research
AMEX	: American Stock Exchange
CAPM	: Capital Asset Pricing Model
CDS	: Central Depository System
CPQS	: Closing Percent Quoted Spread
CPQSIM	: Closing Percent Quoted Spread Impact
CRASH	: Crash Dummy
CRSP	: Center for Research in Security Prices
CSMAR	: China Stock Market and Accounting Research
DED	: Dedicated
DID	: Difference-in-Difference
EDF	: Expected Default Frequency
EDGAR	: Electronic Data Gathering, Analysis and Retrieval System
FCCG	: Finance Committee on Corporate Governance
FDI	: Foreign Direct Investments
FPI	: Foreign Portfolio Investments
GMM	: Generalized Method of Moments
HICOM	: Heavy Industries Corporation of Malaysia
I/B/E/S	: Institutional Brokers Estimate System
ILLIQ	: Amihud Illiquidity ratio
IOSCO	: International Organization of Securities Commissions
IPO	: Initial Public Offering
IR	: Investor Relations
IRO	: Investor Relations Officers
ISI	: Import Substitution Industrialization
KLSE	: Kuala Lumpur Stock Exchange
MSWG	: Minority Shareholders Watchdog Group
MTU	: Minimum Trading Unit
NASDAQ	: National Association of Securities Dealers Automated Quotations
NDP	: National Development Policy
NBER	: National Bureau of Economics Research
NEP	: National Economic Policy
NSKEW	: Negative Skewness
NYSE	: New York Stock Exchange
OLS	: Ordinary Least Squares
OPP	: Outline Perspective Plan
PIN	: Probability of Information-based Trading
QIX	: Quasi-Indexers
SEC	: Securities Exchange Commission
SET	: Stock Exchange of Thailand
S&P	: Standard & Poor
TAQ	: Trade and Quotes
TD	: Transparency and Disclosure
TRA	: Transient
TRTH	: Thomson Reuters Tick History
UMNO	: United Malay National Organization
U.S.	: United States

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Liquidity has always been given utmost attention by stock exchange regulators around the world. This is because liquidity is crucial to the functioning of the secondary markets. In the case of stock exchanges in the United States (U.S.), Amihud and Mendelson (1991) argue that the Securities and Exchange Commission (SEC) has been given a clear mandate to enhance liquidity of the traded securities on its exchanges. According to the authors, based on the 1975 Amendments to the Securities Exchange Act of 1934, the SEC has been entrusted by U.S. Congress to establish an efficient, competitive and fair market system for securities trading. The same objective has been incorporated by the International Organization of Securities Commissions (IOSCO) whose membership regulates more than 95% of the world's securities markets. IOSCO is established to promote adherence to internationally recognized standards for securities markets regulation.[1] The 2008/2009 global financial crisis and several episodes of "Flash Crash" in the U.S. stock markets send clear warning to stock exchange regulators on the detrimental effect of illiquidity. According to Amihud and Mendelson (2012), the sharp decline in liquidity is the main culprit causing stock prices to plunge during the global financial crisis.

To illustrate the importance of liquidity, Amihud and Mendelson (1991) focus on the rules and regulations in the U.S. stock exchanges in their review of liquidity-enhancing public policies. The authors discuss some of the earlier initiatives taken by Securities and Exchange Commission (SEC). First, the Consolidated Tape and Composite Quotation System aims to reduce search and delay costs through information technology.

[1] For more information on the International Organization of Securities Commissions (IOSCO), see http://www.iosco.org/.

Second, Rule 144A facilitates trading in privately placed securities so as to lower search costs and brokerage fees. Third, the initiative to allow multiple listing and competitive trading of stock options aims to increase market liquidity. Fourth, the implementation of the Intermarket Trading System creates market integration facilities to enhance liquidity. In another article, Amihud and Mendelson (1996) propose a new approach to the regulation of multimarket trading of securities. In their proposal, stock exchanges will implement liquidity-enhancing trading systems, rules and procedures in order to attract firms to list and trade securities at their exchanges.

Stock exchange regulators have been at the forefront to enhance market liquidity through various public policies. The popular view holds that corporate managers care less about liquidity after the public listings of their firms. However, the empirical literature documents that public listed firms in developed markets do take deliberate steps to enhance their stock liquidity. Most of these strategies aim at expanding the firms' shareholder bases or targeting the specific type of investors they desire. Among the strategies that have been proven effective in developed stock markets include the reduction in lot size (Ahn, Cai, Hamao, & Melvin, 2014; Amihud, Mendelson, & Uno, 1999), stock splits (Li, Liu, & Shi, 2017; Mukherji, Kim, & Walker, 1997), noncash shareholder perks (Karpoff, Schonlau, & Suzuki, 2018), listing on major stock exchanges (Kadlec & McConnell, 1994; King & Segal, 2009), strategic corporate disclosures (Bushee, 2004; Bushee & Noe, 2000), effective investor relations programs (Bushee & Miller, 2012; Karolyi & Liao, 2017), increases in company name fluency (Green & Jame, 2013), addition to stock indices (Chen, Noronha, & Singal, 2004) and higher levels of advertising expenditures (Grullon, Kanatas, & Weston, 2004). Parrino, Sias and Starks (2003) argue the presence of consulting firms who specialize in shareholder composition is a strong indication that corporate managers strategize to attract certain investor types. Indeed, a recent survey by Stanford's Rock Center for Corporate Governance and the

National Investor Relations Institute finds that the top management of most U.S. corporations is aware of tangible stock market benefits. Hence, these corporate managers dedicate considerable time to manage their diverse shareholder base (see Beyer, Larcker, & Tayan, 2014).[2]

The above shareholder-boosting and hence liquidity-enhancing strategies have their strong support in Amihud and Mendelson (1988, 1991, 2000, 2008). These authors advocate that firms can and should actively pursue corporate policies aimed at increasing the liquidity of their public traded shares. Their argument is that improved liquidity leads to lower cost of equity capital and higher stock price. This in turn increases the market value of the firm. The first evidence supporting the firm value benefit of stock liquidity comes from the U.S. study of Fang, Noe and Tice (2009). Subsequent empirical studies lend further support to the value benefit of higher liquidity (see Bharath, Jayaraman, & Nagar, 2013; Cheung, Chung, & Fung, 2015; Dass, Nanda, & Xiao, 2013; Huang, Wu, Yu, & Zhang, 2014; Jawed & Kotha, 2018; Li, Chen, & French, 2012; Nguyen, Duong, & Singh, 2016; Zhang, Li, Huang, & Chen, 2018). Additional benefits of liquidity enhancement have been reported in the academic literature, such as better corporate governance (Edmans, Fang, & Zur, 2013; Norli, Ostergaard, & Schindele, 2015), more informative stock prices (Chordia, Roll, & Subrahmanyam, 2008; Chung & Hrazdil, 2010a, 2010b), higher managerial pay-for-performance sensitivity to stock prices (Jayaraman & Milbourn, 2012) and lower corporate bankruptcy risk (Brogaard, Li, & Xia, 2017).

In the academic literature, liquidity is one of the most researched areas. There are at least three major strands of studies in the liquidity literature. First, since the seminal paper of Amihud and Mendelson (1986), liquidity has been established as a standard

[2] See also https://www.businesswire.com/news/home/20140521005378/en/Executives-View-Ideal-Shareholder-Base-Key-Increased (retrieved on 30 June 2018).

factor in asset pricing and a key determinant of cost of capital. Their theoretical model predicts that investors demand higher expected returns for less liquid stocks. The premium serves as a compensation for bearing illiquidity costs. Subsequently, theoretical modelling of liquidity experiences a phenomenal growth. This is evidenced by the extensive survey in Amihud, Mendelson and Pedersen (2006) and Vayanos and Wang (2012, 2013). Due to the global financial crisis, the focus has shifted to modelling liquidity dry-ups (see Brunnermeier & Pedersen, 2009; Garleanu & Pedersen, 2007). Second, a large group of empirical studies embarks on exploring the determinants of liquidity. Their objective is to provide useful guides so that stock exchange regulators and corporate managers can undertake measures to improve market and stock liquidity, respectively. Some of the significant liquidity determinants are firm characteristics (Lipson & Mortal, 2007; Stoll, 2000), analyst coverage (Brennan & Subrahmanyam, 1995; Jiang, Kim, & Zhou, 2011; Roulstone, 2003), corporate governance (Chung, Elder, & Kim, 2010; Prommin, Jumreornvong, & Jiraporn, 2014), financial transparency (Heflin, Shaw, & Wild, 2005; Welker, 1995), financial liberalization (Agudelo, 2010; Liew, Lim, & Goh, 2018; Vagias & van Dijk, 2012), corporate ownership (see references cited in Lim, Thian, & Hooy, 2017), algorithmic trading (Frino, Mollica, Monaco, & Palumbo, 2017; Hendershott, Jones, & Menkveld, 2011; Mestel, Murg, & Theissen, 2018) and exchange trading rules (Cumming, Johan, & Li, 2011). Third, another strand of empirical literature puts liquidity as the independent variable. They find that liquidity affects various aspects of corporate finance (see the survey papers of Benson, Faff, & Smith, 2015; Holden, Jacobsen, & Subrahmanyam, 2014).

It is worth highlighting that most of the empirical liquidity studies cover developed stock markets, in particularly the U.S. stock exchanges (see, for example, Amihud & Mendelson, 1986; Brennan & Subrahmanyam, 1995; Chordia et al., 2008; Chung et al., 2010; Fang et al., 2009; Frieder & Martell, 2006; Grullon et al., 2004;

Hendershott et al., 2011; Kale & Loon, 2011). This is because intraday bid-ask spreads data can be extracted from the Trades and Quotes (TAQ) database for U.S. studies. Unfortunately, such high frequency bid-ask spreads data are difficult to obtain for emerging stock markets. Earlier studies on emerging stock markets generally use trade-based indicators such as trading volume and turnover ratio (see, for example, Bekaert, Harvey, & Lumsdaine, 2002; Chan & Faff, 2003; Dey, 2005; Levine & Schmukler, 2006, 2007; Levine & Zervos, 1998). However, these indicators are not measuring trading costs or the price impact of transactions, the two key dimensions of liquidity. There are at least three observations to support criticism against trade-based indicators. First, empirical studies entering liquidity as the dependent variable in a regression generally include trading volume or turnover as the control variable (see, for example, Brockman, Chung, & Yan, 2009; Dang, Nguyen, Tran, & Vo, 2018; Ding, Nilsson, & Suardi, 2017; Lee & Chung, 2018; Lim et al., 2017; Stoll, 2000). Second, Lesmond (2005) and Barinov (2014) find that stocks with high trading volume do not necessarily exhibit high liquidity. Third, the events of "Flash Crash" in the U.S. stock markets – 6 May 2010, 24 August 2015 and 5 February 2018 – show that liquidity can dry up amid very high trading volume.[3]

Motivated by the above limitations, the bid-ask spread is widely used in U.S. studies. It is also adopted as the benchmark in liquidity horseraces to judge the efficacy of existing or new low frequency liquidity proxies (see, for example, Fong, Holden, & Trzcinka, 2017; Goyenko, Holden, & Trzcinka, 2009; Holden, 2009; Lesmond, 2005; Marshall, Nguyen, & Visaltanachoti, 2013). In these liquidity horseraces, if the correlation between the liquidity proxy under study and the benchmark intraday bid-ask spread is high, then the former is judged to be a good measure of liquidity. As highlighted earlier, high frequency bid-ask spreads data are difficult to obtain for emerging stock

[3] Sources: https://www.economist.com/newsbook/2010/10/01/one-big-bad-trade, https://www.cnbc.com/2015/09/25/what-happened-during-the-aug-24-flash-crash.html, https://money.cnn.com/2018/02/05/news/companies/dow-800-points-10-minutes/index.html (retrieved on 16 May 2018).

markets. Nevertheless, this is not a major obstacle because daily bid-ask spreads can be constructed. They are also found to be highly correlated with their intraday benchmarks. For example, Corwin and Schultz (2012) suggest computing the bid-ask spreads using daily high and low prices. Chung and Zhang (2014) instead use closing bid and ask prices for constructing the "Closing Percent Quoted Spread" (*CPQS*). These two proposals represent major development that will stimulate more future research on the liquidity of emerging market firms. The main reason is that the required raw data – daily high prices, daily low prices, daily closing bid prices and daily closing ask prices – are accessible from Thomson Reuters Datastream for most stock exchanges in the world.

Another important development in liquidity research is the extensive cross-country liquidity horseraces conducted by Fong et al. (2017). The usefulness of liquidity horseraces is that they provide performance guides to researchers in their selection of low frequency liquidity proxies. With such guides, researchers avoid extracting intraday microstructure data. This represents substantial savings for researchers in terms of computational time and subscription cost. The liquidity horseraces conducted by Fong et al. (2017) are by far the largest in the academic literature. These authors extract 8 billion trades and 17.7 billion quotes data from Thomson Reuters Tick History (TRTH). The data cover 24,240 firms traded on 42 global stock exchanges over the sample period of 1996 to 2007. There are at least three important implications from their findings for empirical finance research. First, the best performing liquidity proxy differs across stock exchanges. Thus, researchers should not use similar liquidity indicator for all markets. Second, Lesmond (2005) and Bekaert, Harvey and Lundblad (2007) strongly advocate the proportion of zero returns as the liquidity measure for emerging market firms. However, the horseraces reveal that "Zero" is the worst performer for most countries. Third, the "Closing Percent Quoted Spread" (*CPQS*) proposed by Chung and Zhang (2014) stands out as the best performing proxy for many countries. This is encouraging for researchers because bid-ask spread nicely captures the key dimension of trading costs facing investors. Furthermore, the *CPQS* can be constructed using daily closing bid prices and daily closing ask prices. The required data can be retrieved from Thomson Reuters Datastream and are available even for emerging stock markets.

1.2 Motivations of the Study

As highlighted in the previous section, the majority of the liquidity studies use data from developed stock markets, in particularly the U.S. stock exchanges. Relatively, emerging stock markets are largely understudied. However, it is unreasonable to generalize findings from developed to emerging stock markets. This is due to the huge differences in institutional and market features. For instance, it is widely acknowledged that stocks traded in emerging markets are relatively less informationally efficient (Griffin, Kelly, & Nardari, 2010; Lim & Brooks, 2010; Morck, Yeung, & Yu, 2000). On the other hand, Lesmond (2005) and Griffin et al. (2010) report that the liquidity of emerging market firms is still at a lower level relative to those in more developed economies. Besides, emerging markets are also characterized by ownership concentration, weak investor protection and poor corporate governance (Carney & Child, 2013; Claessens, Djankov, & Lang, 2000; Claessens & Yurtoglu, 2013; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Due to such institutional heterogeneity, the literature has consistently argued that there is no one-size-fits-all policy. This applies equally to managing liquidity.

This thesis focuses on the Malaysian stock market mainly because little is known about the liquidity of Malaysian public listed firms. The history of the Malaysian stock exchange can be traced back to the 1930 but as stockbrokers' association. The first official Malayan Stock Exchange was only established in 1960 which marks the beginning of public trading of shares in the country. With the formation of Malaysia on 16 September 1963, the exchange was reconstituted as the Stock Exchange of Malaysia in the following year. The exchange was later renamed as the Stock Exchange of Malaysia and Singapore due to the secession of Singapore from Malaysia on 9 August 1965 to become an independent state. The termination of currency interchangeability between Malaysia and Singapore led to the creation of a new company limited by guarantee– the Kuala Lumpur Stock Exchange (KLSE) in December 1976. In April 2004, KLSE was renamed as Bursa Malaysia as a result of the demutualization exercise. On 18 March 2005, Bursa Malaysia became a public limited company listed on the Main Board of its own exchange under the finance sector.

Despite its incorporation in 1976, there are only a handful of published papers on the liquidity of Malaysian stocks (Azevedo, Karim, Gregoriou, & Rhodes, 2014; Foo & Mat Zain, 2010; Hameed & Ting, 2000; Liew, Lim, & Goh, 2016; Liew et al., 2018; Lim et al., 2017; Rahim & Nor, 2006; Ramlee & Ali, 2012; Sapian, Rahim, & Yong, 2013). None of these firm-level studies utilize bid-ask spread proxy, with trade-based indicators remain the popular choice. The only exceptions are Liew et al. (2016, 2018) but their focus are aggregate liquidity. The lack of research deprives stock exchange regulators and public listed firms valuable input on their liquidity management strategies. This key research gap motivates the thesis to shed more insights into the liquidity of Malaysian public listed firms. The thesis is also motivated by the recent development in the local bourse in which more data are made available by the exchange operator. For instance, annual reports for all companies, listed and delisted, are downloadable from the official website of Bursa Malaysia.[4] The exchange, through its Information Services Division, also provides a wide range of datasets including detailed firm-level shareholder data that are not available in annual reports or other commercial databases.[5]

[4] The URL is http://www.bursamalaysia.com/market/listed-companies/.
[5] See the list of historical data packages at http://www.bursamalaysia.com/market/products-services/information-products/historical-data-packages/.

With detailed firm-level shareholder data recently made available by Bursa Malaysia, this thesis first explores the relationship between the number of shareholders and liquidity of public listed firms. Browsing through the literature, only Demsetz (1968), Benston and Hagerman (1974) and Jacoby and Zheng (2010) provide direct evidence on the negative relationship between the number of common shareholders and the bid-ask spreads using U.S. data. For those voluminous literature exploring the determinants of liquidity, their model has thus far omitted shareholder base in favour of percentage share ownership variables. This is largely due to the lack of quality data in existing commercial databases.[6] Such omission should be rectified as their association has been implied in the literature of investor recognition.[7] Amihud and Mendelson (1989) even allude to a mechanical relationship between shareholder base and liquidity. Despite the limited empirical evidence, stock exchange regulators and corporate managers generally subscribe to the view that more shareholders are associated with higher liquidity.

The above view is in line with the conjecture of Amihud and Mendelson (2000, 2008). These authors suggest expanding the shareholder base is a simple way through which public listed firms can improve their liquidity. In developed stock markets, there is evidence that public listed companies take deliberate steps to expand their shareholder base or to target the specific type of investors they desire (see Ahn et al., 2014; Amihud et al., 1999; Bushee, 2004; Bushee & Miller, 2012; Bushee & Noe, 2000; Chen et al., 2004; Green & Jame, 2013; Grullon et al., 2004; Kadlec & McConnell, 1994; Karolyi & Liao, 2017; Karpoff et al., 2018; King & Segal, 2009; Li et al., 2017; Mukherji et al.,

[6] U.S. firm-level studies typically extract the approximate number of shareholders from COMPUSTAT (see Bodnaruk & Östberg, 2013; Chang, Guo, & Ren, 2013; Chichernea, Ferguson, & Kassa, 2015) or CDA/Spectrum databases (Lehavy & Sloan, 2008; Richardson, Sloan, & You, 2012). The lack of quality data contributes to the scarce literature. There are only a few individual country studies on Sweden (Anchev, 2017; Bodnaruk & ÖStberg, 2009; Jankensgård & Vilhelmsson, 2018), China (Yung & Jian, 2017) and Japan (Ahn et al., 2014; Amihud et al., 1999; Karpoff et al., 2018).

[7] Kadlec and McConnell (1994) find that firms switching to New York Stock Exchange are associated with increases in the number of registered shareholders and reductions in bid-ask spreads. They attribute the increases to enhanced degree of investor recognition. Grullon et al. (2004) show that higher advertising expenditures are associated with lower bid-ask spreads, smaller price impacts and larger quoted depths. This is because product market advertising increases a firm's visibility and attracts stock investors whose decisions are driven primarily by familiarity. Another indirect evidence comes from Green and Jame (2013) who show that public firms with more fluent names are associated with more shareholders and improved liquidity.

1997). However, corporate managers in emerging market firms do not invest much resources in expanding their investor clientele. This is evidenced by the persistence of ownership concentration over time (Carney & Child, 2013; Claessens et al., 2000). Instead, it is the stock exchange operators and regulators who actively promote stock market participation through regulations and incentives. In Malaysia, Bursa Malaysia and Securities Commission Malaysia are the key drivers of investor participation. They place greater emphasis on boasting retail participation in small- and mid-sized listed firms.[8,9]

A critical question is why not all firms, especially those public corporations in emerging markets, actively pursue such shareholder-boosting strategies. Amihud and Mendelson (2000, 2008) caution that maximizing the number of shareholders is not necessarily an optimal strategy. This is because some strategies require substantial managerial time and monetary resources, which are quite costly for small and young public firms in emerging markets. Furthermore, agency costs tend to increase when ownership becomes more dispersed. The costs weaken the incentives for monitoring managers, leading to higher likelihood of free-rider problem and managerial entrenchment (Grossman & Hart, 1980; Jensen & Meckling, 1976). Such environment of weak internal and external governance is found to be detrimental to liquidity (Chung et al., 2010; Jain, Jiang, & Mekhaimer, 2016). Furthermore, a larger shareholder base might yield wider bid-ask spread either due to greater information asymmetry or higher stock volatility. If more informed investors are added to the ownership composition, such

[8] Among the measures undertaken over the past two decades include the reduction of lot size from 1000 to 100 units (2003), the sponsoring of CMDF-Bursa Research Scheme (2005) and Mid and Small Cap Research Scheme (2017), the publication of investor relations manual (2007) and corporate disclosure guide (2012) for listed companies, further liberalization of foreign ownership (2009) and margin financing rules (2018), the launch of a community online portal called Bursa Marketplace (2014), the continuous revisions of Malaysian Code of Corporate Governance (2000, 2007, 2012, 2017), and permitting intraday short-selling for all investors (2018).

[9] Sources: https://www.sc.com.my/general_section/cg/, http://bursa.listedcompany.com/news.rev/id/22874, https://www.thestar.com.my/business/business-news/2003/02/01/board-lots-to-be-fixed-at-100/, https://www.thestar.com.my/business/business-news/2004/11/09/bursa-unveils-scheme-to-boost-market-liquidity/, https://www.thestar.com.my/news/nation/2009/06/30/pm-announces-slew-of-liberalisation-measures-update-2/, http://www.theedgemarkets.com/article/bursa-introduces-corporate-disclosure-guide-effective-jan-3, http://www.theedgemarkets.com/article/bursa-malaysia-seeks-boost-retail-participation-marketplace, http://www.thesundaily.my/news/2017/05/26/mid-and-small-cap-research-scheme-cover-300-companies-eventually, http://www.theedgemarkets.com/article/sc-bursa-outline-equity-market-measures, http://www.thesundaily.my/news/2018/04/16/bursa-malaysia-opens-short-selling-wider-group-investors (retrieved on 30 May 2018).

expansion exacerbates information asymmetry, increases adverse selection costs and leads to lower liquidity. In the case where more noise traders are involved, liquidity will decline if noise trading generates excess volatility.

The possibility of a negative liquidity effect has largely been ignored by the limited empirical studies (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). Their models assume the relationship between the number of shareholders and liquidity is linear. Since a larger shareholder base is widely expected to be associated with higher liquidity, this thesis postulates that the negative liquidity effect will kick in only when the number of shareholders becomes too large. In other words, there is a maximum threshold level for the number of shareholders, beyond which liquidity will deteriorate. The existence of a threshold point suggests the potential costs of maintaining a very large shareholder base outweigh its associated benefits. However, the possible existence of a threshold level has been discarded by previous studies. Thus, this thesis not only extends the limited empirical studies, but also addresses the possibility of a nonlinear relationship between shareholder base and liquidity for Malaysian public listed firms.

The above discussion advocates the inclusion of shareholder base as a determinant of liquidity. However, it is equally important for the thesis to establish the value benefit of promoting liquidity for Malaysian public listed firms. In a series of papers, Amihud and Mendelson (1988, 1991, 2000, 2008) advocate that firms should actively pursue corporate policies aimed at increasing the liquidity of their public traded shares. The incentive is that improved liquidity leads to lower cost of equity capital and higher stock price. This in turn increases the market value of the firm. With the exception of Batten and Vo (2019) for Vietnamese firms, the empirical evidence largely supports the pioneering finding of Fang et al. (2009) on the value benefit of higher liquidity (see

Bharath et al., 2013; Cheung et al., 2015; Dass et al., 2013; Huang et al., 2014; Jawed & Kotha, 2018; Li et al., 2012; Nguyen et al., 2016; Zhang et al., 2018).

The possibility of a threshold level has been completely ignored by previous empirical studies, including the pioneering work of Fang et al. (2009) using U.S. data. These authors lay out five possible theoretical channels through which liquidity might improve firm value, namely liquidity premium, sentiment, positive feedback, pay-for-performance sensitivity and blockholder intervention. However, they also highlight the possibility of a negative relationship between liquidity and firm value due to activist exit and negative stock price feedback effect. While the negative channels might not be dominant in U.S. markets, the same cannot be expected for emerging stock exchanges. This is due to differences in institutional setting, level of information efficiency, ownership structure, shareholder activism, and investor sophistication. Ignoring the dynamic interplays among the competing channels is likely to yield imprecise inferences. This is because the relationship might change due to the dominance of opposing effects at different levels of liquidity.

There are two reasons why the possibility of a nonlinear relationship between liquidity and firm value should be addressed in the Malaysian context. First, the positive channels driving the liquidity-firm value relationship in Fang et al. (2009), informative stock prices and equity-based managerial incentives, might not be dominant in Malaysia. Existing empirical evidence shows that emerging market firms generally have lower levels of information efficiency than their developed counterparts (see Griffin et al., 2010; Lim & Brooks, 2010; Morck et al., 2000). On the other hand, executive stock options are not widely included as components of total managerial compensation in the Malaysian corporate environment. Moreover, the limited empirical studies provide conflicting evidence of their value-enhancing benefit (Ibrahimy & Ahmad, 2016; Ismail, 2014).

Second, the negative channel of liquidity-induced blockholders exit might be stronger in Malaysia. Liew et al. (2018) find that the large withdrawals of foreign investors from the Malaysian stock market are often facilitated by the readiness of state-backed institutions to supply liquidity. Given the countervailing positive and negative effects, the possibility that the relationship between liquidity and firm value is nonlinear cannot be ruled out. In other words, it is possible that a threshold level of liquidity exists for Malaysian public listed firms to reap the benefit of higher firm value.

A consistent theme in this thesis is the existence of threshold levels in the shareholder base-liquidity and liquidity-firm value relationships. In all previous studies, the relationships have been assumed to be linear. To reiterate the importance of functional form, this thesis draws from the rich literature of managerial ownership-firm value. The pioneering theoretical work of Jensen and Meckling (1976) predicts a positive and linear relationship. Their argument is that higher managerial ownership better aligns managers' incentives with those of outside shareholders and thus reduces agency costs. This uniformly positive association is later challenged theoretically by Stulz (1988) and empirically by Morck, Shleifer and Vishny (1988). Both papers argue that firm value tends to fall when the equity stakes of managers grow larger because they are more likely to entrench themselves. Subsequent empirical studies generally support the existence of threshold levels in the relationship between managerial ownership and firm value. In fact, it is now a standard practice in ownership research to fit a nonlinear model. This is motivated by the tradeoff between the positive incentive alignment and negative managerial entrenchment effects (see the survey paper by Chen, Ho, Lee, & Shrestha, 2004). Similarly, the shareholder base-liquidity and liquidity-firm value relationships are driven by countervailing positive and negative effects, and thus motivate this thesis to establish the possible existence of threshold levels.

This thesis further extends the liquidity-firm value literature by exploring the moderating variables that are unique to the Malaysian context. First, in the Malaysian corporate landscape, business, ethnicity and politics are closely linked (see Gomez, 2004; Gomez & Jomo, 1997; Gomez, Padmanabhan, Kamaruddin, Bhalla, & Fisal, 2018; Gomez & Saravanamuttu, 2013). The intertwining of politics and business is rooted in the National Economic Policy (NEP). This is a 20-year national development policy instituted after Malaysia's 1969 race riots to address inter-ethnic socio-economic imbalances. This NEP model of state-led development opens the door for extensive government intervention in the allocation of public investment resources to preferentially selected firms. Political connections are likely to moderate the relationship between liquidity and firm value through the cost of capital channel for two reasons. First, in the theoretical models surveyed by Amihud and Mendelson (2000), the liquidity route to lower cost of capital increases firm value. Second, there is empirical evidence that political connections influence the key channel of cost of capital (Boubakri, Guedhami, Mishra, & Saffar, 2012; Houston, Jiang, Lin, & Ma, 2014). Thus, the entrenched culture of state patronage in Malaysian businesses suggests the moderating role of political connections on the liquidity-firm value relationship. This is an issue unexplored in the extant literature, with cost of capital the key channel as predicted by the theoretical model of Amihud and Mendelson (1986).

Second, the availability of comprehensive ownership dataset for all Malaysian public listed firms allows this thesis to examine two potential channels driving the liquidity-firm value relationship. In an extensive study of Malaysian stock market, Lim, Hooy, Chang and Brooks (2016) find that only foreign investors who trade through the nominee accounts accelerate the incorporation of common information into stock prices. The improvement in price efficiency can be largely attributed to the superior skilled analysis of systematic market-wide factors by foreign nominees. On the other hand, there is evidence that price efficiency plays a crucial role in shaping the liquidity-firm value relationship, both theoretically (Easley & O'hara, 2004; Edmans, 2009; Kyle, 1985) and empirically (Chordia et al., 2008; Chung & Hrazdil, 2010a, b). Motivated by such unique finding for the Malaysian stock market, this thesis explores the moderating role of foreign nominee ownership on the liquidity-firm value relationship. This provides indirect evidence on the channel of stock price informativeness.

Another unique feature of the Malaysian corporate landscape is the government mandate for state-backed local institutional funds to spearhead shareholder activism through Minority Shareholder's Watchdog Group (MSWG)[10] and the Malaysian Code for Institutional Investors.[11] Abdul Wahab, How and Verhoeven (2007) and Ameer and Abdul Rahman (2009) find that local institutional investors play effective monitoring and governance roles among Malaysian public listed firms. There is evidence that greater stock liquidity operates through better corporate governance in deriving higher firm value (see the survey papers of Balachandran & Faff, 2015; Edmans, 2014; Edmans & Holderness, 2017; Love, 2011). This setting permits the analysis to explore the moderating role of local institutional ownership on the liquidity-firm value relationship. This provides indirect evidence on the corporate governance channel.

Browsing through the existing literature for potential moderating variables, previous studies find that the liquidity-firm value relationship is stronger for firms in the real estate investment trust industry (Cheung et al., 2015), firms with large blockholdings

[10] In response to the 1997/1998 Asian financial crisis, the Malaysian government set up the Finance Committee on Corporate Governance (FCCG). One of the FCCG's key recommendations is to institutionalize the monitoring and governance roles of large institutional investors (see https://www.sc.com.my/finance-committee-report-on-corporate-governance/, retrieved on 15 February 2017). This led to the establishment of the Minority Shareholders Watchdog Group (MSWG) in August 2000. MSWG is a government initiative to protect the interests of minority shareholders through shareholder activism and promote corporate governance best practices among publicly listed companies. The four founding members of MSWG are the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board, and the Social Security Organization. Further details on MSWG are available at https://www.mswg.org.my/ (retrieved on 15 February 2017).

[11] On 27 June 2014, the Securities Commission and Minority Shareholders Watchdog Group jointly launched the Malaysian Code for Institutional Investors. The Code outlines six broad principles of effective stewardship by institutional investors, in particularly promoting best corporate governance practices among their investee companies. The Code can be downloaded from https://www.sc.com.my/wp-content/uploads/eng/html/cg/mcii_140627.pdf (retrieved on 15 February 2017).

(Bharath et al., 2013), and innovative firms with stronger equity-based managerial incentive contracts (Dass et al., 2013). In the Malaysian context, the unique corporate landscape provides an ideal setting to explore the moderating roles of political connections and corporate ownership, which have not been explored in the existing literature.

1.3 Research Questions and Hypotheses

Despite the limited empirical studies on the shareholder base-liquidity relationship (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010), the popular view among policymakers and corporate managers is that a larger number of shareholders is associated with higher liquidity. The thesis instead examines the existence of a nonlinear relationship between shareholder base and stock liquidity. This is motivated by the competing positive and negative channels driving the relationship. On one hand, the existing theoretical models predict that a larger shareholder base increases liquidity through greater investor recognition (Merton, 1987), intense competition among informed investors (Foster & Viswanathan, 1994; Holden & Subrahmanyam, 1992; Spiegel & Subrahmanyam, 1992; Subrahmanyam, 1991) and active noise trading by individual investors (Black, 1986; Glosten & Milgrom, 1985; Holmström & Tirole, 1993). On the other hand, more shareholders are predicted to be associated with lower liquidity due to greater asymmetric information (Easley & O'hara, 1987; Glosten & Milgrom, 1985) or higher volatility induced by noise trading (Barberis, Shleifer, & Vishny, 1998; De Long, Shleifer, Summers, & Waldmann, 1990; Shleifer & Summers, 1990).

The Malaysian stock exchange exhibits institutional and market features that differ significantly from developed markets. Examples include lower information efficiency, poor liquidity, high trading frictions, ownership concentration, weak investor protection and poor corporate governance. Such environment is likely to give rise to agency conflicts where firms face free-rider problem and managerial entrenchment (Grossman & Hart, 1980; Jensen & Meckling, 1976). It is well documented in the literature of the detrimental effect of weak internal and external governance on liquidity (Chung et al., 2010; Jain et al., 2016). Furthermore, a larger shareholder base might yield wider bid-ask spread either due to greater information asymmetry or higher stock volatility. If more informed investors are added to the ownership composition, such expansion exacerbates information asymmetry, increases adverse selection costs and leads to lower liquidity. In the case where more noise traders are involved, liquidity will decline if noise trading generates excess volatility.

Motivated by the benefits and costs of larger shareholder base, this thesis formulates the first research question and hypothesis (in alternative form) as follows:

Q_1: Is there a threshold level in the number of shareholders for Malaysian public listed firms to reap the benefit of higher liquidity?

H_1: There is a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms.

To establish the case for Malaysian public listed firms to pursue liquidity-enhancing corporate policies, this thesis re-examines the relationship between liquidity and firm value. Existing empirical studies, mainly from developed stock markets, provide overwhelming evidence that higher liquidity enhances firm value. However, it remains to be ascertained whether such findings from developed markets can be generalized to the Malaysian context. This is due to the huge differences in institutional and market features.

The pioneering U.S. study by Fang et al. (2009) lays out five possible theoretical channels through which liquidity might improve firm value, namely liquidity premium, sentiment, positive feedback, pay-for-performance sensitivity and blockholder intervention. However, they also highlight the possibility of a negative relationship between liquidity and firm value due to activist exit and negative stock price feedback effect. Given the competing positive and negative channels driving the liquidity-firm value relationship, it is reasonable to expect the possible existence of a threshold liquidity level. However, all previous empirical studies ignore this possibility by fitting a linear model. Ignoring the dynamic interplays among the competing channels is likely to yield imprecise inferences. This is because the relationship might change due to the dominance of opposing effects at different levels of liquidity.

Coming back to the Malaysian stock market, there are two reasons why the possibility of a nonlinear relationship might exist. First, existing empirical evidence suggests that the positive channels driving the liquidity-firm value relationship in Fang et al. (2009) might not be dominant for Malaysia, namely informative stock prices (Griffin et al., 2010; Lim & Brooks, 2010; Morck et al., 2000) and equity-based managerial incentives (Ibrahimy & Ahmad, 2016; Ismail, 2014). Second, the negative channel of liquidity-induced blockholders exit might be stronger in Malaysia. Liew et al. (2018) find that the large withdrawals of foreign investors from the Malaysian stock market are often facilitated by the readiness of state-backed institutions to supply liquidity.

Motivated by the benefits and costs of higher liquidity, this thesis formulates the second research question and hypothesis (in alternative form) as follows:

Q_2: Is there a threshold level in liquidity for Malaysian public listed firms to reap the benefit of higher firm value?

H_2: There is a nonlinear relationship between liquidity and firm value for Malaysian public listed firms.

After establishing the nonlinear relationship between liquidity and firm value, the next step is to explore their moderating variables. The first is political connections because Malaysia offers a unique corporate landscape in which business, ethnicity and politics are closely linked (see Gomez, 2004; Gomez & Jomo, 1997; Gomez et al., 2018; Gomez & Saravanamuttu, 2013). The entrenched culture of state patronage in Malaysian businesses suggests the moderating role of political connections on the liquidity-firm value relationship, with cost of capital the underlying channel. Second, two unique Malaysian institutional features provide an ideal setting to explore the moderating role of corporate ownership. More specifically, the higher efficiency of stocks with greater foreign nominee ownership allows the thesis to explore the moderating role of foreign nominee ownership, with stock price informativeness the underlying channel. On the other hand, the government mandate for state-backed local institutions to spearhead shareholder activism forms the basis to test the corporate governance channel through the moderating role of local institutional ownership.

Given the unique corporate landscape of Malaysia, this thesis formulates the third and fourth research question and three related hypotheses (in alternative form) as follows:

Q_3: Do political connections moderate the relationship between liquidity and firm value of Malaysian public listed firms?

H_3: Malaysian public listed firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

Q_4: Does corporate ownership moderates the relationship between liquidity and firm value of Malaysian public listed firms?

H_4: Malaysian public listed firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value.

H_5: Malaysian public listed firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value.

1.4 Research Objectives

The main objective of this thesis is to explore the stock liquidity of Malaysian public listed firms. The three specific research objectives of this thesis are as follows:

1. To determine the threshold level in the relationship between the number of shareholders and stock liquidity.

2. To determine the threshold level in the relationship between stock liquidity and firm value.

3. To examine the moderating effect of political connections and corporate ownership in the liquidity and firm value relationship.

1.5 Significance of the Study

This thesis contributes to the growing literature on the liquidity of emerging stock markets. More importantly, it adds to the limited liquidity studies on the Malaysian stock market. As highlighted earlier, little is known about the liquidity of Malaysian public listed firms even though the stock exchange has been incorporated for more than four decades. Relative to previous Malaysian liquidity studies, this thesis assembles the largest firm-level dataset. The final sample covers 1250 Malaysian public listed firms over the 16-year period from 2000–2015. Since the sample includes both dead and active stocks on Bursa Malaysia, it is free from survivorship bias. Thus, this thesis serves as the reference point for future Malaysian liquidity studies in two different strands. First, the liquidity model specified for Malaysian stocks, with the inclusion of shareholder base, can form the basis for future extensions. Second, when exploring the determinants of firm value for Malaysian firms, liquidity should be included as the key independent variable. On the other hand, the selection of “Closing Percent Quoted Spread” (*CPQS*) proposed by Chung and Zhang (2014) as the main liquidity proxy in this thesis is based on the liquidity horseraces conducted by Fong et al. (2017). The significant results reinforce the reliability of *CPQS* in measuring the liquidity of Malaysian stocks. Even though the findings from Malaysia cannot be generalized to developed mature markets, the possibility that they prevail in other emerging markets with similar institutional and market features cannot be ruled out.

The specific contributions to the academic literature can be summarized as follows. First, the capital market effects associated with larger shareholder base have not been explored rigorously until recently (Anchev, 2017; Bodnaruk & ÖStberg, 2009, 2013; Chang et al., 2013; Chichernea et al., 2015; Choi, Jin, & Yan, 2013; Jankensgård & Vilhelmsson, 2018; Karpoff et al., 2018; Lehavy & Sloan, 2008; Richardson et al., 2012; Yung & Jian, 2017). This thesis contributes to the above limited literature. Second, this thesis shows the importance of functional form when modelling the shareholder base-liquidity and liquidity-firm value relationships. The empirical results reveal the existence of threshold levels in the number of shareholders and stock liquidity. The possibility of threshold levels has been ignored by previous studies as they specify linear models despite theories suggest countervailing driving forces. Third, the unique corporate landscape of Malaysia permits further investigation on the moderating roles of political connections and corporate ownership on the liquidity-firm value relationship. The empirical results show that the value impact demands a more liquid market for firms with political connections, higher foreign nominee ownership and higher foreign institutional ownership. These findings add to the literature because the moderating roles of political connections and corporate ownership have not been explored. Fourth, the empirical evidence sheds new lights on the mechanisms linking liquidity to firm value, namely cost of capital, stock price informativeness and corporate governance. Most previous studies focus only on testing the significance of liquidity in the firm value model. Only a handful of them proceed to explore the underlying channels.

The findings are of significance to policymakers in Malaysia. As highlighted earlier, Bursa Malaysia and Securities Commission Malaysia are the key drivers of investor participation, with greater emphasis on boasting retail participation in small- and mid-sized listed firms. The findings suggest that their shareholder-boosting policies are commendable as they yield higher liquidity. However, the existence of threshold level suggests liquidity will decline when shareholder base becomes too large as the costs outweigh the benefits. This caution against the popular view that "more is better" in shareholding-boosting strategies. Given less than 5% of firm-year observations exceed the threshold level, it suggests either the existing policies are not adequate or there is a limit to what stock exchange can achieve. It thus calls for the active cooperation of public listed firms to manage their shareholder base. The subsequent findings strengthen the call for Malaysian public listed firms to participate actively in shareholder-boosting and liquidity-enhancing strategies. This is because higher liquidity leads to larger firm value. However, the existence of a threshold level in liquidity suggests that the stocks must be traded at a higher level of liquidity before reaping the benefit of larger firm value.

To sum up, the findings reveal much efforts are still needed to improve the liquidity of the Malaysian stocks, with enlarging shareholder base an effective strategy.

Despite the challenges, such objective is attainable if both regulators and listed firms cooperate and make concerted efforts to improve liquidity.

1.6 Outline of the Study

This thesis is organized into seven chapters. Chapter one first provides an overview of the key developments in the stock liquidity literature. This is followed by a discussion on the key issues that motivate the thesis. The subsequent sections lay out the research questions and hypotheses, research objectives and highlight the contributions of this thesis. Chapter two provides an extensive review of the academic literature so as to identify the research gaps in previous liquidity studies. Chapter three discusses existing theories and empirical studies that motivate the development of the five hypotheses. Subsequently, the discussions on methodology cover the sample firms, model specifications, data sources for all variables and the robustness tests. The empirical results for the four research questions are presented in Chapters four to six. Finally, Chapter 7 concludes the thesis by summarizing the key findings for the four research questions. Policy implications and recommendations for future studies are also provided in this final chapter.

CHAPTER 2

LITERATURE REVIEW

As discussed in Chapter 1, the main research gap that motivates this thesis is the limited published studies on the liquidity of Malaysian public listed firms. The lack of research deprives stock exchange regulators and public listed firms valuable input on their liquidity management strategies. This chapter provides a review of the relevant liquidity literature, and discusses some recent developments that motivate the research framework and research questions. Section 2.1 first discusses the existing liquidity measures and justifies the selection of Closing Percent Quoted Spread (*CPQS*) as the main liquidity measure in this thesis. Section 2.2 reviews the studies that explore the determinants of liquidity, while highlighting the limited studies on shareholder base and liquidity that motivates the first research question. Section 2.3 discusses recent studies that examine the effects of higher liquidity on various aspects of corporate finance, including the liquidity-firm value literature that motivates the second research question. Section 2.4 explores existing moderating variables on the liquidity-firm value relationship, and discusses the potential moderating roles of corporate political connections and corporate ownership. Section 2.5 reviews the liquidity-enhancing corporate strategies adopted by public listed firms in developed markets, while highlighting the initiatives to improve the liquidity of Malaysian stock market have largely been undertaken by stock exchange regulator. Last but not least, Section 2.6 provides a brief discussion of the limited Malaysian studies, and how the recent data commercialization by Bursa Malaysia contributes to new empirical work. A summary is given at the end of this chapter.

2.1 Existing Liquidity Measures

Despite the limited availability of microstructure intraday bid-ask spread data on emerging stock markets, daily data are readily available from Thomson Reuters

Datastream to construct low frequency liquidity proxies that highly correlated with intraday benchmarks. The objective of this section is to review which liquidity proxy is a better measure of liquidity for Malaysian public listed firms. First, this section discusses trade-based liquidity proxies. More specifically, this thesis attempts to examine if trading volume and turnover ratio are the best liquidity proxies that correspond to the liquidity benchmark even though they are easy to construct. Second, the review shows that firm-level studies using high frequency bid-ask spread are mostly conducted on U.S. compared to non-U.S. firms. Further investigation on several previous studies proposes that low frequency bid-ask spread can be computed using daily data for emerging markets. Then, the analyses in liquidity horseraces provide useful guides as to which liquidity proxies are strongly correlated with the intraday benchmarks. More importantly, the liquidity horseraces recommend the best-performing liquidity proxy for each stock exchange. In the case of Malaysia, Fong et al. (2017) find that the Closing Percent Quoted Spread (*CPQS*) proposed by Chung and Zhang (2014) is the best liquidity measure.

2.1.1 Trade-Based Liquidity Proxies

There is a large volume of published studies that employ trade-based proxies such as turnover and trading volume because they are simple to construct and data are readily available. Turnover captures trading frequency, i.e. the number of trades executed within a specified interval, but fails to account for cost of trading (Lesmond, 2005). Trading volume increases during liquidity crunches like Tequila crisis, Asian crisis and Brazilian crisis (Summers, 2000). During the crisis period, liquidity will dry up with high trading volume because a crisis forces many traders to do their trading activity.

Empirically, Rouwenhorst (1999) uses turnover measure in a cross-section study to determine the local return factor portfolios involving 1750 individual stocks for 20 emerging markets. Bekaert et al. (2007) study liquidity and expected returns for 19 emerging equity markets and find that future returns are significantly correlated to zero returns while turnover is insignificant. Using a sample of 3200 firms from 55 countries for the period of 1989 to 2000, Levine and Schmukler (2003) utilize turnover ratio to examine the impact of liquidity on domestic and international firms. Jayaraman and Milbourn (2012) examine the role of stock liquidity in executive compensation for the period of 1992 to 2007. The authors use turnover as their liquidity measurement. Prommin et al. (2014) explore the causal link between liquidity and corporate governance using information of 100 firms listed on Stock Exchange of Thailand (SET). They apply three alternative liquidity measures and one of them is turnover. Their study is similar to Tang and Wang (2011) who use turnover ratio as the liquidity measurement to investigate the relationship between corporate governance and liquidity in Chinese stock market.

In the context of Malaysia, there are five research papers that apply trade-based liquidity proxies. First, Hameed and Ting (2000) review weekly return predictability and trading volume based on contrarian investment portfolio securities traded on KLSE over a period of about 989 weeks. Second, Rahim and Nor (2006) investigate the forecasting accuracy of two liquidity-based three-factor models, employing turnover ratio of the Main Board of Bursa Malaysia. Third, Foo and Mat Zain (2010) utilize three measures of liquidity, namely trade-based (trading volume), order-based (quoted depth) and price-based (zero-return) measures. The result shows that firms with independent and diligent board members are associated with higher liquidity when liquidity proxied by trading volume for a sample of 481 firms for the financial year-end of 2007. Fourth, using 283 Initial Public Offering (IPO) stocks listed on Bursa Malaysia from 1998 to 2008, Ramlee and Ali (2012) evaluate the relationship between liquidity proxied by turnover ratio and IPO with government shareholdings as the moderating effect. Fifth, another study on IPO stocks conducted by Sapian et al. (2013) which covers 191 stocks employs three trade-based liquidity measures, namely, trading volume, dollar volume and share turnover.

Aitken and Comerton-Forde (2003) and Lesmond (2005) comment that the proxies applied in all the above cited papers are not good liquidity indicators. These liquidity measures fail to capture the cost of trading when stocks are traded. For example, when investors receive more news on a particular day, trading volume is higher but it does not mean there is liquidity, particularly when there is liquidity crunch. For example, the "Flash Crash" events in the U.S. stock markets on 6 May 2010, 24 August 2015 and 5 February 2018 trigger higher trading volume but there is low liquidity. Therefore, trade-based proxies only measure the ex post rather than ex ante that is relevant for prediction of future event when the stock is traded. Barinov (2014) further proves that turnover is unrelated to liquidity as it tends to fluctuate with firm-specific uncertainty. It is worth highlighting that a growing number of empirical studies include trading volume or turnover as a regressor when specifying their liquidity model (see, for example, Acharya & Pedersen, 2005; Amihud & Mendelson, 1986; Lesmond, 2005; Rhee & Wang, 2009; Stoll, 2000).

2.1.2 High Frequency Intraday Liquidity Measure

The standard practice for many studies on U.S. firms is to use intraday bid-ask spread because high frequency data are available from Trades and Quotes (TAQ) database. The bid-ask spread represents the transaction costs required to execute a small trade immediately and comprises three components – order processing cost, inventory cost and adverse selection cost (Stoll, 1989). Amihud and Mendelson's (1986) study on the effect of bid-ask spread on asset pricing postulates that illiquidity stock is associated with higher cost of capital and expected returns. Their findings show that portfolio return and bid-ask spread has a positive relationship, but the relationship between the return-spread slope and bid-ask spread is negative. They use relative bid-ask spread as their key liquidity measurement. Fang et al. (2009) examine the relationship between stock liquidity and firm value in U.S. for 2642 firms with the sample observations drawing from year 1993, 1995, 1998, 2000, 2002 and 2004. The main liquidity measure is relative effective spread that is considered to be one of the best liquidity proxies. Chordia et al. (2008) and Chung and Hrazdil (2010a, b) investigate the same issues on the relationship between liquidity and market efficiency. All three studies construct liquidity measure by using the relative effective spread which is defined as twice the absolute value of the transaction price deviation from the midpoint of bid-ask prices divided by bid-ask prices midpoint. Chung and Hrazdil (2010a) carry out their study on a large sample of stocks listed on the New York Stock Exchange (NYSE) and Chung and Hrazdil (2010b) collect information on all 11073 listed firms on NASDAQ over the period from January 1, 1993 to June 30, 2004.

Chung et al. (2010) examine the relationship between corporate governance and stock liquidity. Their liquidity data are obtained from TAQ provided by NYSE. Relative effective spread, relative quoted spread and relative price impact are used in their study. The approach is similar to Jiang et al. (2011) that study institutional ownership, number of analysts and stock liquidity. Their liquidity measures are quoted spread, effective spread and Amihud price impact. Grullon et al. (2004) also compute liquidity using relative effective spread, relative quoted spread and relative price impact collected from TAQ database for 1993 to 1998, and investigate the effect of firm advertising expenditures on the breadth of ownership and stock liquidity. Brogaard et al. (2017) examine the relationship between stock liquidity and default risk for 7128 U.S. listed firms for the period 1993 to 2013. High and low frequency measures are constructed using data from the TAQ database. Two main high frequency liquidity measures in their study are relative effective spread and quoted spread. Similarly, Chang, Chen, and Zolotoy (2017) examine liquidity and stock price crash risk where the main liquidity indicator is relative effective spread from 1993 to 2010.

Moving beyond the U.S. stock markets, a few recent studies employ intraday bid-ask spread. Using a sample of international intraday data from Thomson Reuters Tick History (TRTH) database, Huang et al. (2014) employ effective spread as the main liquidity proxy, while considering Amihud illiquidity ratio as an alternative liquidity measure. The authors choose the former because spread-based measure captures better the essence of liquidity which is often used as a benchmark to evaluate the efficacy of other constructed low frequency liquidity proxies. In an empirical examination on stock liquidity and firm value in Australian market, Nguyen et al. (2016) collect intraday bid-ask spread from Securities Industry Research Center of Asia-Pacific Australian Equities database. The primary liquidity measure is relative quoted bid-ask spread of 2034 firms over the period 2001 to 2010.

2.1.3 Low Frequency Liquidity Proxies

The availability of intraday bid-ask spread data in Thomson Reuters Tick History (TRTH) for global stock markets is a very recent development (see Fong et al., 2017). However, the huge computational time and subscription cost involved in assembling such high frequency bid-ask spread remain a challenge for empirical work on emerging stock markets. Hence, low frequency liquidity proxies calculated from daily data are still the popular choices among researchers (see the survey papers by Holden et al., 2014; Benson et al., 2015).

Low frequency liquidity proxies can be categorized into percent-cost and cost-per-volume. The former represents the transaction costs required to execute a small trade. The latter, on the other hand, reflects the marginal transaction costs per currency unit of volume. Even though the literature has proposed many low frequency liquidity proxies over the years, the most commonly used percent-cost and cost-per-volume proxies are reviewed by Goyenko et al. (2009) and Fong et al. (2017). More specifically, Goyenko et al. (2009) compute nine percent-cost and twelve cost-per-volume proxies for U.S. stocks.[12] Fong et al. (2017) compute ten percent-cost and thirteen cost-per-volume proxies for 24240 firms from 42 global stock exchanges.[13]

Coming back to bid-ask spread, Corwin and Schultz (2012) and Chung and Zhang (2014) propose the daily versions using high-low prices and closing bid-ask prices. Corwin and Schultz (2012) propose a simple way to estimate bid-ask spread from daily high and low prices. The authors find that low frequency bid-ask spread is highly correlated with effective spread from TAQ database. Later, Chung and Zhang (2014) construct Closing Percent Quoted Spread by comparing daily bid-ask spread from Center for Research in Security Prices (CRSP) data with intraday TAQ data. Their study shows that CRSP spread is highly correlated with TAQ effective spread in cross-sectional and time-series settings. The authors then argue a simple construction of liquidity measure from CRSP-based spread provides a good approximation of the intraday bid-ask spread from TAQ data. These two studies represent significant breakthrough for emerging market research since the amount of daily data required are manageable and the raw data can be downloaded from the widely subscribed Thomson Reuters Datastream for almost all stock exchanges in the world.

2.1.4 Liquidity Horseraces

Given the variety of liquidity proxies constructed by previous studies, Lesmond (2005), Goyenko et al. (2009), Marshall et al. (2013) and Fong et al. (2017) assemble liquidity

[12] The nine percent-cost liquidity proxies are "Roll" from Roll (1984), "Effective Tick" and "Effective Tick2" from Holden (2009), "Holden" from Holden (2009), "Gibbs" from Hasbrouck (2004), "LOT Mixed" from Lesmond, Ogden, and Trzcinka (1999), "LOT Y-Split" from Goyenko et al. (2009), "Zeros" from Lesmond et al. (1999), "Zeros2" from Goyenko et al. (2009). The twelve cost-per-volume liquidity proxies are "Roll Impact", "Effective Tick Impact", "Effective Tick2 Impact", "Holden Impact", "Gibbs Impact", "LOT Mixed Impact", "LOT Y-Split Impact", "Zeros Impact", "Zeros2 Impact", "Amihud illiquidity ratio" from Amihud (2002), "Gamma" from Pástor and Stambaugh (2003), and "Amivest liquidity ratio" from Amihud, Mendelson, & Lauterbach (1997).

[13] The ten percent-cost liquidity proxies are "Roll" from Roll (1984), "Extended Roll" from Holden (2009), "Effective Tick" from Holden (2009), "LOT Mixed" from Lesmond et al. (1999), "LOT Y-Split" from Goyenko et al. (2009), "FHT" from Fong et al. (2017), "Zeros" from Lesmond et al. (1999), "Zeros2" from Goyenko et al. (2009), "High-Low" from Corwin and Schultz (2012), and "Closing Percent Quoted Spread" from Chung and Zhang (2014). The thirteen cost-per-volume liquidity proxies are "Roll Impact", "Extended Roll Impact", "Effective Tick Impact", "LOT Mixed Impact", "LOT Y-Split Impact", "FHT Impact", "Zeros Impact", "Zeros2 Impact", "High-Low Impact", "Closing Percent Quoted Spread Impact", "Amihud illiquidity ratio" from Amihud (2002), "Pastor and Stambaugh" from Pástor and Stambaugh (2003), and "Amivest liquidity ratio" from Amihud et al. (1997).

horseraces to compare their results using high frequency intraday bid-ask spread as a liquidity benchmark for emerging markets, U.S. markets, frontier markets and international markets, respectively. Lesmond (2005) examines within and cross-country liquidity in 31 emerging markets for the period 1987 to 2000 using five liquidity proxies, namely "Roll" (Roll, 1984), "Amivest" (Amihud et al., 1997), Amihud illiquidity ratio (Amihud, 2002), "LOT" (Lesmond et al., 1999) and turnover. The findings show that "LOT" and "Roll" have better liquidity performance in the cross-country comparison than Amihud illiquidity ratio and turnover with correlation of over 80% and 49% respectively related to bid-ask spread. Surprisingly, the results for turnover are insignificant although its correlation with bid-ask spread is about 60% because turnover captures trading frequency but not cost per trade. As for within-country comparison, "LOT" and Amihud illiquidity ratio dominate "Roll" and turnover. Again, turnover has no correlation against the other three measures on either cross-country or within-country basis, casting doubt on turnover use in emerging markets.

Goyenko et al. (2009) construct 21 low frequency liquidity proxies, where nine of them are percent-cost liquidity proxies and the remaining twelve cost-per-volume proxies. To determine which low frequency liquidity proxy is the best for measuring liquidity, these authors compute high frequency percent-cost benchmarks, namely percent effective spread and percent realized spread. For the category of cost-per-volume, the high frequency benchmarks are the slope of the price function called "lambda" and the percent price impact. All of these liquidity benchmarks are analyzed based on time-series correlations, cross-sectional correlations and prediction errors. The sample covers 400 U.S. stocks chosen randomly over the period 1993 to 2005 from Trades and Quotes database. Based on the liquidity horseraces, "Effective Tick", "Holden" and "LOT Y-Split" dominate the remaining six proxies in percent-cost category, while Amihud illiquidity ratio is the best performer among the twelve cost-per-volume proxies.

Later, Marshall et al. (2013) adopt a similar approach to Goyenko et al. (2009) in evaluating liquidity performance of 19 frontier markets using largest correlations and lowest root mean squared errors. The transaction cost benchmarks are percent effective spread, percent quoted spread and percent price impact sourced from Thomson Reuters Tick History database. Eight liquidity proxies are constructed. They include "Roll" (Roll, 1984), "Gibbs" (Hasbrouck, 2004, 2009), "Zeros" and "Zeros2" (Lesmond et al., 1999), "FHT" (Fong et al., 2017), "Amihud illiquidity ratio" (Amihud, 2002), "Amivest" (Amihud et al., 1997) and "Past Stam" (Pástor & Stambaugh, 2003). They find that Gibbs, Amihud illiquidity ratio and Amivest liquidity measures have the largest correlations relative to percent effective spread and percent quoted spread benchmarks. However, Amihud illiquidity ratio is the best performer for price impact, and "FHT" proxy performs best in terms of root mean squared errors.

Using global intraday data, Fong et al. (2017) compose two samples from Thomson Reuters Tick History and Trades and Quotes. First, the primary sample covers 24240 firms listed on 42 stock exchanges in 38 countries around the world from January 1996 to December 2007. Following Hasbrouck's (2009) methodology, a stock that is eligible for inclusion must meet five criteria: (1) it must be a common stock; (2) it must be present on the first and last TAQ master file for the year; (3) it has appeared in the NYSE, AMEX, or NASDAQ as the primary listing stock exchange; (4) it cannot change primary exchange, tick symbol, or "cusip" (character symbol/code) over the years; (5) it has been listed on Center for Research in Security Prices (CRSP). Second, Fong et al. (2017) utilize the sample of Goyenko et al. (2009) for the years 1993 to 2005 and extend their sample to year 2007 for comparison. The second sample further covers the same 42 stock exchanges that contain 30 firms from January 2008 to December 2014. To run liquidity horseraces, Fong et al. (2017) construct ten percent-cost proxies and thirteen cost-per-volume proxies for comparison against high frequency benchmarks. The benchmarks for percent-cost proxies are percent effective spread, percent quoted spread, percent realized spread and percent price impact. The cost-per-volume benchmark is the slope of price function based on Kyle's (1985) concept called "lambda". From the liquidity horseraces results, Closing Percent Quoted Spread (*CPQS*) developed by Chung and Zhang (2014) is the best monthly percent-cost proxy relative to four liquidity benchmarks (percent effective spread, percent quoted spread, percent realized spread and percent price impact). "High-Low" proxy established by Corwin and Schultz (2012) is the best for capturing the level of percent realized spread and percent price impact. Turning to the best five monthly cost-per-volume proxies, they are Amihud illiquidity ratio, "Closing Percent Quoted Spread Impact", "LOT Mixed Impact", "High-Low Impact" and "FHT Impact". However, the best daily percent-cost proxy falls to *CPQS*, while Amihud illiquidity ratio is the daily top performer among the cost-per-dollar volume proxies.

2.1.5 Best-Performing Liquidity Measure for Malaysian Stocks

Liquidity horseraces provide useful guides to researchers as to which daily or monthly liquidity proxies are highly correlated with their intraday benchmarks. This avoids incurring enormous computational time and high subscription cost for extracting microstructure data.

The liquidity horseraces conducted by Fong et al. (2017) are the reference point of this thesis for three reasons. First, Fong et al. (2017) conduct the largest liquidity horseraces for 42 global stock exchanges (including Malaysia) by constructing intraday liquidity benchmarks from Thomson Reuters Tick History. They collect 8 billion trades and 17.7 billion quotes for 24240 firms over the 12-year sample period from January 1996 to December 2007. Second, they include newly developed bid-ask spread proxies such as the "High-Low" (Corwin & Schultz, 2012) and Closing Percent Quoted Spread (*CPQS*) by Chung and Zhang (2014) whose performance have not been evaluated in previous liquidity horseraces. Third, the results from Fong et al. (2017) show that each stock exchange has its own best performing liquidity proxy that might not necessarily be the best in another market. For instance, the popular Amihud (2002) illiquidity ratio is only found to be the best cost-per-volume liquidity proxy for Italy, Japan, Norway, Spain and Sweden. The liquidity measure of "Zeros", previously advocated by Lesmond (2005) and Bekaert et al. (2007) for emerging markets, has been found to be the worst performer for most countries.

Coming back to the Malaysian stock market, Fong et al. (2017) assemble 189 million trades and 90 million quotes for 960 stocks over the 12-year sample period from January 1996 to December 2007. Their liquidity horseraces show that, in the case of Malaysian stocks, the monthly version of *CPQS* from Chung and Zhang (2014) significantly outperforms its closest competitor by margins of 57% in the cross-sectional dimension, 28% in the portfolio time-series dimension and 105% in the individual stock time-series dimension. At the daily frequency, only two proxies, namely the *CPQS* and the "High-Low" by Corwin and Schultz (2012), are assessed and the former is again found to be the best daily liquidity proxy for Malaysian stocks. Hence, based on the results of Fong et al. (2017), Closing Percent Quoted Spread (*CPQS*) is selected as the main liquidity measure for Malaysian public listed firms.

2.2 Determinants of Stock Liquidity

This section reviews the studies that explore the determinants of liquidity, and highlights the limited studies on shareholder base-liquidity that motivates the first research question.

2.2.1 Number of Shareholders

Merton (1987) shows theoretically that a larger shareholder base is associated with lower cost of capital and higher firm value. Existing empirical studies suggest the benefits of greater breadth of ownership also extend to liquidity. Demsetz (1968), Benston and Hagerman (1974) and Jacoby and Zheng (2010) are the only studies that include shareholder base in their liquidity model. They provide direct evidence on the negative relationship between number of common shareholders and the bid-ask spread. However, their assumption of linear relationship between shareholder base and liquidity is rather strong. This is because existing theoretical models predict countervailing effects. On one hand, the existing theoretical models predict that a larger shareholder base increases liquidity through greater investor recognition (Merton, 1987), intense competition among informed investors (Foster & Viswanathan, 1994; Holden & Subrahmanyam, 1992; Spiegel & Subrahmanyam, 1992; Subrahmanyam, 1991) and active noise trading by individual investors (Black, 1986; Glosten & Milgrom, 1985; Holmström & Tirole, 1993). On the other hand, more shareholders are predicted to be associated with lower liquidity due to greater asymmetric information (Easley & O'hara, 1987; Glosten & Milgrom, 1985) or higher volatility induced by noise trading (Barberis et al., 1998; De Long et al., 1990; Shleifer & Summers, 1990).

The omission of shareholder base variable in existing liquidity models could be due to the lack of quality shareholder base data in commercial databases. For example, U.S. firm-level studies typically extract the approximate number of shareholders from COMPUSTAT (see Bodnaruk & Östberg, 2013; Chang et al., 2013; Chichernea et al., 2015) or CDA/Spectrum databases (Lehavy & Sloan, 2008; Richardson et al., 2012). The former only provides the approximate number of shareholders derived from firms' 10-K filings with the Securities and Exchange Commission. The latter covers U.S. institutions filing Form 13F (for details, see Anchev, 2017; Bodnaruk & Östberg, 2009).

Due to the above data constraint, existing liquidity models favour percentage share ownership variables, such as institutional ownership (Dang et al., 2018; Jiang et al., 2011; Rubin, 2007), blockholder ownership (Attig, Fong, Gadhoum, & Lang, 2006; Brockman et al., 2009; Heflin & Shaw, 2000), government ownership (Borisova & Yadav, 2015; Choi et al., 2010; Ding, 2014), foreign ownership (Lee & Chung, 2018; Ng, Wu, Yu, & Zhang, 2016; Rhee & Wang, 2009), insider ownership (Chiang & Venkatesh, 1988; Kini & Mian, 1995; Rubin, 2007) and ownership concentration (Byun, Hwang, & Lee, 2011; Leaño & Pedraza, 2018; Rubin, 2007). The main drawback of ownership variables is the computation uses only the number of outstanding shares. They thus ignore the number of shareholders that reflects ownership dispersion (Choi et al., 2013; Jacoby & Zheng, 2010). For instance, firms with a high percentage of retail ownership might not witness the expected liquidity improvement through noise trading simply because they are held by a few large wealthy individuals who possess information advantage (see Chen, Chow, & Shiu, 2015; Li, Geng, Subrahmanyam, & Yu, 2017). Given the possibility of such distortion, some studies advocate the number of shareholders (see Blume & Keim, 2012; Edmans & Manso, 2011; Sias, Starks, & Titman, 2001).

The omission of shareholder base variable from the liquidity model should be rectified. This is because their association has been implied in the literature of investor recognition. For instance, Kadlec and McConnell (1994) find that firms switching to New York Stock Exchange are associated with increases in the number of registered shareholders and reductions in bid-ask spreads. They attribute the findings to enhanced degree of investor recognition. Grullon et al. (2004) show that higher advertising expenditures are associated with lower bid-ask spreads, smaller price impacts and larger quoted depths. This is because product market advertising increases a firm's visibility and attracts stock investors whose decisions are driven primarily by familiarity. Another indirect evidence comes from Green and Jame (2013) who show that public firms with more fluent names are associated with more shareholders and improved liquidity. Amihud and Mendelson (1989) even allude to a mechanical relationship between shareholder base and liquidity. These authors use bid-ask spread instead of number of shareholders to proxy for investor recognition. They argue that bid-ask spread and investor recognition are highly and negatively correlated since both are a function of the publicly available firm information.

High quality data on shareholder base are only used by a few individual country studies, but none on liquidity. Their samples cover Sweden (Anchev, 2017; Bodnaruk & Östberg, 2009; Jankensgård & Vilhelmsson, 2018), China (Yung & Jian, 2017) and Japan (Ahn et al., 2014; Amihud et al., 1999; Karpoff et al., 2018). For the literature on shareholder base, most of the earlier studies are dominated by research on cross-sectional stock returns (Anchev, 2017; Bodnaruk & Östberg, 2009; Chang et al., 2013; Choi et al., 2013; Lehavy & Sloan, 2008; Richardson et al., 2012). Moving beyond this traditional focus, Bodnaruk and Östberg (2013) show that firms with broad shareholder base hold lower cash reserves and pay more dividends. This is because investors are able to access cheaper external financing. Chichernea et al. (2015) explore the moderating role of shareholder base on the idiosyncratic volatility-return relationship. They obtain empirical support for their hypothesis that the pricing of idiosyncratic volatility is conditional on firm visibility. Karpoff et al. (2018) find that shareholder perk programs broaden the shareholder base by attracting small individual investors and increase firm value.

However, there is also evidence against expanding the size of the shareholder base. For instance, Yung and Jian (2017) investigate the effects of the shareholder base on firm value in China. They use a sample of 20125 firm-year observations for non-financial firms from 1998 to 2013. They find that larger shareholder base does not benefit firms in China. The negative relationship implies that larger shareholder base causes a higher level of agency conflicts, thus decreases firm value. Jankensgård and Vilhelmsson (2018) examine the relationship between shareholder base and stock return volatility in Swedish firms. Their sample covers the period from 2000 to 2013. They use three databases to collect ownership, shareholder base and financial data, respectively from SIS Ägarservice, VIRSO files and Thomson Datastream. They measure the size of the shareholder base using a broad diversity of the shareholder base. This includes the total number of shareholders, the number of large shareholders, the number of small investors and the number of institutional investors. The findings show that the total number of shareholders, the number of large shareholders, the number of small investors and the number of institutional investors are positively associated with volatility. This implies that having a large number of shareholders can lead to higher volatility due to the presence of noise trading.

2.2.2 Local Institutional Investors

Jennings, Schnatterly and Seguin (2002) study institutional ownership, information and liquidity of U.S. stocks listed on NASDAQ. Using the adverse selection component of the bid-ask spread, they find that an increase in institutional ownership is associated with lower proportion of adverse selection. They attribute the positive relationship between institutional ownership and liquidity to the reduction of information asymmetry by institutional investors. Rubin (2007) examines the relationship between institutional ownership and stock liquidity. Their sample covers 1369 stocks listed on NYSE over the sample period of 1999-2003. The regression results show that total institutional ownership is positively related to liquidity through the channel of trading activity. Jiang et al. (2011) cover a larger sample of U.S. stocks from the three exchanges of NYSE, AMEX, and NASDAQ. Liquidity is measured using quoted spread, effective spread, market quality index and price impact of trades. Across all four proxies, they consistently find a positive relationship between institutional ownership and liquidity. They argue that the liquidity improvement can be attributed to effective monitoring of corporate managers by institutional investors.

Blume and Keim (2012) examine the relationship between institutional investors and liquidity of U.S. stocks. They use two measures of institutional ownership, namely the number of institutional investors and the percentage of institutional ownership. Their liquidity measure is Amihud illiquidity ratio. They find that the number of institutional investors has a higher explanatory power relative to institutional ownership in explaining the cross-section variation of liquidity. They further provide evidence that the explanatory power of the number of institutional investors is significantly stronger in the second sample period of 1996-2010 than the first sample of 1982-1995.

Agarwal (2007) hypothesizes a nonlinear relationship between local institutional ownership and liquidity. This is because the relationship is driven by two competing effects, namely the positive effect of information competition and the negative effect of adverse selection. Using large sample of stocks traded on NYSE and AMEX for the period 1980-2005, the results reveal a nonlinear relationship between institutional ownership and liquidity. At lower levels of institutional ownership, the information competition among informed institutional investors facilitates the speedy incorporation of information into stock prices. The improved price efficiency then increases liquidity. However, liquidity drops after institutional ownership exceeds the threshold level of 35%-40% because the negative effect of adverse selection dominates.

Lim et al. (2017) examine the relationship between local institutional ownership and liquidity in the Malaysian stock market. Their sample covers 600 stocks listed on Bursa Malaysia over the sample period of 2002-2009. Their liquidity measure is the Amihud illiquidity ratio to capture the price impact of trading. They find that local institutional investors who trade through direct accounts are negatively related with liquidity. These authors argue that the negative liquidity effect can be attributed to the large shareholdings held by government-owned institutions that account for about 70% of total local institutional shareholdings. Their large shareholdings exacerbate information asymmetry, reduce the degree of competition and lower the level of trading activity.

2.2.3 Local Blockholders

Heflin and Shaw (2000) hand-collect data for a sample of 260 stocks traded on the U.S. stock exchange in 1988. They measure liquidity using quoted spreads, effective spreads, adverse selection spread components and quoted depths. They find a negative relationship between blockholder ownership and stock liquidity. The evidence supports their hypothesis that the presence of large blockholdings exacerbates information asymmetry and reduces liquidity. Rubin (2007) also finds a negative relationship between institutional blockholdings and liquidity, using data for 1369 stocks listed on NYSE over the sample period of 1999-2003. The author argues that blockholders are perceived by market markers as informed investors who possess superior information. The same negative relationship is further documented by Brockman et al. (2009) who measure liquidity using relative quoted bid-ask spread, relative effective bid-ask spread and quoted depth. However, they do not find evidence that the negative relationship is driven by greater asymmetric information costs. Instead, block ownership affects liquidity through its adverse impact on trading activity, measured by turnover, the number of trades and trade size.

2.2.4 Local Individual Investors

Wang and Zhang (2015) examine the relationship between local individual investors and stock liquidity. Instead of using percentage ownership, these authors collect actual retail trading data from the NYSE ReTrac End of Day (EOD) database for the period from March 2004 to December 2011. The database covers all daily executed trades made by individual investors for all stocks listed on NYSE. Liquidity is measured by Amihud illiquidity ratio. The proxies for trading activity are trading share volume and the number of trades. They find that stocks that are more heavily traded by individual investors are associated with higher liquidity. This positive relationship is stronger for smaller firms, growth firms and non-S&P 500 firms. The results suggest the trading of individual investors reduces information asymmetry, and thus improves stock liquidity.

Lim et al. (2017) examine the relationship between local individual ownership and liquidity in the Malaysian stock market. Their sample covers 600 stocks listed on Bursa Malaysia over the sample period of 2002-2009. Their liquidity measure is the Amihud illiquidity ratio to capture the price impact of trading. They find that the local individual ownership-liquidity relationship is nonlinear. This suggests that the increases in liquidity will reverse once the individual shareholdings reach the threshold level. Their further analysis reveals that at lower levels of shareholdings, the active trading activity of small individual investors improves the liquidity of Malaysian stocks. However, when their shareholdings become large, the negative effects brought by information asymmetry and competition become the dominant force. These authors argue that individual investors with large shareholdings might possess valuable private information and engage in informed trading. This increases information asymmetry and reduces liquidity.

2.2.5 Foreign Investors

Rhee and Wang (2009) examine the causal effect from foreign institutional ownership to future liquidity in Indonesia. The authors are able to obtain daily holdings of free-float shares by investor types from the Jakarta Stock Exchange. They compute daily bid-ask spread, market depth and price sensitivity as proxies for liquidity. Their sample period is from 1/1/2002 to 31/8/2007. The main finding reports that foreign holdings reduce liquidity of the Indonesian stock market. More specifically, a 10% increase in foreign institutional ownership in the current month is associated with approximately 2% increase in the average bid–ask spread, 3% decrease in the average depth, and 4% rise in average price sensitivity in the following month. The authors justify that the negative liquidity effect from foreign institutions might arise because they exacerbate information asymmetry, induce greater volatility, reduce competition in liquidity supply, or adopt passive buy-and-hold strategy.

Ng et al. (2016) investigate the relationship between foreign ownership and stock liquidity using an international coverage of 27828 firms from 39 countries for the sample period of 2003-2009. They divide foreign investors into foreign direct investments (FDI) and foreign portfolio investments (FPI). FDI refers to foreign investors holding at least 5% of a firm's outstanding shares. Foreign investors with ownership below 5% are considered FPI. The data for FDI come from Thomson Reuters Datastream and FPI from FactSet/LionShares. Their main liquidity measure is the Amihud illiquidity ratio, but they also check the result using the proportion of zero return and effective spread. The key result in Ng et al. (2016) shows that foreign direct ownership is negatively associated with liquidity, whereas foreign portfolio ownership is positively related to liquidity. The authors further identify how foreign investors affect stock liquidity. They find that foreign direct investors reduce stock liquidity because of reduced trading activity and increased information asymmetry. In contrast, liquidity improvement by foreign portfolio investors occur through their intense trading activity.

Lim et al. (2017) examine the relationship between foreign ownership and liquidity in the Malaysian stock market. Their sample covers 600 stocks listed on Bursa Malaysia over the sample period of 2002-2009. Their liquidity measure is the Amihud illiquidity ratio to capture the price impact of trading. They find that the foreign ownership-liquidity relationship is nonlinear, but operates through the nominee accounts. This suggests that the existence of a threshold level in foreign nominee ownership. They find that foreign nominees improve liquidity because they lower the level of information asymmetry, increases trading activity and information competition. However, the authors are unable to identify the negative channel which kicks in after foreign nominee ownership exceeds the threshold point.

Lee and Chung (2018) use data from 20 emerging markets and examine the impact of foreign blockholdings on liquidity. Their liquidity measures are the Amihud illiquidity ratio and the bid-ask spread. The latter is derived from the High-Low of Corwin and Schultz (2012) and the Closing Percent Quoted Spread of Chung and Zhang (2014). The results reveal that larger foreign blockholdings have a larger price impact of trades. This suggests that foreign investors increase adverse selection risks for domestic liquidity providers. In contrast, the bid-ask spread decreases with the level of foreign blockholdings. This implies that foreign investors reduce trading costs incurred by liquidity demanders through enhanced competition to the price discovery process.

2.2.6 Security Analyst

Using intraday data of 1508 stocks traded on NYSE for the year 1988, Brennan and Subrahmanyam (1995) find that an increase in the number of analysts following is associated with a lower bid-ask spread due to lower adverse selection costs of trading. Irvine (2003) explores the incremental impact of analyst initiation of coverage. Data for analyst coverage are collected from the Institutional Brokers Estimate Service (*I/B/E/S*) database. The author finds that the incremental price impact of analyst initiation is 1.02% greater than the reaction to a recommendation by analysts who already cover the firm. They argue that liquidity improves not only for the initiation of stock coverage but also depends on the analyst's recommendation. For instance, a positive analyst's recommendation for strong buy is associated with greater liquidity improvement compare to a negative recommendation for hold and sell. Roulstone (2003) also reports a positive relationship between analyst following and liquidity. However, analyst dispersion is associated with lower liquidity after controlling other control variables.

Chung et al. (1995) and Jiang et al. (2011) report contradicting results that analyst coverage is associated with lower liquidity. Both authors justify that market markers tend to set wider spreads for stocks covered extensively by security analysts. This is because analysts are more likely to cover stocks that exhibit higher level of information asymmetry. Nevertheless, Jiang et al. (2011) further show that the information asymmetry can be alleviated by institutional investors through their effective monitoring.

2.2.7 Corporate Governance

Chung et al. (2010) examine the relationship between corporate governance and liquidity for stocks listed on NYSE, AMEX and NASDAQ. They measure liquidity using quoted percentage spread, effective percentage spread, market quality index, price impact of trades and probability of information-based trading, all data sourced from Trades and Quotes database. Governance index are constructed using data provided by Institutional Shareholder Services, covering six categories of audit, board, charter, compensation, ownership and state. Their pooled OLS regression results show that firms with better corporate governance have narrower spreads, higher market quality index, smaller price impact of trades and lower probability of information-based trading. The improvement in liquidity is because corporate governance enhances financial and operational transparency. This in turn reduces information asymmetry and increases stock liquidity.

Foo and Mat Zain (2010) explore the relationship between corporate governance and liquidity for the emerging market of Malaysia. They collect cross-sectional data for

481 stocks traded on the Main Board of Bursa Malaysia in the year 2007. Liquidity is proxied by relative volume, relative quoted depth and proportion of zero returns. Five corporate governance proxies are used, namely the percentage of independent directors on the board, the percentage of independent directors on the audit committee, the percentage of non-executive directors on the board, the number of board meetings during the year and the number of audit committee meetings during the year. The two variables of board independence and board diligence are constructed by applying principal component analysis on the five corporate governance proxies. While not addressing causality, their results show that firms with more independent and diligent boards are associated with higher stock liquidity. Another study conducted by Prommin et al. (2014) explores the effect of corporate governance on the liquidity of stocks listed on the Stock Exchange of Thailand (SET). Their results show that better corporate governance quality is significantly associated with higher level of liquidity.

2.2.8 Financial Transparency

Welker (1995) explores the relationship between corporate disclosures and stock liquidity. The author compiles annual corporate disclosure rating from the Association for Investment Management and Research Corporate Information Committee reports for the period 1983-1990. The results show an inverse relationship between firm disclosure and bid-ask spreads. This suggests that firms with high level of financial disclosure is associated with lower information asymmetry, and hence higher liquidity. Heflin et al. (2005), on the other hand, collect disclosure policy rating from the Corporate Information Committee of the Financial Analysts Federation reports, available on the Institute for the Study of Security Markets database. The final sample covers 1374 firm-year observations from 1988 to 1992. Their baseline two-stage least squares regression finds that higher disclosure ratings are associated with lower effective spread and lower quoted depth. The results remain robust and statistically significant in the sample of industry-year ranked data and industry-year mean adjusted data.

2.3 Empirical Effects of Higher Liquidity

In recent years, the focus of the research has shifted from exploring the determinants of liquidity to examining the empirical effects of higher liquidity. The latter aims to establish the costs and benefits of promoting the liquidity of public listed firms. This section provides a review of this growing strand of literature that examines the effects of liquidity on various aspects of corporate finance, including the liquidity-firm value studies that motivate the second research question.

2.3.1 Firm Value

Despite theoretical predictions and the repeated calls for liquidity management, the first evidence supporting the firm value benefit of stock liquidity is only provided by the pioneering empirical work of Fang et al. (2009). Subsequently, the relationship between liquidity and firm value has been examined for Australia (Nguyen et al., 2016), China (Zhang et al., 2018), India (Jawed & Kotha, 2018), Russia (Li et al., 2012), U.S. (Bharath et al., 2013; Cheung et al., 2015), Vietnam (Batten & Vo, 2019) and international stock markets (Huang et al., 2014). With the exception of Batten and Vo (2019) for Vietnamese firms, all empirical studies show a positive relationship between liquidity and firm value. Notably, all studies assume the relationship is linear and non-monotonic, which is relatively strong given that the relationship is predicted to be driven by countervailing theoretical effects.

The study on liquidity and firm value is pioneered by Fang et al. (2009). They use relative effective spread as the main liquidity measure whereas Amihud illiquidity ratio, zero return and relative quoted bid-ask spread are included for robustness checks. Firm value is proxied by Tobin's *Q*, defined as the market value of assets scaled by the book value of assets. Their sample covers 2642 firms for years 1993, 1995, 1998, 2000, 2002 and 2004. These authors develop five positive channels (liquidity premium, sentiment, positive feedback, pay-for-performance sensitivity and blockholder intervention) and two negative channels (activist exit and negative feedback) through which liquidity affects firm value. From their hypothesis development, the findings provide evidence that liquidity enhances firm value through the informativeness of stock prices and managerial incentive pay-for-performance sensitivity. After that, they extend their study by decomposing Tobin's *Q* into three components, namely, operating income-to-price, financial leverage ratio and operating income-to-assets. The results show that firm with higher stock liquidity is associated with more equity in capital structure and higher operating profitability. In another U.S. study, Cheung et al. (2015) find that liquidity positively affects firm value through a corporate governance mechanism particularly institutional ownership on REIT industry. More specifically, higher level of institutional ownership magnifies the incentive effect of monitoring, thus firm value improves with greater stock liquidity. Bharath et al. (2013) use financial crisis and decimalization to examine exogenous liquidity shocks. Their findings show that firm value declines with larger blockholdings during the crisis but the value benefit increases through decimalization. This suggests that higher stock liquidity facilitates blockholders to improve firm value.

Nguyen et al. (2016) investigate through which mechanism stock liquidity will improve firm value for Australian public listed firms. Their main liquidity measure is relative quoted bid-ask spread, while Amihud illiquidity ratio is used as the alternative liquidity measure. The authors extend the study of Fang et al. (2009) and decompose Tobin's *Q* into three components, namely, operating income over price, leverage ratio and operating income on assets using a sample that consists of 2034 firms over the period 2001 to 2010. The results of Fang et al. (2009) show that firms with more liquid stocks have more equity in capital structure and higher operating profitability. But the findings by Nguyen et al. (2016) suggest that higher stock liquidity and firm value stem from pricing-based mechanism and not operating profitability. This indicates that the impact of liquidity-firm value relationship is not through better operating performance but is more likely the influence from stock price mechanism.

In the case of the China stock market, Zhang et al. (2018) review liquidity and firm value using quasi-natural experiment of non-tradable share reform. They use Tobin's *Q*, Amihud illiquidity measure and turnover as proxies for firm value and liquidity. Their trading and non-tradable share reform related information are collected from China Stock Market and Accounting Research (CSMAR) while Tobin's *Q* from RESSET Financial Research database. Their sample covers 1589 firms from 2001 to 2010. Before the stock market reform, the public holds only 40% of total shares that can be traded publicly in stock exchanges. After the Chinese government launched the non-tradable share reform between 2005 and 2006, all of the shares can be traded in the stock market and this leads to liquidity improvement. Their results suggest that firms with stocks of higher liquidity have better performance. However, Jawed and Kotha (2018) also use a regulatory intervention as a natural shock to liquidity in the Indian stock market. Their results indicate a positive relationship between liquidity and firm value stems from regulatory intervention. They conduct further analyses and decompose Tobin's *Q* into three components, namely operating income to price, financial leverage and operating income to assets. The results find that higher stock liquidity improves firm value through operating performance.

Li et al. (2012) scrutinize the relationship between liquidity, corporate governance and firm value for the Russian stock market. They sample firm-level information that covers the period from 2002 to 2009. Data on transparency and disclosure (TD) scores collected from Standard & Poor's survey reports are used as the proxy for corporate governance. TD scores include ownership structure, shareholder rights, financial and operational information, board composition and management structure. They employ the SURE method to test whether liquidity has an impact on TD and how TD impacts on firm value in Russia. The liquidity measures are trading volume, Amihud illiquidity ratio and zero return. The findings show a positive liquidity-firm value relationship that mainly stems from better corporate governance. They demonstrate that a 10% decrease in the proportion of zero return days will increase transparency and disclosure by 0.34%, which leads to 9.6% increase in firm performance.

For international stock markets, the cross-country study by Huang et al. (2014) examines the impact of investor protection on the relationship between stock liquidity and firm value. The authors use country-level investor protection to proxy for legal regulations, financial information disclosure and political environment. The liquidity measures are relative effective spread and Amihud illiquidity ratio. All of their data are obtained from Thomson Datastream, Worldscope and Thomson Reuters Tick History database for 41 countries for the period 1996 to 2010. Their pooled analysis and country-specific regressions show a positive and significant relation between liquidity and Tobin's *Q* in 36-40 countries for both U.S. and non-U.S. subsamples. This provides strong evidence that liquidity exerts significant impact on firm value. Then, Tobin's *Q* is decomposed into three components, namely operating income, future growth rate in earnings and cost of capital. The findings exhibit that investor protection has a stronger effect on company future earnings and its growth rate but it has no correlation with cost of capital. Their evidence also proves that investor protection enhances firm value by providing protection for minority shareholders from expropriation of managers, encouraging informational trading activity and increasing pay-for-performance sensitivity.

It is worth highlighting that all the above cited papers demonstrate a positive relationship between liquidity and firm value. Batten and Vo (2019), however, report contradicting evidence. These authors re-examine the relationship between stock liquidity and firm value in Vietnamese firms for the period from 2006 to 2015. They follow Fang et al. (2009) to proxy firm value using Tobin's *Q*, measured as the market value of assets scaled by the book value of assets. Their liquidity indicator is calculated as the total trading volume scaled by total shares outstanding. Their fixed effect analysis shows that liquidity has a negative coefficient and significant at the 5% level, suggesting that higher liquidity is associated with lower firm value. They also provide further analysis to identify which mechanisms affect liquidity and firm value, by decomposing Tobin's *Q* into three components, namely operating income-to-price ratio, financial leverage ratio and operating income-to-assets ratio. Among these three components, only the coefficient for liquidity is positively and significantly related to financial leverage at 10% significance level. There are two possible mechanisms that drive their negative liquidity effect, namely agency-based theory and pricing-based theory (buy-and-hold strategy). First, their negative relationship result predicts that firm at a higher level of liquidity can reduce the cost of exit that enables large shareholders to sell off their shares and exit the firm when they are dissatisfy with firm performance, and hence weaken monitoring effect. Second, the negative relationship between liquidity and firm value is due to sophisticated investors, especially foreign investors and institutional investors who are long-term investors and tend to hold their stock with long investment horizon. These long-term investors who adopt buy-and hold strategy will overweight assets and benefit from the illiquidity premium.

2.3.2 Corporate Governance

Edmans et al. (2013) and Norli et al. (2015) investigate liquidity and corporate governance, particularly with the presence of blockholders. Edmans et al. (2013) examine the relationship between stock liquidity and blockholder governance. They measure liquidity using the Amihud illiquidity ratio and the FHT measure proposed by Fong et al. (2017). Governance indicators are constructed based on the filings of Schedule 13D and Schedule 13G from the U.S. Securities and Exchange Commission's (SEC) EDGAR database. 13D represents a dummy variable that equals to one if the hedge fund file is blockholding and zero for 13G. They find a positive effect of liquidity on block formation. One standard deviation increases in Amihud illiquidity ratio (FHT) will increase the probability of hedge fund acquiring a block by 0.47% (0.20%). The authors hypothesize that liquidity increases when a hedge fund acquires a block from firms, leading to higher managerial monitoring incentives. After the hedge fund becoming a blockholder, stock liquidity drops and reduces blockholders' ability in active monitoring activities and make them switch to "exit". This "exit" does not mean that the blockholder quits from governance, but they are employing the alternative "exit" mechanism. This allows them to earn the return through informed trading to gather information like positive announcement returns, holding period returns and greater operating performance especially firm with higher liquidity. So, their findings show that liquidity facilitates both "voice" (intervene) and "exit" (trading) mechanisms and improves overall corporate governance.

Norli et al. (2015) examine liquidity and shareholder activism using a sample of firms listed on NYSE, AMEX and NASDAQ from year 1994 to 2007. 385 shareholder activism data are collected from U.S. Securities and Exchange Commission, the Electronic Data Gathering, Analysis and Retrieval System (EDGAR). Their liquidity measure is the effective cost of trading measure of Hasbrouck (2009). Using probit regression, they find that stock liquidity has a positive effect on the probability of activism. They infer liquid firms are more likely to be targeted by shareholder activists as potential activists are able to trade on private information from their monitoring process. In other words, shareholder activism acts to monitor and govern the managerial activities. Therefore, the empirical findings strongly support their hypothesis that liquidity improves shareholder activism through monitoring incentives. Their study is consistent with Maug's (1998) theory where liquidity motivates shareholder activism practice in "voice mechanism" through informed trading.

While Edmans et al. (2013) and Norli et al. (2015) show the benefit of higher liquidity to corporate governance, Back, Li, & Ljungqvist (2015) report contradicting evidence that greater stock liquidity is harmful for governance. Coffee (1991) and Bhide (1993) argue that higher liquidity reduces the cost of exits and allows blockholders to sell their shares without incurring larger trading cost, thus blockholders intervention is deterred. If the firms fail to maximize firm value, it stimulates the action of blockholders to "vote with their feet" and sell off their stocks. In this case, high liquidity of stock will weaken the monitoring incentive and threat of the exit mechanism is more dominant than voice. Back et al. (2015) establish three natural experiments to determine the exogenous liquidity shocks: brokerage closures (Kelly & Ljungqvist, 2012), market maker closures (Balakrishnan, Billings, Kelly, & Ljungqvist, 2014) and brokerage mergers (Kelly & Ljungqvist, 2012). Their liquidity measure is Amihud (2002) illiquidity ratio. Next, to estimate exogenous liquidity shocks on blockholder activism, they use four proxies to represent blockholder activism with the data obtained from Risk Metrics. This includes shareholder proposals, 13G-to-13D conversions (conversion from passive to active blockholder), first 13D filings and activist campaigns. Their empirical evidence shows that greater liquidity trading is harmful for corporate governance for four measures of blockholder activism across the three natural experiments based on listed firms in U.S. from year 2000 to 2008.

2.3.3 Expected Stock Returns

In the seminal work of Amihud and Mendelson (1986) on the relationship between illiquidity and stock returns, they use bid-ask spread as a proxy for liquidity in NYSE. The theoretical framework points out that investors require liquidity premium for holding illiquid stocks. This demonstrates that illiquid stocks have higher expected returns and cost of capital. In order to reduce security risk from the investment, investors can hold a diversified portfolio to avoid cost of illiquidity. By holding the same stocks, each investor has different gross rate of returns depending on their holding period. It is important to note that the longer the holding period is, the lower is the expected return required to compensate the investors for their liquidity cost because this cost would amortize over a longer period. Their empirical analyses show a positive relation between portfolio return and bid-ask spread, while the relation is negative between return-spread slope and bid-ask spread. This can be described as expected stock return is an increasing and concave function of bid-ask spread caused by the clientele effect. Hence, the authors suggest higher stock liquidity will stimulate lower cost of capital and expected stock returns and provide better firm performance.

In another extensive empirical study on illiquidity and stock returns by Amihud (2002), illiquidity exerts positive significant effect on stock returns in his sample of stocks traded on NYSE for 408 monthly or over 34 years from 1964 to 1997, which is consistent with the hypothesis proposed by Amihud and Mendelson (1986). Chiang and Zheng (2015) utilize sample of international dataset on the G7 stock markets (United States, Canada, France, Germany, Italy, Japan and United Kingdom) to investigate the relationship between liquidity and stock returns. The data covering the period from August 31, 1990 to March 31, 2009 are collected from Thomson Datastream except for the U.S. market that are obtained from CRSP database. The results reveal that illiquidity is positively correlated with stock returns. Survey papers by Amihud et al. (2006) and

Vayanos and Wang (2012) provide an extensive review of the theoretical and empirical studies linking liquidity to expected stock returns, with is now one of the richest literature in finance.

2.3.4 Market Efficiency

Chordia et al. (2008) explore the relationship between liquidity and market efficiency for 193 firms. The sample for their study only includes the largest and active stocks traded on NYSE for the period 1993 to 2002 to avoid non-trading impact in a short-horizon setting. The primary liquidity measure is effective bid-ask spread whereas quoted spread is used for robustness check. To estimate market efficiency, the authors apply five-minute returns where return predictability is an inverse measure of market efficiency. The independent variables are lagged order imbalances and the interaction term between lagged order imbalances and illiquidity dummy variable. Due to the institutional characteristics of U.S., they investigate which type of characteristics can affect the relationship between liquidity and market efficiency such as trading rules, reduced minimum tick size and open-close/close-open prices settings. The results find that the average effective spread (quoted spread) substantially drops across the three tick size regime namely eighth, sixteenth and decimal from 12 (17) cents to 8 (13) cents and 3 (5) cents. This infers that higher stock liquidity is associated with market efficiency through a reduction in minimum tick size. The coefficient of the interaction term between illiquidity dummy and lagged order imbalances is positive and significant for all three sub-periods considered, indicating that return predictability increases during periods of illiquidity. They find that higher liquidity stimulates arbitrage activity which in turn improves market efficiency because arbitrageurs can help market participants to absorb order flows. For additional analysis, the authors perform return variance ratios and first-order autocorrelations. The results reveal that a reduction in the minimum tick size increases return variance ratios but reduces first-order autocorrelations. Their findings suggest that liquidity improves market efficiency by incorporating more private information into stock prices.

After that, Chung and Hrazdil (2010a) further analyze the sample used by Chordia et al. (2008) but with extension that covers the period of January 1, 1993 to June 20, 2004. A total of 4222 firms listed on NYSE are included for comparison purpose. Their liquidity measure is effective bid-ask spread and market efficiency is proxied by return predictability from past order flows. Using pooled regression, their sample covers 300000 firm-month observations. Their finding is similar to Chordia et al. (2008) who report that market efficiency increases across the three different tick size regimes. The empirical evidence has strengthened the findings of Chordia et al. (2008) where lower return predictability is associated with higher liquidity because arbitrageurs assist the specialists in absorbing order flows during period of high liquidity. They also find that a higher level of information efficiency interacts positively with greater liquidity. This suggests that stock prices incorporate information quickly in stock markets that are liquid, thus increase market efficiency.

Chung and Hrazdil (2010b) employ a large sample of U.S. firms listed on NASDAQ which consists of 11073 firms to check whether the positive relationship found in NYSE remains intact for NASDAQ firms. They follow the methodology of Chordia et al. (2008) and Chung and Hrazdil (2010a) to examine how effective bid-ask spread affects return predictability for the period from January 1993 to June 2004. Using pooled regression, their sample covers 528000 firm-month observations which are larger than the sample size reported in Chung and Hrazdil (2010a). They use adjusted R-squared that represents return predictability and hence is an inverse measure of market efficiency. In other words, higher adjusted R-squared is associated with lower market efficiency. The findings show that liquidity is positively related to market efficiency across the three tick size regimes. For instance, adjusted R-squared decreases from 9.22% to 4.33% and further to 0.97% corresponding to the eighths, sixteenths and decimal regimes respectively. The effective bid-ask spread also falls from 0.0382 to 0.0206 and further to 0.0118. The interaction term between illiquidity dummy and lagged order imbalances is positive and significant, suggesting liquidity increases with lower return predictability and improved market efficiency.

2.3.5 Corporate Bankruptcy Risk

Brogaard et al. (2017) examine the relationship between liquidity and firm bankruptcy risk in the U.S. stock market. Their sample covers 7128 firms and the results show a negative relationship between liquidity and firm bankruptcy risk. The data are obtained from Compustat Industrial files and the Center for Research in Securities Prices (CRSP) for the sample period of 1994-2014. To construct default risk, they follow Bharath and Shumway's (2008) measure of expected default frequency (EDF) which is a simplified version of Merton's (1974) distance-to-default model. They measure liquidity using both high frequency and low frequency measures from the TAQ database. Their liquidity measures are effective spread, quoted spread, Amihud illiquidity ratio and Zeros. The results reveal that one standard deviation decrease in effective spread is associated with a drop of 1.66% in EDF. Similarly, for other illiquidity measures, one standard deviation decrease in Amihud illiquidity ratio (Zeros) corresponds to a drop of 1.01% (1.19%) in EDF. To strengthen their findings, the authors explore two possible channels, namely informational efficiency and corporate governance. The findings report that liquidity affects default risk through both channels. Nevertheless, the informational efficiency channel outperforms the corporate governance channel in their horserace analysis. Therefore, higher informational efficiency is associated with reduced firm bankruptcy risk because investors trade on private information that leads to stock price being more informed. This is consistent with the study of Fang et al. (2009) that provides evidence to show that for stocks with high liquidity, firms tend to have more equity and thus bankruptcy risk is lower and this improves firm value.

2.3.6 Firm Innovation

Fang et al. (2014) explore the effect of stock liquidity on firm innovation between 1994 and 2005 with 39469 firm-year observations. They identify that increased liquidity will reduce firm innovation through hostile takeovers and an increased number of non-dedicated investors (transient institutional investors) can lower monitoring incentives. They construct firm innovation productivity in two ways. First, they use the number of patents to capture innovation productivity. Second, the number of non-self-citations that each patent receives is used to measure innovation output. In their study, innovation data are collected from National Bureau of Economics Research (NBER) Patent Citation Data File. The intraday liquidity measure of relative effective spread is obtained from the TAQ database. The findings that show a negative relationship between liquidity and firm innovation propose that liquidity impedes firm innovation for two reasons. First, Stein (1988) argues that information asymmetry arises between managers and investors at higher liquidity, whereby managers will undervalue the company stocks, and this leads to the opportunity for hostile takeover by the outside investors. To avoid the firm being expropriated, there is pressure for managers to sacrifice long-term investment in innovation and focus on a short-term investment projects to boost their current profits. Shleifer and Summers (1988) clarify that when the threat of hostile takeover is high, managers have less power over shareholders, and thus managerial incentive granted to managers to invest in innovation is lower. Kyle and Vila (1991) further explain that increased liquidity allows aggressive traders to take over the firms. Hence, firm innovation is disrupted when liquidity increases. Second, when the number of transient investors increases, they have low incentive to monitor managers and collect information, thus causes stock prices to be less efficient. These transient investors are non-dedicated investors characterized by high portfolio turnover who tend to put more effort to meet short-term earnings targets and cut long-term investment in innovation.

2.3.7 Stock Price Crash Risk

Chang et al. (2017) study liquidity-stock price crash risk relationship using a large sample of 9285 U.S. firms for the period of 1993 to 2010. The main liquidity measure used in their study is relative effective spread. Turning to the stock price crash risk measurement, the authors employ a crash dummy (*CRASH*) and negative skewness (*NSKEW*) of returns. They follow Hutton, Marcus and Tehranian (2009) method to construct crash dummy, where *CRASH* is equal to one if one or more weekly returns falling 3.09 standard deviations below the mean weekly returns over the fiscal year, and zero otherwise. The magnitude of a 3.09 standard deviation is chosen to generate a 0.1% frequency of crashes in the normal distribution. The negative skewness measure (*NSKEW*) is the ratio of the third moment of firm-specific weekly returns divided by the standard deviation of weekly returns raised to the third power, then multiplied by -1. A high value of *NSKEW* indicates a higher crash risk. Therefore, crash risk captures the negative event for firm stock prices. Based on their findings, the coefficient of liquidity is positively and significantly associated with both the *CRASH* dummy and *NSKEW*, indicating firms with higher liquidity have the tendency to induce stock price crash risk. An increase of one standard deviation of stock liquidity is found to increase the probability of future stock price crash by 0.027 and negative skewness of stock returns by 0.047.

The authors further examine two important channels that drive the stock liquidity-crash risk relation by augmenting interaction variables in their baseline model. They evaluate whether the effect of the transient investor channel or the blockholder channel is more important. The results show a positive coefficient of the interaction term between liquidity and transient institutional ownership which is significant for both the models with *CRASH* dummy and *NSKEW*. The interaction between liquidity and non-transient institutional ownership, however, is insignificant. Conversely, the interaction variable of liquidity and blockholder is positive but insignificant in relation to *CRASH* dummy and *NSKEW*. This suggests stocks with higher liquidity largely held by transient investors will lead to future crash risk but not for the blockholder ownership channel. The transient investor channel suggests that these investors focus on short-term trading profit and once the accumulation of bad news released causes the selling pressure from transient institutional investors which leads to a stock price crash. Hence, stock liquidity is positively associated to crash risk because bad news hoarding facilitates the exit of transient investors when bad news are eventually released, thus the accumulation of bad news is the major factor of stock price crash.

2.4 Moderating Variables on Liquidity-Firm Value Relationship

This section provides a review of existing moderating variables on the liquidity-firm value relationship, and discusses the potential moderating roles of corporate political connections and corporate ownership for Malaysian public listed firms.

2.4.1 Existing Moderating Variables

Sampling international firms from 41 countries over the period 1996-2010, Huang et al. (2014) confirm the positive relationship between stock liquidity and firm value across countries in their pooled analysis and within 36-40 countries in country-specific regressions. The value gains from improved stock liquidity are greater in countries with stronger investor protection, operating through its effect on the future growth of operating earnings rather than the cost of equity capital. Further conditions that strengthen the liquidity-firm value relationship have been documented for firms in the real estate investment trust industry (Cheung et al., 2015), firms with large blockholdings (Bharath et al., 2013), and innovative firms with stronger equity-based managerial incentive contracts (Dass et al., 2013).

2.4.2 Potential Moderating Role of Corporate Political Connections

Malaysia has a unique political and social landscape made up of a multi-racial population of Malays, Chinese, Indians and other minority ethnic groups. Since Malaysia's independence on 31 August 1957, the government has embarked on various development plans. During the early years after independence, Malaysia was an agriculture-based economy and the main producer of rubber, tin and palm oil. Subsequently, the economy transformed into a manufacturing and services base. The policy of industrialization shifted from Import Substitution Industrialization (ISI) in 1960-1970 to Export Oriented Industrialization in 1980-1990. Gomez and Jomo (1997) identify a huge gap in income distribution where the Bumiputeras (or "Son of the soil") that account for 60% of the population were mainly in the agricultural sector and the Chinese were dominantly involved in business activities. As a consequence of the inequality, a racial riots broke out on 13 May 1969.

One of the factors that contributed to political patronage is the initiation of the New Economic Policy (NEP) (see Gomez & Jomo, 1997). The policy is introduced in 1970 by the second Prime Minister Tun Abdul Razak, with the prime aim to address inter-ethnic inequality and reduce poverty. NEP covered a period of 20 years, 1971-1990. The objectives of NEP policy (First Outline Perspective Plan, OPP) are to achieve national unity, eradicate poverty and restructure the society imbalance between Bumiputera and non-Bumiputeras. The implementation of the OPP policy for 1971-1990 resulted in the decline of poverty rate from 49.3% in 1970 to 17% in 1990. In terms of restructuring unequal social corporate equity distribution, NEP set a target of 30:40:30 where 30% equity should be held by the Bumiputeras, 40% equity for other Malaysians and 30%

equity for foreigners. In 1970, foreign corporate equity accounts for 63.3%, Bumiputeras owned a proportion of 2.4% and the Chinese owned 27.2% of the shares. After 20 years since the policy was introduced, Bumiputera equity share rose to 19.3%, other Malaysians reached 46.8% and 33.9% for foreigner and nominee companies (see Table 1 of Lim et al., 2016). Although the proportion owned by the Bumiputeras does not achieve the target of 30% ownership equity in 1990, their equity holding shows an improvement from 1970 to 1990. Subsequently, in relation to the country's vision 2020, the National Development Policy (NDP) was introduced in 1991 to replace NEP in the phase of the Second Outline Perspective Plan, 1991-2000 (OPP2), and this is followed by the Third Outline Perspective Plan, 2001-2010 (OPP3) that is associated with the National Vision Policy (NVP).

The implementation of NEP and NDP is to encourage the participation of the Bumiputeras in the corporate sector. However, a close link between business and politics is in existence. By the mid-1990s, the Malaysian corporate sector was dominated by politically connected firms (Gul, 2006). This avenue allows the Bumiputeras to gain increased access to capital, priority for government contracts, opportunities to buy privatized assets and other subsidies (Johnson & Mitton, 2003). For many years until 2018, United Malays National Organization (UMNO) is the largest component political party of the ruling coalition in Malaysia known as Barisan Nasional. The government has selectively chosen firms to receive investment resources such as the Heavy Industries Corporation of Malaysia (HICOM) set up by Dr. Mahathir Mohammad when he is the Minister of Trade and Industry in 1980. Subsequently, HICOM invested in steel, cement and auto industries. As the government is actively involved through their favored firms, this can provide stronger political connections between businessmen and politicians. Meanwhile, Gomez and Jomo (1997) identify the three dominant politicians who have major shareholders and political connections with businessmen: (1) Dr. Mahathir

Mohammad, the former Prime Minister of Malaysia (who became Prime Minister again in 2018); (2) Daim Zainuddin, the former Minister of Finance; and (3) Anwar Ibrahim, the former Deputy Prime Minister.

While relationship-based capitalism is well entrenched in the economies of East Asia (see Rajan & Zingales, 1998), Gomez and Jomo (1997) is perhaps the first published study to systematically trace the close personal friendships between big business owners and top politicians prior to the outbreak of the 1997 Asian financial crisis. Their list of patronized corporations has been widely used to examine the economic consequences of political connections using Malaysia as the laboratory (Abdul Wahab et al., 2007; Adhikari, Derashid, & Zhang, 2006; Bliss & Gul, 2012a, 2012b; Fraser, Zhang, & Derashid, 2006; Gul, 2006; Jebaraj Benjamin, Mat Zain, & Abdul Wahab, 2016; Johnson & Mitton, 2003; Tee, Gul, Foo, & Teh, 2017). The literature subsequently experiences a phenomenal growth, especially after Faccio (2006) compiles an extensive database of 541 firms with political ties in 35 countries.[14] While her international sample shows political connection is a worldwide phenomenon, Malaysia stands out with the second highest number of connected firms, accounting for 28.24% of the country's total stock market capitalization.

The dataset of Gomez and Jomo (1997) has generally outlived its usefulness because the three dominant political figures were no longer in the Malaysian government during our sample period of 2000-2015. After 22 years in power, Mahathir Mohamad handed over the premiership to Abdullah Badawi in October 2003, whereas Najib Razak

[14] For instance, the literature on political connections-firm value relationship is relatively rich, though the findings are inconclusive. On the one hand, the market valuation of firms increases because of the close ties forged with politicians or political parties in power (Faccio 2006; Goldman, Rocholl, & So, 2009; Johnson & Mitton, 2003). Much of this value gain comes from preferential access to credit (Charumilind, Kali, & Wiwattanakantang, 2006; Khwaja & Mian, 2005), lower cost of capital (Boubakri et al., 2012; Houston et al., 2014), higher likelihood of government bailouts (Blau, Brough, & Thomas, 2013; Faccio, Masulis, & Mcconnell, 2006), and lucrative government contracts (Duchin & Sosyura, 2012; Goldman, Rocholl, & So, 2013). In contrast, political patronage can be detrimental to firm value due to rent-seeking and tunnelling activities (Cheung, Rau, & Stouraitis, 2010; Habib, Muhammadi, & Jiang, 2017; Ma, Ma, & Tian, 2013), opportunistic earnings management (Braam, Nandy, Weitzel, & Lodh, 2015; Habib et al., 2017; Ramanna & Roychowdhury, 2010), and lower investment efficiency (Chen, Sun, Tang, & Wu, 2011). Given the opposing effects, Chen, Li, Luo, & Zhang (2017) find a nonlinear relationship between the strength of political links and firm value.

took over the national leadership in April 2009. All three prime ministers came from the same political party, the United Malay National Organization (UMNO), which is the backbone of the coalition government that has ruled Malaysia since independence in 1957 until 2018. Anwar Ibrahim was removed from the Malaysian cabinet and expelled from UMNO in September 1998, and subsequently convicted of corruption and jailed for six years. Daim Zainuddin, a former Finance Minister from July 1984–March 1991, was reappointed to the same portfolio in January 1999 but retired completely from public service in May 2001. Only in the 2018 Malaysian General Election, these three political figures return to active politics when their coalition formed the new government.

While some of those established connections in Gomez and Jomo (1997) may have disappeared, newly forged political ties are documented by Fung, Gul, & Radhakrishnan (2015), Wong (2016) and Tee et al. (2017), suggesting politics continues to be a unique feature of corporate Malaysia. In Fung et al. (2015), politically connected (*PCON*) firms are those that satisfy any of the following criteria: (1) government cabinet members and/or members of parliament sit on corporate boards; (2) government or UMNO-linked organizations/individuals hold significant ownership; and (3) managers are politically connected individuals. Tee et al. (2017) define a firm as under political patronage if one of its controlling shareholders or top officers is a member of parliament, a minister, a head of state, or is closely related to a senior cabinet minister. A broader definition is used by Wong (2016) to consider four types of political connections that are forged through personal friendships between business owners and politicians, former government servants serving as board of directors, government-link companies, and having immediate family members of leading politicians on corporate boards.

Apart from exploring the direct effects of political connections (for example, Fraser et al., 2006; Gul, 2006; Johnson & Mitton, 2003), existing Malaysian studies also find that the dummy variable of *PCON* is an important moderator in the relationship of corporate governance-audit fees (Bliss, Gul, & Majid, 2011), ethnic diversity-firm value (Gul, Munir, & Zhang, 2016) and foreign institutional ownership-audit fees (Tee et al., 2017). This thesis hypothesizes that political connections might also moderate the relationship between liquidity and firm value based on theoretical and empirical grounds. In the theoretical model of Amihud and Mendelson (2000), cost of capital is the key channel linking liquidity and firm value. More specifically, the liquidity route to lower cost of capital increases firm value. Empirically, there is evidence that political connections influence this cost of capital channel. For instance, the cross-country study by Boubakri et al. (2012) finds that investors require a lower cost of equity for firms with strong political ties. This is because politically connected firms are perceived to be less risky due to implicit government guarantees, especially during economic recessions. Using U.S. data, Houston et al. (2014) report a lower cost of bank loans for politically connected firms because lenders perceive them as having high creditworthiness.

2.4.3 Potential Moderating Role of Corporate Ownership

Corporate ownership is a rich literature in the empirical finance research. However, published studies on Malaysian corporate ownership are limited. Those available studies are either covering small sample of stocks or short time period. For instance, Abdul Wahab et al. (2007) examine the role of institutional investors on corporate governance reform. Their sample covers 440 firms listed on the Malaysian stock exchange from 1999 to 2002. The data on institutional ownership are hand-collected from annual reports, but only focus on shareholdings by the top five institutional investors, namely the Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization. Abdul Wahab, Mat Zain, James, & Haron (2009) examine whether institutional investors and political connections are associated with higher audit fees. Their sample covers 390 Malaysian firms from 1999 to 2003. Institutional ownership is defined as the shareholdings of top five institutional investors. Sulong and Mat Nor (2008) examine the relationship between ownership structure and firm value for 406 Malaysian firms. Their data over the sample period of 2002-2005 are collected from annual reports. Four types of ownership structure measures are used, namely ownership concentration, government ownership, foreign ownership and managerial ownership. All ownership are for thirty largest shareholders reported in the annual reports.

Smaller samples continue to be used by recent studies. For instance, Lean, Ting, & Kweh (2015) examine the relationship between ownership concentration and the leverage decision, and the moderating role of family ownership. They use data of 201 Malaysian public listed firms over 2002-2011. The ownership data are collected from annual reports which provide complete information on 30 largest shareholders. Using the same sample firms and time period, Ting, Kweh, Lean, & Ng (2016) examine the relationship between ownership structure (family ownership, government ownership and foreign ownership) and firm performance. The ownership data are collected from annual reports and only cover the top 30 shareholders. Paramanantham, Ting, & Kweh (2018) sample 88 public listed Malaysian companies for the period of 2011-2015. They extract data of ownership concentration from companies' annual reports to examine its relationship with debt structure. Ting, Kweh, Lean, & Juan (2018) examine the relationship between founder CEOs and firm performance, and the moderating role of government ownership. While covering a long sample period of 2002-2013, these authors only cover data for 183 public listed firms on the Malaysian stock exchange.

Most of the above-cited studies rely on annual reports for ownership data, but they do not reflect complete shareholdings for the firm because only the information on the top 30 largest shareholders are reported. Lim, How, & Verhoeven (2014) explain that the change in reporting from top 20 shareholders to top 30 shareholders in the annual reports is due to the implementation of Malaysian Code of Corporate Governance in 2001. Only in recent years that Bursa Malaysia is engaged in the business of data commercialization. This service contributes to new empirical work on Malaysian firms. For instance, Lim et al. (2016, 2017) use the annual ownership dataset "End of Year Shareholdings by Type of Investor" which covers all firms listed in that particular calendar year. The dataset provides total number of shareholders and the total number of shares at year end for seven investor groups: (1) individuals; (2) banks; (3) investment trusts; (4) other corporations; (5) government agencies; (6) nominees; (7) others. Within each group, data are provided for Malaysian and foreign investors. Liew et al. (2018) utilize the "Trading Participation by Category of Investors" at the weekly frequency. The dataset provides trading volume (in million shares) and trading value (in million ringgit) for six investor groups, namely foreign institutions, foreign retail investors, local institutions, local nominees, local proprietary day traders and local retail investors.

The availability of comprehensive ownership dataset for all Malaysian public listed firms allows this thesis to examine the moderating role of corporate ownership on the liquidity-firm value relationship. In an extensive study of Malaysian stock market, Lim et al. (2016) utilize the ownership dataset "End of Year Shareholdings by Type of Investor" provided by Bursa Malaysia and examine the informational role of key market participants. These authors find that only foreign investors who trade through the nominee accounts accelerate the incorporation of common information into stock prices. The improvement in price efficiency can be largely attributed to the superior skilled analysis of systematic market-wide factors by foreign nominees.

On the other hand, there is evidence that price efficiency plays a crucial role in shaping the liquidity-firm value relationship, both theoretically and empirically. This is due to the feedback effects from stock prices to firms' real investment decisions. First, several theoretical models show that managers do learn and glean information contained in stock prices that they may not otherwise possess when making value-enhancing corporate investment decisions (see the survey paper by Bond, Edmans, & Goldstein, 2012). These models show that informative prices help firms to efficiently allocate their investment resources. Second, the theoretical models of Kyle (1985) and Easley and O'Hara (2004) predict that higher liquidity induces more informed trading. This is because the reduced trading costs incentivize traders to acquire more private information. As a result, stock prices become more informative. Empirically, the causal relationship from liquidity to price efficiency is firmly established by Chordia et al. (2008) and Chung and Hrazdil (2010). The moderating role of foreign nominee ownership on the liquidity-firm value relationship provides indirect evidence on the channel of stock price informativeness.

Another unique feature of the Malaysian corporate landscape is that government-controlled institutions hold more than 70% of total local institutional shareholdings. Examples are the Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization. Apart from their social-economic mandates to support national development goals (see Lim et al., 2016 and references cited therein), these state-backed local institutional funds have been entrusted by the Malaysian government to spearhead shareholder activism through Minority Shareholder's Watchdog Group (MSWG) and the Malaysian Code for Institutional Investors.

First, the Malaysian government set up the Finance Committee on Corporate Governance (FCCG) in the aftermath of the 1997/1998 Asian financial crisis. One of the FCCG's key recommendations is to institutionalize the monitoring and governance roles of large institutional investors. This led to the establishment of the Minority Shareholders Watchdog Group (MSWG) in August 2000. MSWG is a government initiative to protect the interests of minority shareholders through shareholder activism and promote corporate governance best practices among publicly listed companies. The four founding members of MSWG are the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board, and the Social Security Organization. Second, the Securities Commission and Minority Shareholders Watchdog Group jointly launched the Malaysian Code for Institutional Investors on 27 June 2014. The Code outlines six broad principles of effective stewardship by institutional investors, in particularly promoting best corporate governance practices among their investee companies. Empirically, Abdul Wahab et al. (2007) and Ameer and Abdul Rahman (2009) find that local institutional investors play effective monitoring and governance roles among Malaysian public listed firms.

There is evidence that greater stock liquidity operates through better corporate governance in deriving higher firm value. The theoretical model of Maug (1998) demonstrates that liquidity facilitates the formation of large blockholdings at a lower transaction cost. This enhances blockholders' incentives to voice or intervene. Recent theoretical models, however, emphasize alternative governance mechanism through the threat of exit. In these models (see the survey papers by Edmans, 2014 and Edmans & Holderness, 2017), higher liquidity allows blockholders to dispose their shares easily when they are unhappy with firm performance. This exerts downward pressure on stock prices. Such disciplinary trading is highly effective in aligning managers' incentives with those of outside shareholders when managerial compensation is closely tied to stock prices. Empirically, there is growing evidence for stronger corporate governance as firms with better practices are found to enjoy higher market valuation (see the survey papers of Balachandran & Faff, 2015 and Love, 2011). The moderating role of local institutional ownership on the liquidity-firm value relationship provides indirect evidence on the channel of corporate governance channel.

2.5 Liquidity-Enhancing Corporate Strategies

Since its incorporation in 1976, the regulators of the Malaysian stock exchange have placed liquidity at the forefront of their public policies. Unlike developed markets, public listed firms in Malaysia do not invest much resources in expanding their investor clientele. Hence, the stock exchange operator (Bursa Malaysia) and regulator (Securities Commission Malaysia) have to actively promote stock market participation through regulations and incentives. Among the measures undertaken over the past two decades include the reduction of lot size from 1000 to 100 units (2003), the sponsoring of CMDF-Bursa Research Scheme (2005) and Mid and Small Cap Research Scheme (2017), the publication of investor relations manual (2007) and corporate disclosure guide (2012) for listed companies, further liberalization of foreign ownership (2009) and margin financing rules (2018), the launch of a community online portal called Bursa Marketplace (2014), the continuous revisions of Malaysian Code of Corporate Governance (2000, 2007, 2012, 2017), and permitting intraday short-selling for all investors (2018).

However, there is no empirical study to assess the effectiveness of the above public measures in enhancing the liquidity of the Malaysian stock market or its public listed firms. The closest is the study by Lim et al. (2017), who examine the relationship between ownership of different types of investor and liquidity for 600 Malaysian public listed firms over the 2002-2009 sample period. The authors find that local institutional ownership is associated with lower liquidity. Local individual ownership and foreign nominee ownership is nonlinearly related to stock liquidity, which the authors attribute to the competing channels of information competition, information asymmetry and trading activity. While their findings are not directly related to the liquidity-enhancing public measures, they nevertheless shed lights on the types of investors that stock exchange authorities and public listed firms should attract. As argued by the authors, some of the public policies formulated are directed towards attracting the participation of specific investor groups, especially local retail investors and foreign investors.

Unlike Malaysia, there is empirical evidence that public listed firms in developed stock markets do take deliberate steps to enhance the liquidity of their traded stocks. Most of these strategies aim at expanding the firms' shareholder bases or targeting the specific type of investors they desire. The evidence shows that these corporate strategies are effective in enhancing liquidity, which should be given due consideration by public listed firms in Malaysia. Indeed, Amihud and Mendelson (1988, 1991, 2000, 2008) advocate that firms can and should actively pursue corporate policies aimed at increasing the liquidity of their public traded shares. Their argument is that improved liquidity leads to lower cost of equity capital and higher stock price. This in turn increases the market value of the firm.

This section thus provides a review of the liquidity-enhancing corporate strategies adopted by public listed firms in developed markets.

2.5.1 Reduction in Lot Size

In the Japanese stock market, public listed firms can affect their investor base by changing the minimum trading unit (MTU) or lot size, which is the minimum number of shares that can be traded on the exchange. Capitalize on this unique setting, Amihud et al. (1999) examine the relationship between the number of shareholders and stock prices using data of 66 firms over the sample period of 1991-1996. They find that the reduction in MTU increases the number of individual investors from an average of 2210 each company to 5517, growing at an average rate of 234%. This is because the reduction in MTU affords small investors to own stocks that were previously too expensive. These authors also find that the reduction in MTU is associated with higher liquidity. Subsequently, Ahn et al. (2014) confirm the liquidity-enhancing benefit of MTU reduction stills persists over the later sample period of 1996-2005 at the Tokyo Stock Exchange.

2.5.2 Stock Splits

Mukherji et al. (1997) empirically examine whether stock splits broaden the shareholder base of firms. Their sample consists of firms listed on NYSE and AMEX from 1984 through 1988. By comparing split firms to a control group of non-split firms, they find that the former experience an increase in the numbers of both individual and institutional investors. As a result, the total number of shareholders registers an increase of 3.49% in split firms. The control group of non-split firms, however, records a decrease of 3.17%. Regression analysis reaffirms that changes in shareholder base are positively and significantly associated with the split factor. The result is consistent with the signaling hypothesis, in which stock splits attract the attention of market participants because they signal managers' favorable assessment of the firm's future prospects.

Li et al. (2017) examine the effect of institutional ownership on stock splits. Using data for all non-financial and non-utility U.S. stocks, they collect stock splits data from CRSP database for 1981-2009 for firms with split factor greater than or equal to 0.5. After cleaning the data, their final sample consists of 6788 stock splits. The key variable of institutional ownership is further classified into short-term investors, medium investors and long-term investors. They obtain institutional ownership data from Thomson Financial CDA/Spectrum 13F filings for stocks traded on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ. Their results show that the changes in institutional ownership and matching firms are statistically significant across all short-term, medium and long-term investors. For the abnormal change in institutional ownership, only short-term investors register significant increase of their holdings of the splitting stocks by 0.84%. This suggests that stock splits attract short-term investors over long-term investors, as the former trade more often at higher level of liquidity with lower trading costs.

2.5.3 Noncash Shareholder Perks

Karpoff et al. (2018) examine the relationship between shareholder perks, ownership structure and firm value. Shareholder perks are noncash benefits offered by companies like a gift, purchase discount at specific retailers shop and travel vouchers. They collect perk data from Japan Company Handbook reports from year 2001 to 2011 that include list of companies that have adopted perks, the minimum number of shares required to receive shareholder perks, the types of perks offered, the timing of perk payments, and the value of the perk. Their event study and difference-in-difference (DID) tests show that 544 firms initiating perk programs increase the shareholder base by attracting small shareholders, leading to an increase in share liquidity, reduce the cost of capital and enhance firm value. Hence, the motivation of initiating perk programs serves shareholders' interest and mitigate transaction and information costs problem that causes small investors to be under-diversified in their portfolio.

2.5.4 Listing on Major Stock Exchanges

Kadlec and McConnell (1994) examine the relationship between listing on major U.S. stock exchange and stock liquidity for the sample period 1980-1989. The key data of their study is the firm's announcement date and listing date in the major U.S. stock exchange. These dates are obtained from the NYSE's *Weekly Bulletin* and *Wall Street Journal*. Grounded on the theoretical predictions of Merton's (1987) and Amihud and Mendelson (1986), they hypothesize that firms listed on major stock exchange are associated with increases in the number of investors and stock liquidity. Their empirical results show that, on average, listing on major stock exchange is associated with a 19% (27%) increase in the number of shareholders (number of institutional shareholders), and a 5% (7%) reduction in absolute bid-ask spread (relative bid-ask spread).

Using the sample of Canadian firms over the period 1988-2005, King and Segal (2009) examine the impact of investor recognition and bonding on the valuation of Canadian firms cross-listed on the U.S. stock exchange. Their results consistently show that U.S. listing increases the valuation of Canadian firms only if they are successful in broadening the shareholder base of the hosting country, particularly in maintaining a high level of U.S. institutional investor holdings. For those firms that fail to attract U.S. investors, their values are not significantly different from non-cross-listed firms. This finding supports the hypothesis that cross-listing increases the degree of investor recognition or visibility for Canadian firms. The subsequent panel regressions confirm that the increases in firm value post-cross-listing are permanent, and the premium is largely attributed to investor recognition that expands the U.S. shareholder base.

2.5.5 Strategic Corporate Disclosures

Bushee and Noe (2000) examine whether corporate disclosure practices affect the composition of institutional investors and return volatility. Their total sample size covers 4314 firm-year observations from 1982 to 1996. They measure disclosure using the annual ranking of corporate disclosure practices rated by the Association for Investment and Management Research (*AIMR*). Institutional ownership data are collected from the *Spectrum* database that contains all 13-F filings, computed as the percentage ownership relative to the total shares outstanding. They categorize institutional investors into three groups, namely transient (*TRA*), dedicated (*DED*) and quasi-indexers (*QIX*). The results show that higher *AIMR* disclosure rankings have greater institutional ownership for both transient institutions and quasi-indexers. However, the ownership of these two groups has no net impact on return volatility. For the first group, transient institutions often trade aggressively on their short-term investment horizon at higher levels of liquidity, and hence their trading induces higher volatility. Quasi-indexers, who tend to hold stocks for longer periods, help to reduce the firm's stock return volatility. Hence, a higher level of disclosure quality is associated with an expanded shareholder base, which in turn increases liquidity.

The above findings are confirmed by Bushee (2004) who finds that both transient and quasi-indexers have higher corporate disclosure quality. Firms attract transient investors because the latter react quickly to their portfolio return at higher liquidity and disclosure, whereas quasi-indexers reduce their cost of monitoring on their large portfolio of stocks relative to greater disclosure. Amidst widespread analyst coverage terminations, Balakrishman et al. (2014) report that corporate managers deliberately seek to boost liquidity through the alternative means of voluntarily disclosing more information than mandated by legislation.

2.5.6 Effective Investor Relations Programs

Bushee and Miller (2012) investigate, through interviews with investor relations (IR) professionals, the consequences of IR programs in 210 small- and mid-cap companies. Relative to a matched sample of control firms, these authors find that for companies hiring an outside IR firm, their IR activities are associated with increases in the number and percentage ownership of institutional investors, broadening of analyst and media coverage, and improved firm valuation. The results provide empirical evidence that IR programs improve the visibility, shareholder base and market value of less visible smaller firms.

Karolyi and Liao (2017) utilize the global proprietary survey data administered by BNY Mellon's Global Investor Relations Advisory team, with participation of 773 investor relations officers (IROs) from 59 countries across diverse range of industries.

From the global survey, these authors construct investor relations (IR) index for five sub-categories, namely interactions with brokers and other financial intermediaries, direct engagement with investors, maintaining and updating corporate disclosure policies, reporting of non-financial metrics, and global outreach. Using the constructed aggregate index, they find that firms with greater global IR activities are associated with higher Tobin's *Q* valuation ratios, through the channels of higher foreign institutional ownership, expanded global analyst following, and greater global capital raising. At the granular level, the valuation premium is driven largely by the sub-category of global outreach. The premium is also higher among firms that are not cross-listed in the U.S. or those located in countries that have weak investor protection laws and poor disclosure standards.

2.5.7 Increase in Company Name Fluency

Green and Jame (2013) examine the effects of company name fluency on the number of retail or mutual funds investors, liquidity and firm value. They collect historical company names from Center for Research in Security Pricing and Securities and Exchange Commission Electronic Data Gathering, Analysis, and Retrieval system. Their final sample consists of 14926 companies, 18585 unique company names with a total of 133400 firm-year observations. They find that one unit increase in fluency score results in a 3.87% (2.03%) increase in the number of retail investors (number of mutual fund investors). They further investigate the effects of fluency on liquidity and firm value. The results show that one unit increase in fluency reduces illiquidity by 4.61% and increase Tobin's *Q* by 1.90%. Therefore, firms with short and easy to pronounce company names are associated with greater number of shareholders, higher liquidity and larger firm value.

2.5.8 Addition to Stock Indices

Chen et al. (2004) examine the asymmetric price response to S&P 500 index additions and deletions. They construct effective dates of changes to the S&P index and announcement dates after September 1989, drawing the data from annual issues of S&P 500 Directory and Standard and Poor's S&P 500 index Focus Monthly Review (for 1998, 1999, and 2000). These effective and announcement dates are further verified with Dow Jones Newswire and the Wall Street Journal. They report a permanent price increase for added firms but no permanent negative price effect for deleted firms. Further analyses reveal that the above asymmetric price response can be attributed to changes in investor awareness, consistent with the theoretical prediction of Merton (1987). More specifically, they report a significant increase in the number of shareholders for stocks added to the S&P index. However, the decline in the number of shareholders is significantly smaller for stocks whose membership in the index were removed. These authors conclude, among others, that the enhanced awareness following addition to stock indices causes a reduction in the information asymmetry component of bid-ask spread, and hence improvement in liquidity.

2.5.9 Higher Levels of Advertising Expenditures

Grullon et al. (2004) examine the relationship between advertising and stock liquidity to test the investor recognition hypothesis of Merton (1987). They collect advertising expenditure data from Compustat. Advertising expenditure is proxied by the cost of advertising media and promotional expenses. Their liquidity measures are relative bid-ask spread, quoted depth and relative price impact, all sourced from TAQ database. The pooled OLS regression analysis finds a positive relationship between advertising expenditure and the total number of shareholders, as well as the number of institutional investors. An increase of one standard deviation in advertising expenditure is associated with 98.7% (11.9%) increase in the number of shareholders (number of institutional investors). These authors also find that an increase in advertising expenditure is associated with lower spread, smaller price impact and larger quoted depth. More specifically, a one standard deviation increase in advertising expenditure is associated with a reduction of 4.5% in relative bid-ask spread, 25.4% increase in quoted depth, and a drop in the relative price impact by18.3%. Putting the results together, higher advertising expenditure to increase investor awareness is associated with larger shareholder base and higher liquidity.

2.6 Malaysian Liquidity Studies

As highlighted in the previous chapter and earlier sections of this chapter, the main research gap that motivates this thesis is the limited published studies on the liquidity of Malaysian public listed firms. From the literature search, there are only nine published papers on the liquidity of Malaysian stocks. Liew (2016) provides a brief review of the first six studies (Azevedo et al., 2014; Foo & Mat Zain, 2010; Hameed & Ting, 2000; Rahim & Nor, 2006; Ramlee & Ali, 2012; Sapian et al., 2013). Three new studies are published thereafter, that is, Liew et al. (2016, 2018) and Lim et al. (2017).

The recent data commercialization by Bursa Malaysia contributes to the new empirical work. For instance, Lim et al. (2017) use the annual ownership dataset "End of Year Shareholdings by Type of Investor" which covers all firms listed in that particular calendar year. The dataset provides total number of shareholders and the total number of shares at year end for seven investor groups: (1) individuals; (2) banks; (3) investment trusts; (4) other corporations; (5) government agencies; (6) nominees; (7) others. Within each group, data are provided for Malaysian and foreign investors. Liew et al. (2018) utilize the "Trading Participation by Category of Investors" at the weekly frequency. The dataset provides trading volume (in million shares) and trading value (in million ringgit) for six investor groups, namely foreign institutions, foreign retail investors, local institutions, local nominees, local proprietary day traders and local retail investors.

This section provides a brief discussion of the nine Malaysian liquidity studies in chronological order. Hameed and Ting (2000) investigate the profitability of short-term contrarian portfolio investment strategy and the trading volume in the Malaysian stock market. These authors argue that liquidity is of great concern to investors when they trade in emerging markets. They collect weekly data for 663 stocks traded on the Malaysian stock exchange over the period of January 1977 to December1996. Using portfolio analysis, they find that contrarian profits are positively associated with the level of trading activity. More specifically, high-volume portfolios are found to earn substantially higher profits than low-volume portfolios. The differential profitability cannot be explained fully by firm size effect, bid-ask bounce effect and non-synchronous trading. These authors attribute the profits to the reallocation of portfolio weights from short-term winners to recent short-term losers.

Rahim and Nor (2006) explore the role of illiquidity risk in the pricing of Malaysian stocks, where liquidity is proxied by turnover ratio. To do that, they evaluate the forecasting accuracy of two variants of liquidity-based three-factor models relative to the conventional capital asset pricing model (CAPM). Their sample consists of 230 to 480 stocks listed on the Main Board of the Malaysian stock exchange over the sample period of 18 years. The years of 1987-2000 are designated as the estimation period, whereas the forecast period covers 2001-2004. Forecasting accuracy is measured by mean absolute percentage errors and Theil's inequality coefficient. Their results show that liquidity-based three-factor models outperform the benchmark CAPM. This suggests that return predictability of Malaysian stocks can be improved by incorporating firm-specific factors such as distress and illiquidity risk in a three-factor model.

Foo and Mat Zain (2010) explore the relationship between corporate governance and liquidity for the emerging market of Malaysia. They collect cross-sectional data for 481 stocks traded on the Main Board of Bursa Malaysia in the year 2007. Liquidity is proxied by relative volume, relative quoted depth and proportion of zero returns. Five corporate governance proxies are used, namely the percentage of independent directors on the board, the percentage of independent directors on the audit committee, the percentage of non-executive directors on the board, the number of board meetings during the year and the number of audit committee meetings during the year. The two variables of board independence and board diligence are constructed by applying principal component analysis on the five corporate governance proxies. While not addressing causality, their results show that firms with more independent and diligent boards are associated with higher stock liquidity.

Ramlee and Ali (2012) explore the relationship between long-term initial public offering (IPO) return and post-listing liquidity, and the potential moderating role of government ownership. Their sample consists of 283 IPO stocks listed on the Main Board and Second Board of the Malaysian stock exchange for the period 1998 to 2008. Liquidity is proxied by monthly turnover ratio and turnover volatility ratio, whereas long-term return is computed as market-adjusted buy-and-hold return. Government ownership is defined as government privatisation companies, government link companies or government link investment companies. 53 firms fulfil the criteria of government ownership and 230 firms are of private ownership. The empirical results show that only average monthly turnover ratio explains the long-term return of Malaysian IPO stocks. This implies that highly liquid stocks are compensated with higher return. Subsequent analysis reveals that the dummy variable for government ownership is positive and significant. This indicates the relationship between liquidity and long-term return is stronger for IPO firms with substantial government ownership. These authors argue that government ownership boosts investor confidence because of the implicit government guarantee.

Sapian et al. (2013) also address similar topic, but hypothesize IPO underpricing is positively associated with post-listing liquidity. They collect 191 IPOs listed on the Malaysian stock exchange from June 2003 to December 2008. The starting date of June 2003 is selected because standard board lot of 100 units was implemented on 26 May 2003. Liquidity is measured using trading volume, dollar volume, share turnover and Amihud illiquidity ratio. The multiple regression results reveal a positive relationship between IPO underpricing and post-listing liquidity, suggesting that underpricing stimulates trading activity. These authors further argue that newly listed firms have greater chances of survival in the secondary market due to the high liquidity of their shares.

Azevedo et al. (2014) examine the effects of index revision on prices and volumes of Malaysian stocks over the sample period of 2005-2012. They hypothesize significant liquidity changes after the announcement of index composition. To test for liquidity changes, they use quoted spread, effective spread, and the depth of Malaysian Ringgit. Their analysis shows that liquidity changes significantly following the announcement of stock additions to the Kuala Lumpur Composite Index. They argue that market makers increase bid-ask spreads in response to the news, causing a decline in trading volume. Therefore, trading volume and stock prices revert back to their original level before the index composition. However, there is no significant liquidity change for stock deletions from the index.

Liew et al. (2016) construct two monthly aggregate liquidity indicators for the Malaysian stock market using Closing Percent Quoted Spread (*CPQS*) and Closing Percent Quoted Spread Impact. These liquidity measures are first constructed at the daily frequency, averaged across months, and then aggregated using equal- and value-weighted schemes. To do that, they collect data for all Malaysian public listed stocks on Bursa

Malaysia over a 15-year sample period from 2000 to 2014. All the required raw data of closing bid price, closing ask price, number of shares traded and closing stock price are sourced from Thomson Datastream. From these long time series data of 180 months, the authors observe a liquidity dry-up in year 2008 which they attribute to the bankruptcy of Lehman Brothers. However, there is no evidence of an upward trend in aggregate liquidity over the sample period. In terms of seasonality, aggregate liquidity seems to drop in the last quarter of the year. The detected structural breaks in the liquidity series can be mapped to international events. This suggests that sharp liquidity changes stem from investors' reactions to international events.

Using the aggregate Closing Percent Quoted Spread constructed by Liew et al. (2016), Liew et al. (2018) examine the impact of gross foreign equity flows on the aggregate liquidity of the Malaysian stock market. These authors use the recently assembled foreign trading data provided by Bursa Malaysia at the weekly frequency. Their sample period spans from October 2009 to December 2016. The key findings can be summarized as follows. First, there is a one-way causality running from gross inflows to aggregate liquidity for both foreign institutions and foreign retail investors. Second, there is evidence that foreign institutional trading erodes the aggregate liquidity of the Malaysian stock market. Third, foreign investors are found to destabilize the market through their positive feedback trading strategy. However, this negative effect is neutralized by local state-backed institutional funds and local proprietary day traders who step in to provide the much-needed liquidity.

Last but not least, Lim et al. (2017) examine the relationship between the ownership of different investor groups and the liquidity of 600 stocks listed on Bursa Malaysia over the sample period of 2002-2009. Their liquidity measure is the Amihud illiquidity ratio to capture the price impact of trading. They find that local institutional investors who trade through direct accounts are negatively related with liquidity. Similarly, local individual investors are significantly associated with liquidity when they trade through direct accounts. However, the relationship between local individual ownership and liquidity is nonlinear, suggesting the existence of a threshold level. The same significant nonlinear relationship is reported for foreign investors, but they operate through the nominee accounts. These authors further find that large shareholdings by any investor group is associated with lower liquidity. This is because large shareholdings exacerbate information asymmetry, reduce the degree of competition and lower the level of trading activity.

2.7 Summary of the Chapter

The main takeaways from this literature review can be summarized as follows. First, despite the large number of liquidity proxies available in the literature, the liquidity horseraces conducted by Fong et al. (2017) find that the Closing Percent Quoted Spread (*CPQS*) proposed by Chung and Zhang (2014) is the best liquidity measure for Malaysian stocks. Second, the literature has identified a number of significant determinants of liquidity. However, the number of shareholders has been omitted in existing liquidity models. This could be due to the lack of quality shareholder base data in commercial databases. The review provides theoretical and empirical grounds for the inclusion of this variable. Third, there is growing literature exploring the effects of higher liquidity on various aspects of corporate finance. This review focuses on the liquidity-firm value relationship, and highlights the methodological gap. Academic studies are cited to support the specification of a nonlinear model for exploring the liquidity-firm value relationship. Fourth, there are theoretical and empirical grounds to explore the moderating roles of corporate political connections and corporate ownership on the liquidity-firm value relationship. Fifth, the literature provides a menu of possible liquidity-enhancing policies that Malaysian public listed firms might consider. Last but not least, the dearth of

Malaysian liquidity studies deprives stock exchange regulators and public listed firms valuable input on their liquidity management strategies. However, the recent data commercialization by Bursa Malaysia should stimulate more empirical work.

CHAPTER 3

THEORIES AND METHODOLOGIES

In Chapter 1 of this thesis, a brief discussion on the research questions and hypotheses are provided. The first research question examines the existence of a threshold level in the number of shareholders for Malaysian public listed firms to reap the benefit of higher liquidity. The second research question then proceeds to explore the existence of a nonlinear relationship between stock liquidity and the firm value of Malaysian public listed firms. The third and fourth research question addresses the moderating roles of political connections and corporate ownership on the liquidity-firm value relationship.

The above four research questions generate five testable hypotheses. Section 3.1 provides an in-depth discussion on the theories and empirical studies that motivate each hypothesis. Section 3.2 lays out the model specifications to test each hypothesis. Section 3.3 discusses all the dependent and key independent variables used in all models, along with their data sources. The descriptions of the control variables and their data sources are provided in Section 3.4. Section 3.5 discusses the final sample of Malaysian public listed firms selected for this thesis and Section 3.6 outlines the robustness checks. The final section then concludes this chapter.

3.1 Theoretical Grounds for Hypotheses

This section lays out the theories and empirical studies that motivate the three research questions. As a result, five hypotheses are developed for empirical testing.

3.1.1 Nonlinear Relationship between Shareholder Base and Stock Liquidity

Theoretically, the nonlinear relationship between shareholder base and liquidity might arise due to the countervailing effects of investor recognition, information competition, asymmetric information, noise trading and stock volatility.

The theoretical model of Merton (1987) focuses on the central role of investor recognition in the determination of expected stock returns and firm value. The model assumes that investors consider only a subset of all publicly listed firms in their investment choices. It further characterizes the degree of investor recognition as the number of outside investors who knows about the firm. Even though the model is silent on liquidity, empirical studies testing Merton's (1987) theoretical prediction find that enhanced investor recognition – due to exchange switching (Kadlec & McConnell, 1994), effective advertising (Grullon et al., 2004), company name fluency (Green & Jame, 2013) and reduction in minimum trading unit (Amihud et al., 1999) – generally leads to larger shareholder base and higher stock liquidity.[15]

The positive relationship between shareholder base and liquidity might also operate through information competition among informed investors. According to the strategic trader models (see Foster & Viswanathan, 1994; Holden & Subrahmanyam, 1992; Spiegel & Subrahmanyam, 1992; Subrahmanyam, 1991), the increasing competition among multiple privately informed traders who act strategically causes stock prices to become more information efficient. This in turn lowers the extent of information asymmetry and increases stock liquidity. Empirically, Akins et al. (2012) show that greater competition is associated with lower pricing of information asymmetry. This is because there is little room for informed traders to exploit their private information. These authors measure the extent of information competition using the number of informed traders.[16] In the liquidity literature, the largely ignored information competition channel is first explored by Agarwal (2007) who uses the number of local institutions as the proxy.

[15] Some empirical studies use the number of shareholders as a direct proxy for investor recognition (Bodnaruk & Östberg, 2009; Chang et al., 2013; Chichernea et al., 2015; Jankensgård & Vilhelmsson, 2018; Lehavy & Sloan, 2008; Richardson et al., 2012; Yung & Jian, 2017).

[16] In recent years, the number of shareholders has also been adopted as a proxy for information competition. The empirical studies cover the pricing of information asymmetry (Armstrong, Core, Taylor, & Verrecchia, 2011), stock price efficiency (Lim et al., 2016), cross-section of stock returns (Jiao, 2016), firm operating performance (Jiao, 2016) and stock price crash risk (Vorst, 2017).

The author finds that liquidity is an increasing function of the number of informed investors, consistent with the information competition channel.

The literature has long associated informed traders with lower liquidity due to the dominance of asymmetric information models (Easley & O'Hara, 1987; Glosten & Milgrom, 1985). According to the asymmetric information models, when the number of privately informed investors who act non-strategically increases, the bid-ask spreads become wider due to the higher adverse selection costs. Existing empirical studies find that both local (Attig et al., 2006; Brockman et al., 2009; Heflin & Shaw, 2000) and foreign blockholders (Lee & Chung, 2018; Ng et al., 2016) have detrimental effect on liquidity. This is consistent with the theoretical prediction of asymmetric information models. Agarwal (2007) highlights the possibility of the two countervailing forces of information competition and asymmetric information driving the informed institutional investors-liquidity relationship. The author finds that the upward trend in liquidity reverses after institutional ownership reaches the threshold level of 35%–40%. This nonlinear relationship suggests the dominance of information competition effect at lower levels of liquidity, but the asymmetric information effect dominates after the threshold point.

Individual investors have long been regarded as noise traders. They trade for liquidity reasons unrelated to fundamental (Foucault et al., 2011) and exhibit behavioural biases (Barber & Odean, 2000). The positive effect of noise trading on liquidity is acknowledged by Black (1986). The market microstructure models rationalize this positive relationship through lower adverse selection costs (see Glosten & Milgrom, 1985; Holmström & Tirole, 1993). The literature has largely subscribed to the view that noise trading increases liquidity. Their interpretation is based on the positive relationship between individual ownership and liquidity (Ahn et al., 2014; Amihud et al., 1999; Wang & Zhang, 2015).

However, the possibility that noise trading might reduce liquidity cannot be dismissed. This possibility can be gleaned from the empirical findings of Morck et al. (2000) that emerging markets are dominated by noise traders due to weak private property rights protection. Griffin et al. (2010), on the other hand, establish the poor liquidity of these emerging markets relative to developed countries. The above puzzle can be rationalized through the stock volatility channel. In the noise trader models (Barberis et al., 1998; De Long et al., 1990; Shleifer & Summers, 1990), a key assumption is that noise traders are prone to sentiment not fully justified by fundamental information. Their noise trading causes mispricing and generates excess volatility (for empirical evidence, see Brown, 1999; Foucault et al., 2011; Pontiff, 1997). It is further documented in the theoretical and empirical literature that higher volatility is associated with lower liquidity (Chung & Chuwonganant, 2014; Stoll, 1978a, 1978b, 2000). This is supported by a recent study of Jankensgård and Vilhelmsson (2018) who find that a larger shareholder base increases stock price volatility through noise trading.

The above countervailing theoretical effects provide the grounds for the first hypothesis (in alternative form) as follows:

H_1: There is a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms.

3.1.2 Nonlinear Relationship between Stock Liquidity and Firm Value

The pioneering work of Fang et al. (2009) lays out five possible theoretical channels through which liquidity might improve firm value. First, the theoretical model of Holmström and Tirole (2001) predicts that highly liquid firms command premium and thus have higher firm value. Second, the sentiment model of Baker and Stein (2004) predicts a higher firm value for highly liquid stocks. This is because these stocks are overvalued by irrational investors who underreact to information in order flow. Third, in the theoretical model of Subrahmanyam and Titman (2001), high liquidity stimulates the entry of informed investors who make prices more informative. These informative stock prices will feedback to firms in making value-enhancing corporate investment decisions (see the survey paper by Bond et al. 2012 and references cited therein). Fourth, the informative prices also enable firms to design equity-based managerial incentives (Holmström & Tirole, 2001). This motivates corporate managers to undertake value-enhancing investments. Fifth, Maug (1998) demonstrates theoretically that liquidity facilitates the formation of large blockholdings at a lower transaction cost. This enhances blockholders' incentives to voice or intervene. Such disciplinary trading is highly effective in aligning managers' incentives with those of outside shareholders. The reduction in agency costs, according to Jensen and Meckling (1976) will lead to an increase in firm value.

Nevertheless, Fang et al. (2009) also highlight two negative mechanisms through which liquidity might reduce firm value. First, Coffee (1991) and Bhide (1993) argue that higher liquidity reduces the costs of exit and thus deters monitoring incentives. This encourages large shareholders to vote with their feet when firm performance is unsatisfactory. Such activist exist will have dampening effect on stock price and hence firm value. Second, according to the theoretical model of Goldstein and Guembel (2008), when speculators exploit liquidity with short-selling strategies, this might distort the firm's efficient allocation of resources.

Despite the overwhelming empirical evidence on the value gains from higher stock liquidity, these findings might not prevail in Malaysia for two reasons. First, the positive channels driving the liquidity-firm value relationship in Fang et al. (2009), informative stock prices and equity-based managerial incentives, are not dominant in Malaysia. Existing empirical evidence shows that emerging market firms generally have lower levels of information efficiency (see Griffin et al., 2010; Lim & Brooks, 2010; Morck et al., 2000). On the other hand, there is limited evidence of value-enhancing benefit for equity-based incentives in Malaysia (Ibrahimy & Ahmad, 2016; Ismail, 2014). Second, the negative channel of liquidity-induced blockholders exit might be stronger in Malaysia. Anecdotal and empirical evidence suggest the large withdrawals of foreign investors from the local bourse are often facilitated by the readiness of state-backed institutions to supply liquidity (Liew et al., 2018). It is worth highlighting that the only evidence of a negative relationship between liquidity and firm value comes from the emerging market of Vietnam (Batten and Vo, 2019).

Given the countervailing positive and negative effects as predicted by competing theoretical models, this thesis formulates the second hypothesis (in alternative form) as follows:

H_2: There is a nonlinear relationship between liquidity and firm value for Malaysian public listed firms.

3.1.3 The Moderating Role of Corporate Political Connections on the Liquidity-Firm Value Relationship

Political connections are likely to moderate the relationship between liquidity and firm value for two reasons. First, in the theoretical models surveyed by Amihud and Mendelson (2000), the liquidity route to lower cost of capital increases firm value. For instance, the model of Amihud and Mendelson (1986) shows that liquidity is an important determinant of corporate cost of capital. This is because investors demand liquidity premium for trading stocks. More specifically, the greater the liquidity of a stock, the lower the cost of capital. This leads to higher market valuation of the firm through increases in stock prices without changing the firm's fundamentals. Second, while there is no theory to explicitly model the relationship between political connections and the cost of capital, Boubakri et al. (2012) argue that their potential link can be found in the corporate governance literature. This is largely attributed to agency conflicts and asymmetric information problems (see references cited therein). Empirically, there is evidence that political connections influence the key channel of cost of capital. For instance, the cross-country study by Boubakri et al. (2012) finds that investors require a lower cost of equity for firms with strong political ties. This is because political connected firms are perceived to be less risky due to implicit government guarantees, especially during economic recessions. Using U.S. data, Houston et al. (2014) report a lower cost of bank loans for politically connected firms because lenders perceive them as having high creditworthiness.

Malaysia offers a unique corporate landscape in which business, ethnicity and politics are closely linked (see Gomez, 2004; Gomez & Jomo, 1997; Gomez et al., 2018; Gomez & Saravanamuttu, 2013). The intertwining of politics and business is rooted in the National Economic Policy (NEP). This is a 20-year national development policy instituted after Malaysia's 1969 race riots to address inter-ethnic socio-economic imbalances. This NEP model of state-led development opens the door for extensive government intervention in the allocation of public investment resources to preferentially selected firms.

Motivated by the possibility that corporate political connections influence the key channel of cost of capital that links liquidity to firm value, this thesis formulates the third hypothesis (in alternative form) as follows:

H_3: Malaysian public listed firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

3.1.4 The Moderating Role of Corporate Ownership on the Liquidity-Firm Value Relationship

Another important channel that might shape the stock liquidity-firm value relationship is the informativeness of stock prices. This is due to the feedback effects from stock prices to firms' real investment decisions. First, several theoretical models show that managers do learn and glean information contained in stock prices that they may not otherwise possess when making value-enhancing corporate investment decisions (see the survey paper by Bond et al. 2012). These models show that informative prices help firms to efficiently allocate their investment resources. Second, the theoretical models of Kyle (1985) and Easley and O'Hara (2004) predict that higher liquidity induces more informed trading. This is because the reduced trading costs incentivize traders to acquire more private information. As a result, stock prices become more informative. Empirically, the causal relationship from liquidity to price efficiency is firmly established by Chordia et al. (2008) and Chung and Hrazdil (2010).

Coming back to the Malaysian stock market, Lim et al. (2016) utilize the ownership dataset provided by Bursa Malaysia and examine the informational role of key market participants. These authors find that only foreign investors who trade through the nominee accounts accelerate the incorporation of common information into stock prices. The improvement in price efficiency can be largely attributed to the superior skilled analysis of systematic market-wide factors by foreign nominees.

Motivated by the possibility that foreign nominee ownership influences the key channel of stock price informativeness that links liquidity to firm value, this thesis formulates the fourth hypothesis (in alternative form) as follows:

H_4: Malaysian public listed firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value.

Greater stock liquidity may also operate through better corporate governance in deriving higher firm value. The theoretical model of Maug (1998) demonstrates that liquidity facilitates the formation of large blockholdings at a lower transaction cost. This enhances blockholders' incentives to voice or intervene. Recent theoretical models, however, emphasize alternative governance mechanism through the threat of exit. In these models (see the survey papers by Edmans, 2014 and Edmans & Holderness, 2017), higher liquidity allows blockholders to dispose their shares easily when they are unhappy with firm performance. This exerts downward pressure on stock prices. Such disciplinary trading is highly effective in aligning managers' incentives with those of outside shareholders when managerial compensation is closely tied to stock prices. Empirically, there is growing evidence for stronger corporate governance as firms with better practices are found to enjoy higher market valuation (see the survey papers of Balachandran & Faff, 2015 and Love, 2011).

Coming back to the Malaysian stock market, a unique feature of the corporate landscape is that government-controlled institutions hold more than 70% of total local institutional shareholdings. Examples are the Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization. Apart from their social-economic mandates to support national development goals (see Lim et al., 2016 and references cited therein), these state-backed local institutional funds have been entrusted by the Malaysian government to spearhead shareholder activism through Minority Shareholder's Watchdog Group (MSWG) and the Malaysian Code for Institutional Investors. Empirically, Abdul Wahab et al. (2007) and Ameer and Abdul Rahman (2009) find that local institutional investors play effective monitoring and governance roles among Malaysian public listed firms.

Motivated by the possibility that local institutional ownership influences the key channel of corporate governance that links liquidity to firm value, this thesis formulates the fifth hypothesis (in alternative form) as follows:

H_5: Malaysian public listed firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value.

3.2 Model Specifications

This section specifies the empirical models for testing the five formulated hypotheses of H_1, H_2, H_3, H_4 and H_5.

3.2.1 Nonlinear Relationship between Shareholder Base and Stock Liquidity

For comparison with previous studies (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010), the baseline liquidity model (3.1) first specifies a linear relationship between the number of shareholders and liquidity for Malaysian public listed firms. The model is then extended in (3.2) to include a squared term for the number of shareholders, in order to test hypothesis H_1 that the relationship between the number of shareholders and liquidity for Malaysian public listed firms is nonlinear.

Linear relationship between number of shareholders and stock liquidity:

$$\begin{aligned} CPQS_{it} = {} & \alpha_0 + \alpha_1 \ln NSH_{it} + \alpha_2 LIND_{it} + \alpha_3 LIND^2{}_{it} + \alpha_4 LINST_{it} \\ & + \alpha_5 \ln(1 + ANALYST)_{it} + \alpha_6 RETURN_{it} + \alpha_7 VOL_{it} + \alpha_8 TURNOVER_{it} \\ & + \alpha_9 \ln SIZE_{it} + \alpha_{10} BLOCK_{it} + \alpha_{11} \ln BSIZE_{it} + \alpha_{12} BINDEP_{it} \\ & + \alpha_{13} DUAL_{it} + \alpha_{14} CHAIR_{it} + \sum_{j=1}^{J} \alpha_{15j} IND_j + \sum_{t=1}^{T} \alpha_{16t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.1}$$

Nonlinear relationship between number of shareholders and stock liquidity:

$$\begin{aligned} CPQS_{it} = {} & \gamma_0 + \gamma_1 \ln NSH_{it} + \gamma_2 \ln NSH^2{}_{it} + \gamma_3 LIND_{it} + \gamma_4 LIND^2{}_{it} + \gamma_5 LINST_{it} \\ & + \gamma_6 \ln(1 + ANALYST)_{it} + \gamma_7 RETURN_{it} + \gamma_8 VOL_{it} + \gamma_9 TURNOVER_{it} \\ & + \gamma_{10} \ln SIZE_{it} + \gamma_{11} BLOCK_{it} + \gamma_{12} \ln BSIZE_{it} + \gamma_{13} BINDEP_{it} \\ & + \gamma_{14} DUAL_{it} + \gamma_{15} CHAIR_{it} + \sum_{j=1}^{J} \gamma_{16j} IND_j + \sum_{t=1}^{T} \gamma_{17t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.2}$$

ln refers to natural logarithm. The dependent variable of liquidity is the "Closing Percent Quoted Spread" (*CPQS*) developed by Chung and Zhang (2014). The key independent variable is the number of common shareholders (*NSH*). The control variables are local individual ownership (*LIND*), local institutional ownership (*LINST*), the number of security analyst (*ANALYST*), stock return (*RETURN*), return volatility (*VOL*), turnover (*TURNOVER*), firm size (*SIZE*), blockholdings (*BLOCK*), board size (*BSIZE*), board independence (*BINDEP*), CEO duality (*DUAL*) and independent chairman (*CHAIR*). IND_j is a vector of industry-specific dummy variables constructed based on the sector classification of Bursa Malaysia to control for time-invariant industry effects, where $IND_j = 1$ if firm *i* is in industry *j* and 0 otherwise, and *J* is the number of industries. Year dummies YR_t are included to control for common shocks, where $YR_t = 1$ if firm *i* is in year *t* and 0 otherwise, and *T* is the number of years. A nonlinear relationship between liquidity and shareholder base requires model (3.2) to have statistically significant coefficients with opposite signs for γ_1 and γ_2.

The baseline liquidity models of (3.1) and (3.2) are estimated using pooled Ordinary Least Squares (OLS). To ensure valid statistical inferences for pooled OLS, this study follows the recommendations of Petersen (2009) to account for the likely presence of within-cluster correlations. More specifically, all the regressions are estimated using White heteroscedastic-robust, firm-clustered, time-clustered and double-clustered standard errors. This is important because Petersen (2009) and Gow, Ormazabal, and Taylor (2010) demonstrate that when within-cluster correlations are not properly accounted for, the OLS estimator produces biased standard errors. Nevertheless, for robustness checks, alternative estimators are used.

3.2.2 Nonlinear Relationship between Stock Liquidity and Firm Value

To determine the nonlinear relationship between stock liquidity and the firm value of Malaysian public listed firms (hypothesis H_2), this thesis formulates a quadratic model. Linear model is included for comparison purpose with previous studies (Batten & Vo, 2019; Bharath et al., 2013; Cheung et al., 2015; Dass et al., 2013; Fang et al., 2009; Huang et al., 2014; Jawed & Kotha, 2018; Li et al., 2012; Nguyen et al., 2016; Zhang et al., 2018).

Linear Model

$$\begin{aligned} Q_{it} = {} & \beta_0 + \beta_1 CPQS_{it} + \beta_2 \ln SIZE_{it} + \beta_3 \ln AGE_{it} + \beta_4 LEV_{it} \\ & + \beta_5 SALES_{it} + \beta_6 CAPEX_{it} + \beta_7 VOL_{it} + \beta_8 ROA_{it} + \beta_9 KLCI_{it} \\ & + \beta_{10} \ln BSIZE_{it} + \beta_{11} BINDEP_{it} + \beta_{12} DUAL_{it} + \beta_{13} CHAIR_{it} \\ & + \sum_{j=1}^{J} \beta_{14j} IND_j + \sum_{t=1}^{T} \beta_{15t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.3}$$

Quadratic Model:

$$\begin{aligned} Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\ & + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\ & + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} \\ & + \sum_{j=1}^{J} \delta_{15} IND_j + \sum_{t=1}^{T} \delta_{16} YR_t + \varepsilon_{it} \end{aligned} \tag{3.4}$$

ln refers to natural logarithm. The dependent variable is Tobin's *Q*. The key independent variable of liquidity is the "Closing Percent Quoted Spread" (*CPQS*) developed by Chung and Zhang (2014). The control variables include firm size (*SIZE*), firm age (*AGE*), financial leverage (*LEV*), sales growth (*SALES*), capital expenditures (*CAPEX*), return volatility (*VOL*), return on assets (*ROA*), index membership (*KLCI*), board size (*BSIZE*), board independence (*BINDEP*), CEO duality (*DUAL*) and independent chairman (*CHAIR*). IND_j is a vector of industry-specific dummy variables constructed based on the sector classification of Bursa Malaysia to control for time-invariant industry effects, where $IND_j = 1$ if firm *i* is in industry *j* and 0 otherwise, and *J* is the number of industries. Year dummies YR_t are included to control for common shocks, where $YR_t = 1$ if firm *i* is in year *t* and 0 otherwise, and *T* is the number of years. A nonlinear relationship between liquidity and firm value requires model (3.4) to have statistically significant coefficients with opposite signs for δ_1 and δ_2. Both the linear and quadratic models are estimated using pooled Ordinary Least Squares (OLS), with the standard errors adjusted for within-cluster correlations (Petersen, 2009).

3.2.3 The Moderating Role of Corporate Political Connections on the Liquidity-Firm Value Relationship

To test the moderating role of corporate political connections on the liquidity-firm value relationship (hypothesis H3), the quadratic model (3.4) is augmented with a new dummy variable of *PCON* and its interaction terms with liquidity, written as follows:

$$\begin{aligned} Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\ & + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\ & + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} + \delta_{15} PCON_{it} \\ & + \delta_{16} PCON_{it} \cdot CPQS_{it} + \delta_{17} PCON_{it} \cdot CPQS_{it}^2 + \sum_{j=1}^{J} \delta_{18j} IND_j + \sum_{t=1}^{T} \delta_{19t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.5}$$

ln refers to natural logarithm. All variables are similar to model (3.4). The new variable is the dummy *PCON* that takes a value of one if a firm is politically connected, and zero otherwise. The model is estimated using pooled Ordinary Least Squares (OLS), with the standard errors adjusted for within-cluster correlations (Petersen, 2009).

3.2.4 The Moderating Role of Corporate Ownership on the Liquidity-Firm Value Relationship

To test the moderating role of corporate ownership on the liquidity-firm value relationship (hypotheses H_4 and H_5), the quadratic model (3.4) is augmented with a new dummy variable of *OWN* and its interaction terms with liquidity, written as follows:

$$\begin{aligned} Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\ & + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\ & + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} + \delta_{15} OWN_{it} \\ & + \delta_{16} OWN_{it} \cdot CPQS_{it} + \delta_{17} OWN_{it} \cdot CPQS_{it}^2 + \sum_{j=1}^{J} \delta_{18j} IND_j + \sum_{t=1}^{T} \delta_{19t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.6}$$

ln refers to natural logarithm. All variables are similar to model (3.4). The new variable is corporate ownership (*OWN*), computed as the total shares held by each investor group divided by the total shares outstanding in each firm at the end of every calendar year. Foreign nominee ownership (local institutional ownership) enters model (3.6) when testing hypothesis H_4 (H_5). The model is estimated using pooled Ordinary Least Squares (OLS), with the standard errors adjusted for within-cluster correlations (Petersen, 2009).

3.3 Dependent and Key Independent Variables

This section provides a description of the dependent and key independent variables in models (3.1)-(3.6), along with their respective data sources. The definitions for all the variables are summarized at the end of this chapter in Table 3.

3.3.1 Closing Percent Quoted Spread (*CPQS*)

High frequency intraday bid-ask spread is widely used in U.S. studies and has become the standard liquidity measure. It is also the benchmark in liquidity horseraces for researchers to judge the efficacy of existing or newly proposed liquidity proxies (see Fong et al., 2017; Goyenko et al., 2009; Holden, 2009; Lesmond, 2005; Marshall et al., 2013). However, such intraday bid-ask spreads data are difficult to obtain for emerging stock markets. In view of this, several authors propose new approaches of constructing daily bid-ask spreads. For example, Corwin and Schultz (2012) suggest computing the bid-ask spreads using the daily high and low prices. Chung and Zhang (2014) instead use closing bid and ask prices for constructing the "Closing Percent Quoted Spread" (*CPQS*). The advantage of the above proposed approaches is that the required raw data – daily high prices, daily low prices, daily closing bid prices and daily closing ask prices– can be downloaded from Thomson Reuters Datastream for most stock exchanges in the world.

One important development in liquidity research is the extensive liquidity horseraces conducted by Fong et al. (2017). The usefulness of liquidity horseraces is that they provide guides to researchers in their selection of low frequency liquidity proxies, and thus avoids extracting intraday microstructure data. This represents substantial savings for researchers in terms of computational time and subscription cost. The liquidity horseraces conducted by Fong et al. (2017) are the largest in the academic literature. These authors extract 8 billion trades and 17.7 billion quotes data from Thomson Reuters Tick History (TRTH) for 24,240 firms traded on 42 global stock exchanges over the sample period of 1996 to 2007. For Malaysian stocks, Fong et al. (2017) assemble 189 million trades and 90 million quotes for 960 stocks. Their liquidity horseraces show that, in the case of Malaysian stocks, the "Closing Percent Quoted Spread" (*CPQS*) developed by Chung and Zhang (2014) is the best performer among their ten shortlisted percent-cost liquidity proxies. More specifically, *CPQS* outperforms its closest competitor by large margins at both the daily and monthly intervals. *CPQS* also captures an important dimension of liquidity, namely the transaction cost incurred by investors to trade immediately.

The *CPQS* for stock *i* on day *d* can be written as:

$$CPQS_{i,d} = \frac{\text{Closing Ask}_{i,d} - \text{Closing Bid}_{i,d}}{\left(\text{Closing Ask}_{i,d} + \text{Closing Bid}_{i,d}\right)/2} \text{ x } 100 \tag{3.7}$$

where Closing $\text{Ask}_{i,d}$ and Closing $\text{Bid}_{i,d}$ are respectively the closing ask and bid prices of stock *i* on day *d*. The multiplication by 100 is for scaling purpose. The daily *CPQS* measure is computed using the closing bid and ask prices sourced from Thomson Datastream. These daily estimates are then averaged to obtain the liquidity measure for each year and each individual Malaysian stock. A higher value for *CPQS* indicates a wider spread and thus higher trading costs. This suggests that *CPQS* is an inverse measure of liquidity.

3.3.2 Number of Common Shareholders (*NSH*)

The theoretical model of Merton (1987) characterizes the degree of investor recognition as the number of outside investors who knows about the firm. Existing empirical studies employ the size of the shareholder base as a popular proxy for investor recognition. However, there is no consensus on the investor types. For instance, Lehavy and Sloan (2008) and Richardson et al. (2012) use the number of institutional investors. There is also study that uses the number of individual investors as the proxy for investor recognition (Chang et al., 2013). However, the total number of common shareholders is closer to the original theoretical exposition (see Bodnaruk & Östberg, 2009; Chichernea et al., 2015; Jankensgård & Vilhelmsson, 2018; Yung & Jian, 2017).

For U.S. studies, the data for number of shareholders are extracted from COMPUSTAT (see Bodnaruk & Östberg, 2013; Chang et al., 2013; Chichernea et al., 2015) or CDA/Spectrum databases (Lehavy & Sloan, 2008; Richardson et al., 2012). The limitation of COMPUSTAT database is that it only provides the approximate number of shareholders derived from firms' 10-K filings with the U.S. Securities and Exchange Commission. The CDA/Spectrum database only covers U.S. institutions filing Form 13F (for criticisms, see Anchev, 2017; Bodnaruk & Östberg, 2009). High quality data on shareholder base are only used by a few individual country studies on Sweden (Anchev, 2017; Bodnaruk & Östberg, 2009; Jankensgård & Vilhelmsson, 2018), China (Yung & Jian, 2017) and Japan (Ahn et al., 2014; Amihud et al., 1999; Karpoff et al., 2018).

For Malaysian stocks, Bursa Malaysia through its Information Services Division has undertaken the compilation of year-end shareholdings data for all publicly listed firms. The dataset "End of Year Shareholdings by Type of Investor" provides the number of shareholders and number of shares in each firm for seven types of investors: (1) individuals; (2) banks; (3) investment trusts; (4) other corporations; (5) government agencies; (6) nominees; and (7) others. Each investor type is further disaggregated into Malaysian and foreign. Bursa Malaysia is able to compile detailed shareholdings data because all investors must open a Central Depository System (CDS) account. The CDS is fully owned and operated by its subsidiary Bursa Malaysia Depository, formerly known as Malaysian Central Depository.[17]

Therefore, this thesis extracts from the Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor" the total number of common shareholders for each

[17] Similar shareholdings data for Sweden have been used by researchers to address the capital market effects of shareholder base (see Anchev, 2017; Bodnaruk & Östberg, 2009; Jankensgård & Vilhelmsson, 2018). The dataset is assembled by Swedish central securities depository known as Euroclear Sweden (formerly Värdepapperscentralen, VPC). It contains detailed information on all investors who own shares and the number of shares they own in publicly listed Swedish companies.

firm and each year. This reflects the size of the shareholder base for Malaysian public listed firms.

3.3.3 Firm Value (Tobin's *Q*)

In the existing literature on liquidity-firm value, firm value is consistently proxied by the forward-looking Tobin's *Q*. It measures the market valuation of a firm's assets relative to their replacement cost. A value greater than unity indicates the firm has an incentive to make additional capital investment and thus signaling higher future growth opportunities. This thesis follows Fang et al. (2009) in defining Tobin's *Q* as the market value of assets scaled by the book value of assets. The numerator in the formula is computed as the market value of common equity plus the book value of assets minus the sum of the book value of common equity and balance sheet deferred taxes. The year-end data for all the four readily available balance sheet items are sourced from Thomson Datastream.

3.3.4 Corporate Political Connections (*PCON*)

To test the moderating role of corporate political connections on the liquidity-firm value relationship (hypothesis H_3), model (3.5) defines *PCON* as a dummy variable that takes a value of one if a firm is politically connected, and zero otherwise. In the academic literature, Gomez and Jomo (1997) is perhaps the first published study to systematically trace the close personal friendships between big business owners and top politicians before the outbreak of the 1997 Asian financial crisis. Their list of patronized corporations has been widely used to examine the economic consequences of political connections using Malaysia as the case study (earlier studies include Fraser et al., 2006; Gul, 2006; Johnson & Mitton, 2003).[18]

[18] The literature subsequently experiences a phenomenal growth, especially after Faccio (2006) compiles an extensive database of 541 firms with political ties in 35 countries. While her international sample shows political connections is a worldwide phenomenon, Malaysia stands out with the second highest number of connected firms, accounting for 28.24% of the country's total stock market capitalization.

This dataset of Gomez and Jomo (1997) has generally outlived its usefulness. This is because the three dominant political figures were no longer in the Malaysian government for most of the sample period of 2000-2015. The dataset of Gomez and Jomo (1997) traces the firms' close relationships with three key political figures since the early 1990s–then-Prime Minister Mahathir Mohamad, then-Deputy Prime Minister Anwar Ibrahim and Daim Zainuddin. After 22 years in power, Mahathir Mohamad handed over the premiership to Abdullah Badawi in October 2003, whereas Najib Razak took over the national leadership in April 2009. All three prime ministers came from the same political party, the United Malay National Organization (UMNO), which is the backbone of the coalition government that has ruled Malaysia since independence in 1957. Anwar Ibrahim was removed from the Malaysian cabinet and expelled from UMNO in September 1998, and subsequently convicted of corruption and jailed for six years. Daim Zainuddin, a former Finance Minister from July 1984–March 1991, was reappointed to the same portfolio in January 1999 but retired completely from public service in May 2001.

Nevertheless, newly forged political ties are documented by Fung et al. (2015), Wong (2016) and Tee et al. (2017). The thesis uses these updated lists of connected Malaysian firms and constructs a dummy variable *PCON* that takes a value of one if a firm is politically connected, and zero otherwise. In Fung et al. (2015), *PCON* firms are those that satisfy any of the following criteria: (1) government cabinet members and/or members of parliament sit on corporate boards; (2) government or UMNO-linked organizations/individuals hold significant ownership; and (3) managers are politically connected individuals. Tee et al. (2017) define a firm as under political patronage if one of its controlling shareholders or top officers is a member of parliament, a minister, a head of state, or is closely related to a senior cabinet minister. A broader definition is used by Wong (2016) to consider four types of political connections that are forged through personal friendships between business owners and politicians, former government servants serving as board of directors, government-link companies, and having immediate family members of leading politicians on corporate boards. The total numbers of *PCON* firms in Fung et al. (2015), Wong (2016) and Tee et al. (2017) are 122, 256 and 69, respectively.

3.3.5 Corporate Ownership (*OWN*)

To test the moderating role of corporate ownership on the liquidity-firm value relationship (hypotheses H_4 and H_5), model (3.6) includes a new variable of corporate ownership (*OWN*). It is computed as the total shares held by each investor group divided by the total shares outstanding in each firm at the end of every calendar year. Foreign nominee ownership (local institutional ownership) enters model (3.6) when testing hypothesis H_4 (H_5).

Both hypotheses H_4 and H_5 require complete ownership data. Such data are not available in existing commercial databases or annual reports of public listed companies. Following Lim et al. (2016), this thesis subscribes to the annual ownership dataset "End of Year Shareholdings by Type of Investor" from the primary and sole source, Bursa Malaysia, but for a longer sample period of 16 years from 2000 to 2015. The dataset provides the number of shareholders and the number of shares in each firm for seven types of investors: (1) individuals; (2) banks; (3) investment trusts; (4) other corporations; (5) government agencies; (6) nominees; and (7) others. Each investor type is further disaggregated into Malaysian and foreign. Following the convention in the literature, banks, investment trusts and other corporations are grouped under the category of institutions. Bursa Malaysia is able to compile detailed shareholdings data because all investors must open a Central Depository System (CDS) account, fully owned and operated by its subsidiary Bursa Malaysia Depository (formerly known as Malaysian Central Depository).

Therefore, this thesis extracts from the Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor" the number of shares for each firm and each year to compute the percentage of ownership by each type of investors.

3.4 Control Variables

This section provides a description of all the control variables in models (3.1)-(3.6), arranged based on the order they appear.

3.4.1 Local Individual Ownership (*LIND*)

Local individual ownership and its squared term are included in models (3.1) and (3.2) as a determinant of stock liquidity, consistent with the findings of Lim et al. (2017) for Malaysian stocks. In the literature, Wang and Zhang (2015) show that local individual ownership is positively associated with liquidity, while Lim et al. (2017) report a nonlinear relationship. Individual investors have long been regarded as noise traders. They trade for liquidity reasons unrelated to fundamental (Foucault et al., 2011) and exhibit behavioural biases (Barber & Odean, 2000). The positive effect of noise trading on liquidity is acknowledged by Black (1986). The market microstructure models rationalize this positive relationship through lower adverse selection costs (see Glosten & Milgrom, 1985; Holmström & Tirole, 1993). Local individual ownership is computed as the proportion of shares held by local individuals relative to total shares outstanding. The data are extracted from Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor".

3.4.2 Local Institutional Ownership (*LINST*)

Local institutional ownership is included in models (3.1) and (3.2) as a determinant of stock liquidity. For Malaysian stocks, Lim et al. (2017) find that local institutional ownership is negatively associated with liquidity. They argue that local institutional investors in Bursa Malaysia are informed because 70% of local institutional ownership are held by government-owned institutions, namely Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization. However, their findings contradict Rubin (2007) and Jiang et al. (2011) who find that local institutional ownership is positively associated with liquidity through higher trading activity. Local institutional ownership is computed as the proportion of shares held by local institutions relative to total shares outstanding. The data are extracted from Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor".

3.4.3 Number of Security Analysts (*ANALYST*)

The number of security analysts is included in models (3.1) and (3.2) as a determinant of stock liquidity. Brennan and Subrahmanyam (1995), Irvine (2003) and Roulstone (2003) find that an increase in the number of analysts following a stock is associated with lower bid-ask spread. Contradicting evidence, however, has been reported by Chung et al. (1995) and Jiang et al. (2011). Following the literature, the variable is defined as the number of analysts issuing earnings forecasts for a firm during a calendar year. If a firm is not listed on the Institutional Brokers Estimate System (*I/B/E/S*) database, analyst coverage is set to zero. This study follows Brennan and Subrahmanyan (1995) in taking natural logarithm of one plus the number of security analysts. The (*I/B/E/S*) database can be extracted from Thomson Datastream.

3.4.4 Stock Return (*RETURN*)

Stock return is included in models (3.1) and (3.2) as a determinant of stock liquidity. The empirical evidence shows that firms with better return performance exhibit higher liquidity (see Agarwal, 2007; Lim et al., 2017; Rhee & Wang, 2009). Stock return is computed by taking the time series average of daily returns for each year and each firm. The stock price data are sourced from Thomson Datastream. It is worth highlighting that for public holidays, Thomson Datastream uses the closing prices of the previous trading day. This study thus manually deletes those public holidays for Malaysia in which trading is closed.

3.4.5 Return Volatility (*VOL*)

Stock return volatility is included in all six models. Existing empirical evidence shows that return volatility is negatively associated with liquidity (Agarwal, 2007; Brockman et al., 2009; Lim et al., 2017; Wang & Zhang, 2015). This is because volatile stocks reflect greater uncertainty and higher inventory costs. On the other hand, Gunasekarage, Hess, and Hu (2007) and Mishra (2014) find a positive correlation between volatility and firm value. The annual measure of return volatility is computed as the standard deviation of daily stock returns over the year. The stock price data are sourced from Thomson Datastream.

3.4.6 Turnover Ratio (*TURNOVER*)

Turnover ratio is included in models (3.1) and (3.2) as a determinant of stock liquidity. The empirical evidence finds that firms with high turnover are more liquid (see Agarwal, 2007; Lim et al., 2017; Rhee & Wang, 2009). Turnover ratio is computed as the number of shares traded divided by the number of shares outstanding, with the data sourced from Thomson Datastream. This study averages the daily turnover ratios to get the annual measure for each firm.

3.4.7 Firm Size (*SIZE*)

Firm size is included in all six models. Existing empirical evidence shows that larger firms exhibit higher liquidity (Agarwal, 2007; Lim et al., 2017; Rhee & Wang, 2009). However, the relationship between firm size and firm value is not conclusive. Short and Keasey (1999) report a positive relationship because larger firms enjoy economies of scale and greater financing opportunities. However, larger firms can report lower firm value due to operational inefficiencies and costlier monitoring (Fama & French, 1992; Lang & Stulz, 1994). Firm size is measured as the natural logarithm of book value of total assets. The data are sourced from Thomson Datastream.

3.4.8 Blockholding (*BLOCK*)

Blockholding is included in models (3.1) and (3.2) as a determinant of stock liquidity. It is well documented that blockholders have privileged access to private information. The higher information asymmetry increases adverse selection costs. This in turn reduces liquidity (see Brockman et al., 2009; Heflin & Shaw, 2000; Jacoby & Zheng, 2010; Ng et al., 2016; Rubin, 2007). Following the literature, blockholders are defined as shareholders holding at least 5% of the outstanding shares. Thus, blockholding is computed as the percentage of outstanding shares held by blockholders. The data are sourced from Thomson Datastream.

3.4.9 Board Size (*BSIZE*)

Board size is included in all six models. In recent years, there has been growing evidence that corporate governance is important for liquidity (Al-Jaifi, Al-rassas, & AL-Qadasi, 2017; Chung et al., 2010; Prommin et al., 2014). On the other hand, there is no conclusive evidence on the relationship between board size and firm value. Several papers find evidence in favor of smaller board (Mak & Kusnadi, 2005; Shakir, 2008; Yermack, 1996). Yasser, Mamun, and Rodrigs (2017) instead find that larger board is positively related to firm value due to diverse expertise and better monitoring efforts. Board size is the natural logarithm of the total number of directors on a firm's board at year-end. The data are hand-collected from annual reports downloaded from Bursa Malaysia's website.

3.4.10 Board Independence (*BINDEP*)

Board independence is included in all models. In recent years, there has been growing evidence that corporate governance is important for liquidity (Al-Jaifi et al., 2017; Chung et al., 2010; Prommin et al., 2014). On the other hand, corporate governance has been found to be an important driver of firm value (Fauver, Hung, Li, & Taboada, 2017; Hooy & Hooy, 2017). Board independence is defined as the ratio of independent non-executive directors over board size at year-end. For Malaysian public listed firms, the Malaysian Code of Corporate Governance (2017) requires at least one-third of the board to be independent non-executive directors. This criterion has been included in the Bursa Malaysia Listing Requirement for newly listed firms. The data are hand-collected from annual reports downloaded from Bursa Malaysia's website.

3.4.11 CEO Duality (*DUAL*)

CEO duality is included in all models, defined as a dummy variable which takes a value of one if the chief executive officer is also the board chairman at year-end, zero otherwise. CEO duality is a common indicator of corporate governance. Weaker corporate governance, in which the board chairman is also the chief executive officer, is expected to reduce firm value. The data are hand-collected from annual reports downloaded from Bursa Malaysia's website.

3.4.12 Independent Board Chairman (*CHAIR*)

Independent board chairman is included in all models. To provide a more stringent version of board independence, this study defines *CHAIR* as a dummy variable which takes a value of one if the board chairman is an independent non-executive director at year-end, zero otherwise. The data are hand-collected from annual reports downloaded from Bursa Malaysia's website.

3.4.13 Firm Age (*AGE*)

Firm age is included in models (3.3)-(3.6). There is no conclusive evidence on the relationship between firm age and firm value. Fang et al. (2009) find that younger firms perform better, whereas Nguyen et al. (2016) report in favor of older firms. Firm age is defined as the natural logarithm of the number of years since incorporation prior to year-end. The data are sourced from Thomson Datastream.

3.4.14 Leverage Ratio (*LEVERAGE*)

Leverage is included in models (3.3)-(3.6). According to Jensen (1986), a positive relationship between leverage and firm value reflects the disciplinary benefits of using more debt. This is because corporate managers are forced to achieve organizational efficiency. It then generates high cash flow to repay debt and interest commitments. Modigliani and Miller (1963) instead attribute the value gains to tax savings of debt obligations. Leverage is computed as the ratio of book value of debts over the book value of assets at year-end. The data are sourced from Thomson Datastream.

3.4.15 Sales Growth (*SALES*)

Sales growth is included in models (3.3)-(3.6). Morck et al. (1988) argue that higher growth rate reflects the value of future growth opportunities which leads to better firm valuation. Uno and Kamiyama (2009) and Green and Jame (2013) report a positive relationship between sales growth and firm value. Sales growth is defined as the annual percentage change in sales. The data are sourced from Thomson Datastream.

3.4.16 Capital Expenditure (*CAPEX*)

Capital expenditure is included in models (3.3)-(3.6). Johnson, Wang, and Zhang (2013) find that capital expenditure is positively related to firm value. This suggests investors value highly those firms that invest in long-term investment projects for future growth. Capital expenditure is defined as the ratio of capital expenditures over the book value of assets measured at year-end. The data are sourced from Thomson Datastream.

3.4.17 Return on Asset (*ROA*)

Return on asset is included in models (3.3)-(3.6), which is a widely used indicator to assess how efficient firms utilize their assets in generating income. It is widely expected that profitability as reflected by higher return on assets (*ROA*) effectively translates into larger market valuations (Isakov & Weisskopf, 2014; Ng, Yuke, & Chen, 2009; O'Connor, 2012). Return on asset is computed as the operating income divided by the book value of assets measured at year-end. The data are sourced from Thomson Datastream.

3.4.18 Index Membership (*KLCI*)

Index membership is included in models (3.3)-(3.6). Index membership is value-enhancing because it improves firm visibility and attracts investors' attention. Merton (1987) argues that, in the presence of high information costs, investors are more likely to hold stocks they are familiar. *KLCI* is a dummy variable of stock index membership which takes a value of one if a stock is included in the main index of the Malaysian stock market (namely Kuala Lumpur Composite Index prior to 6 July 2009, and FTSE Bursa Malaysia KLCI Index thereafter), and zero otherwise.

3.5 The Sample Firms

The Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor" provides the list of stocks that are traded at the end of each calendar year. This thesis includes all stocks in the list, and is therefore free from survivorship bias. The data on board characteristics are hand-collected from the annual reports of publicly listed firms, which are available on the website of Bursa Malaysia[19], namely: (1) the total number of directors on the board (*BSIZE*); (2) the proportion of independent non-executive directors (*BINDEP*); (3) CEO duality (*DUAL*), in which the positions of board chairman and chief

[19] The annual reports for all listed companies are publicly available on the Bursa Malaysia website for 2000 forward. The URL link is http://www.bursamalaysia.com/market/listed-companies/company-announcements/ (last retrieved on May 30, 2016).

executive officer are to be held by the same individual; and (4) the board chairman is an independent non-executive directors (*CHAIR*). From the Bursa Malaysia's dataset "End of Year Shareholdings by Type of Investor", this thesis extracts data on number of shareholders and corporate ownership.

Data for all other variables are extracted from Thomson Datastream. It is worth highlighting that there are stocks listed in "End of Year Shareholdings by Type of Investor" dataset for certain years only, either due to delisting or new listed. However, Thomson Datastream only provides data for stocks that are still active at the point of retrieval. For stocks that have been delisted, their historical data must be downloaded from the list of "Dead Stocks" in Thomson Datastream. This thesis includes both dead and active stocks on Bursa Malaysia. This is because survivorship bias is of primary concern to firm performance studies.

Given that annual reports for public listed companies are only available in Bursa Malaysia's website from year 2000, the sample period thus covers 2000-2015. When retrieving data from Thomson Datastream, firm identification is done by matching the stock codes used by Bursa Malaysia and the Datastream codes. Financial firms are excluded because the Malaysian financial system is governed under a different regulatory and supervisory framework set up by the Central Bank of Malaysia.[20] As a result, the final data covers 1250 Malaysian publicly listed firms over the 16-year period, with the number of firm-year observations varies for each variable in our unbalanced panel. All continuous variables, with the exception of dummies, are winsorized at the 1st and 99th percentiles to reduce the influence of outliers.

[20] Financial firms are excluded because they are subjected to different regulatory framework. From the accounting perspective, the balance sheet of financial firms differs from non-financial firms. For example, financial firms do not classify loans as liabilities but assets in their balance sheet.

3.6 Robustness Tests

This section discusses the additional robustness checks in the empirical chapters 4 to 6 for the baseline results obtained from models (3.2), (3.4), (3.5) and (3.6).

3.6.1 Alternative Shareholder Base Measure

In the baseline liquidity model (3.2), the key independent variable of shareholder base is proxied by the number of common shareholders (*NSH*). Citing previous empirical evidence, Bodnaruk and Östberg (2013) caution the strong correlation between the number of shareholders and some control variables such as firm size and firm age. Following their orthogonalization method, the robustness check in chapter 4 construct excess shareholder base (*ESHB*) by collecting the residuals from the following model:

$$\begin{aligned} \ln NSH_{it} = \beta_0 + \beta_1 \ln AGE_{it} + \beta_2 ROE_{it} + \beta_3 \ln SIZE_{it} + \beta_4 BM_{it} + \beta_5 RETURN_{it} \\ + \beta_6 TURNOVER_{it} + \beta_7 VOL_{it} + \sum_{j=1}^{J} \beta_{8j} IND_j + \sum_{t=1}^{T} \beta_{9t} YR_t + \varepsilon_{it} \end{aligned} \tag{3.8}$$

where ln refers to natural logarithm, the dependent variable is the number of shareholders (*NSH*), while the regressors consist of firm age in years since incorporation (*AGE*), return on equity (*ROE*), firm size measured by book value of total assets (*SIZE*), the ratio of book value to market value of equity (*BM*), annual stock returns (*RETURN*), stock turnover (*TURNOVER*) and stock return volatility (*VOL*). IND_j and YR_t are industry and year dummies, respectively. Using the residuals from the above model (3.8), the robustness check re-estimates model (3.2) by replacing the number of common shareholders (*NSH*) with excess shareholder base (*ESHB*).

3.6.2 Alternative Liquidity Measures

The “Closing Percent Quoted Spread” (*CPQS*) is selected as the main liquidity measure in this thesis because it is the best performing percent-cost proxy for Malaysian stocks (see Fong et al., 2017). Moreover, it captures an important dimension of liquidity: the transaction cost incurred by investors to trade immediately. The use of bid-ask spread is also consistent with the common practice in the liquidity literature.

Another liquidity dimension that is widely considered in the literature, however, is the price impact of trade. The Amihud (2002) illiquidity ratio is accepted as the standard proxy of price impact in the empirical finance research. Lou and Shu (2017) conduct an extensive check on articles published in Journal of Finance, Journal of Financial Economics and Review of Financial Studies during 2009–2015. They find over one hundred and twenty papers using the Amihud illiquidity ratio. According to the authors, two factors contribute to the popularity of Amihud illiquidity ratio. First, the ratio is simple to construct, using the absolute value of the return-to-volume ratio. Second, it has been found to exhibit strong positive correlation with expected stock return.

However, for Malaysian stocks, the horseraces conducted by Fong et al. (2017) find that the price impact version of *CPQS* performs best at the monthly frequency, and as well as the Amihud illiquidity ratio at the daily interval. The second robustness check is to determine whether the baseline results still hold when liquidity is measured by the price impact of trade. This is important because it pinpoints the liquidity dimension that matters. For instance, Lee and Chung (2018) find that higher level of foreign ownership is negatively associated with the bid-ask spreads, but exhibit positive correlation with price impact.

The robustness check thus considers two price impact measures: (1) *CPQS* Impact (hereafter referred to as *CPQSIM*); and (2) Amihud illiquidity ratio (hereafter referred to as *ILLIQ*).

Closing Percent Quoted Spread Impact for stock *i* on day *d* can be written as:

$$CPQSIM_{i,d} = \frac{CPQS_{i,d}}{P_{i,d} \times VO_{i,d}} \tag{3.9}$$

where $CPQS_{i,d}$ is Closing Percent Quoted Spread, $P_{i,d}$ is the daily closing stock prices and $VO_{i,d}$ is the number of shares traded on day *d*. It is the daily ratio of the *CPQS* scaled by local currency trading volume. Higher value of *CPQSIM* indicates greater degree of illiquidity.

Amihud illiquidity ratio for stock *i* on day *d* can be written as:

$$ILLIQ_{i,d} = \frac{|R_{i,d}|}{P_{i,d} \times VO_{i,d}} \tag{3.10}$$

where $R_{i,d}$ is the daily stock return, $P_{i,d}$ is the daily closing stock prices and $VO_{i,d}$ is the number of shares traded on day *d*. It is the daily ratio of the absolute stock returns to the local currency trading volume. Higher value of *ILLIQ* indicates lower liquidity.

In both cases, the annual liquidity estimates for each stock are obtained by averaging the computed daily ratios across all trading days for each calendar year. Since the Amihud (2002) illiquidity ratio is highly skewed, this study follows Edmans et al. (2013) in taking the natural logarithm of one plus *ILLIQ* x 10^6. The same approach is applied for *CPQS* Impact by taking natural logarithm of one plus *CPQSIM* x 10^4. Again, these two price impact proxies are inverse measures of liquidity, where higher values indicate greater degree of illiquidity. The required daily data for computing *CPQSIM* and *ILLIQ* are all sourced from Thomson Datastream.

3.6.3 Alternative Estimation Methods

In the baseline results, all models are estimated using pooled OLS with the standard errors accounted for within-clustered correlations. The next robustness check is to use alternative estimation methods.

The first is Fama-MacBeth two-step regression, which is popular in the empirical finance research. Fama and MacBeth (1973) develop a two-step risk-premium estimation approach. The first step involves estimating cross-sectional regression for each year separately. The second step draw inferences from the time-series averages of the estimated coefficients. Hence, Fama-MacBeth two-step regression is designed to pick up cross-sectional effects.

The second estimation method is the quantile regression developed by Koenker and Bassett (1978). It examines the effects of the independent variable along the entire range of the dependent variable conditional distribution especially at the extreme upper and lower tails (for a survey, see Koenker & Hallock, 2001). There are a few advantages of quantile regression over the OLS regression. First, it identifies the different conditional quantiles of the distribution between the relationship of independent and dependent variables. OLS regression only captures the average relationship. Second, quantile regression estimation is robust to the presence of outliers or skewed tails. Third, quantile regression takes into account the non-normal distribution of error term and heteroskedasticity. This thesis estimates quantile regression at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the conditional distribution of the dependent variable.

3.6.4 Formal Statistical Test for U-Shape

Lind and Mehlum (2010) develop a formal U-test, which can be written as follows:

$$y_{it} = \alpha + \beta X_{it} + \gamma f(X_{it}) + \xi' CV_{it} + \varepsilon_{it} \tag{3.11}$$

where y is the dependent variable, X the key independent variable and CV the vector of control variables. f is the function of quadratic with a squared term.

By testing the U-shape of a relationship, the null hypothesis and alternative hypothesis are exhibited as follow:

$$\text{H}_0\text{: } \beta + \gamma f'(X_L) \geq 0 \quad \text{and/or} \quad \beta + \gamma f'(X_U) \leq 0 \tag{3.12}$$

$$\text{H}_1\text{: } \beta + \gamma f'(X_L) < 0 \quad \text{and} \quad \beta + \gamma f'(X_U) > 0 \tag{3.13}$$

Assuming that $\varepsilon_{it} \sim NID(0, \sigma^2)$, Lind and Mehlum (2010) state that the null hypothesis is rejected only if either H_0^L (lower bound) or H_0^U (upper bound) or both are rejected at the same confidence interval. More specifically, H_0^L and H_0^U are displayed as below:

$$H_0^L : \beta + \gamma f'(X_L) \geq 0 \text{ versus } H_1^L : \beta + \gamma f'(X_L) < 0 \tag{3.14}$$

$$H_0^U : \beta + \gamma f'(X_U) \leq 0 \text{ versus } H_1^U : \beta + \gamma f'(X_U) > 0 \tag{3.15}$$

The rejection area for U-test is:

$$R_\alpha = \{(\beta, \gamma) : \frac{\beta + \gamma f'(X_L)}{\sqrt{S_{11} + 2f'(X_L)S_{12} + f'(X_L)^2 S_{22}}} < -t_\alpha \quad \text{and} \quad \frac{\beta + \gamma f'(X_U)}{\sqrt{S_{11} + 2f'(X_U)S_{12} + f'(X_U)^2 S_{22}}} \, t_\alpha\} \tag{3.16}$$

where S_{11}, S_{12} and S_{22} are estimated variances of β, γ and the covariance between them. t_α is the critical value with the appropriate degrees of freedom at α confidence interval. Lind and Mehlum (2010) use Fieller (1954) method to compute (1-2α) confidence interval where the turning point falls into the minimum and maximum range.

3.6.5 Sample Period Excluding the Crisis Years of 2008-2009

This robustness check is to determine whether the baseline results are influenced by the global financial crisis of 2008-2009. To address this concern, the baseline models (3.2), (3.4), (3.5) and (3.6) are re-estimated using pooled OLS for three different sub-samples: pre-crisis period of 2000-2007, post-crisis period of 2010-2015, and whole sample period of 2000-2015 but excludes the crisis years of 2008-2009.

3.6.6 Industry-Specific Regressions

The sample in this thesis consists of all non-financial firms that cover a large number of industries over the sample period of 2000-2015. Bursa Malaysia uses the following industry classifications – consumer products, construction, close-end funds, exchange-traded funds, finance, hotels, industrial products, infrastructure project PLCs, mining, plantations, properties, real estate investment trusts, special purpose acquisition company, trading/services and technology. Industry-specific regression is conducted to check whether the significant baseline results from pooled OLS might yield a different relationship across industries. To address this concern, the baseline models (3.2), (3.4), (3.5) and (3.6) are re-estimated using pooled OLS for each industry in the sample. However, those industries with less than 100 firm-year observations are excluded. Only nine industries meet this criterion, namely consumer products, construction, finance, industrial products, plantations, properties, real estate investment trusts, trading/services and technology.

3.6.7 Endogeneity Check with Lag in Variables

To address endogeneity, this thesis follows Bellemare, Masaki, and Pepinsky (2017) to use lagged explanatory variables. More specifically, the baseline models (3.2), (3.4), (3.5) and (3.6) are re-written as follows and re-estimated using pooled OLS:

$$y_{it} = \gamma_0 + \gamma_1 X_{it-1} + \sum_{k}^{N} \gamma_{2k} \Delta CONTROL_{k,it-1} + \sum_{j=1}^{J} \gamma_{3j} IND_j + \sum_{t=1}^{T} \gamma_{4t} YR_t + \varepsilon_{it} \qquad (3.17)$$

where y_{it} is the dependent variable, X_{it-1} the key independent variable, $CONTROL_{k,it-1}$ the set of control variables and N is the number of control variables. IND_j = 1 if firm i is in industry j and 0 otherwise, and J is the number of industries. YR_t = 1 if firm i is in year t and 0 otherwise, and T is the number of years.

3.6.8 Endogeneity Check with Changes in Variables

The next test for endogeneity is to rewrite the baseline models by specifying the dependent and independent variables in changes rather than levels. This thesis follows Chung et al. (2010), An and Zhang (2013) and Prommin et al. (2014) who argue that spurious relationship can be avoided when the variables are specified in changes. Thus, the change-in-variable regression is specified as follows:

$$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta X_{it} + \sum_{k}^{N} \gamma_{2k} \Delta CONTROL_{k,it} + \sum_{j=1}^{J} \gamma_{3j} IND_j + \sum_{t=1}^{T} \gamma_{4t} YR_t + \varepsilon_{it} \qquad (3.18)$$

where y_{it} is the dependent variable, X_{it} the key independent variable, $CONTROL_{k,it}$ the set of control variables and N is the number of control variables. IND_j = 1 if firm i is in industry j and 0 otherwise, and J is the number of industries. YR_t = 1 if firm i is in year t and 0 otherwise, and T is the number of years.

3.6.9 Endogeneity Check with Firm Fixed Effect Estimator

It is possible that some unobserved time-invariant firm characteristics simultaneously determine both the dependent variable and the key independent variable under study. To rule out the unobserved omitted variable concern, the fixed effects approach is used. Gormley and Matsa (2014) demonstrate that the firm fixed effects estimator yields consistent estimates in the presence of unobserved heterogeneity. The procedure involves demeaning for both dependent and independent variables with respect to the group. The transformed data are then re-estimated using pooled OLS:

$$y_{it} - \bar{y}_i = \beta(x_{it} - \bar{x}_i) + \varepsilon_{it} \tag{3.19}$$

where $y_{it} - \bar{y}_i$ is demean for dependent variable and $x_{it} - \bar{x}_i$ is demean for independent variable for firm *i* at year *t*.

Equivalently, equation (3.19) can be re-written as follow:

$$y_{it} = \beta X_{it} + \mu_i + \varepsilon_{it} \tag{3.20}$$

where y_{it} is the dependent variable, X_{it} the vector of observable determinants, μ_i represents time-invariant unobserved heterogeneity and ε_{it} is the error term. The subscripts for *i* and *t* represent firm and year respectively.

3.6.10 Endogeneity Check with Two-Step System GMM Estimator

Given the difficulty of finding a strictly exogenous external instrument, Wintoki, Linck, & Netter (2012) recommend the use of dynamic generalized method-of-moments (GMM) estimator in empirical finance research. The dynamic two-step system GMM is developed by Arellano and Bover (1995). Based on their dynamic models of panel data, the specification equation can be formulated as follow:

$$y_{it} = \alpha y_{it-1} + \beta_1 K_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \tag{3.21}$$

where y_{it} is the dependent variable, y_{it-1} lag of dependent variable, K_{it} the key independent variable, X_{it} the vector of control variables, μ_i is an unobserved firm-specific effects and ε_{it} is the error term. The subscripts for *i* and *t* represent firm and year respectively.

There are at least two reasons to construct two-step system GMM estimator. First, to control for the presence of unobserved firm-specific effects. Second, to control for a simultaneity bias caused by the possible endogeneity of the explanatory variables. Therefore, to eliminate firm-specific effects, Arellano and Bond (1991) propose transforming equation (3.21) into first-differences as follow:

$$y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \beta_1(K_{it} - K_{it-1}) + \beta_2(X_{it} - X_{it-1}) + \varepsilon_{it} - \varepsilon_{it-1} \quad (3.22)$$

To address the possible correlation between (y_{it-1} – y_{it-2}) and ε_{it} - ε_{it-1} and simultaneity bias of explanatory variables, Arellano and Bond (1991) propose using the lagged levels of the regressors as instruments. Following these authors, the GMM estimator uses the following moment conditions:

$$E[y_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \qquad \text{for } s \geq 2;\ t=3, \ldots, T \quad (3.23)$$

$$E[K_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \qquad \text{for } s \geq 2;\ t=3, \ldots, T \quad (3.24)$$

$$E[X_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \qquad \text{for } s \geq 2;\ t=3, \ldots, T \quad (3.25)$$

Under the above assumptions, the error term is not serially correlated and the lags of the explanatory variables are weakly exogenous.

However, the above difference GMM estimator has shortcomings, though it can control for firm-specific effects and simultaneity bias. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) show that when the explanatory variables are persistent over time, lagged levels of the variables become weak instruments for the differences equation. Thus, Arellano and Bover (1995) propose system GMM estimator which combines the difference equation (3.22) and the level equation (3.21). The additional moment conditions for the second part of the system estimator are shown as below:

$$E[(y_{it-s} - y_{its-1})(\mu_i + \varepsilon_{it})] = 0 \qquad \text{for s=1} \tag{3.26}$$

$$E[(K_{it-s} - K_{its-1})(\mu_i + \varepsilon_{it})] = 0 \qquad \text{for s=1} \tag{3.27}$$

$$E[(X_{it-s} - X_{its-1})(\mu_i + \varepsilon_{it})] = 0 \qquad \text{for s=1} \tag{3.28}$$

The moment conditions in equations (3.23), (3.24), (3.25), (3.26), (3.27) and (3.28) are employed to generate consistent and efficient parameter estimates based on system GMM estimation procedure.

Last but not least, the consistency of the GMM estimator depends on two types of specification tests. First, the serial correlation test should reject the null hypothesis of the absence of first-order serial correlation ($AR1$) and do not reject the absence of second-order serial correlation ($AR2$). Second, Sargan and Hansen tests should not reject the null hypothesis of over-identifying restrictions. This imply that the instruments are valid and the model is correctly specified.

3.6.11 Exogenous Liquidity Shock

The standard in the empirical finance literature to establish causal relation is through natural experiments or strictly exogenous experiments. In the liquidity literature, Fang et al. (2009) use the decimalization of tick size in 2001 to identify the causal effect from liquidity to firm value. This event is now a standard exogenous liquidity shock for U.S. studies (see Bharath et al., 2013; Cheung et al., 2015; Dou, Hope, Thomas, & Zou, 2018; Edmans et al., 2013; Fang et al., 2014; Huang et al., 2017). Apart from that, events that have been used as natural experiments include the 1997 reduction in tick size (Fang et al., 2014; Huang et al., 2017), stock splits (Jayaraman & Milbourn, 2012), analyst coverage terminations (Back et al., 2015; Balakrishnan et al., 2014) and financial crises (Bharath et al., 2013; Dou et al., 2018).

Unlike the U.S. stock exchanges, there is no reference study for the Malaysian stock market in terms of exogenous liquidity shocks. This study thus browses through the major policies since year 2000 undertaken by Bursa Malaysia with the aim of increasing stock liquidity. The reduction of lot size from 1000 units to 100 units in May 2003 appears to be a good candidate to generate exogenous variation in liquidity for three reasons.[21] First, previous studies from Japan show that the reduction in lot size has led to a significant increase in liquidity, especially among high-priced stocks. Amihud et al. (1999) and Ahn et al. (2014) find that liquidity increases because the reduction in lot size makes high-priced stocks more affordable. This expands substantially the number of small individual investors. Thus, the increases in liquidity induced by this regulatory change vary in the cross-section of stocks. Second, the lot size reduction is unlikely to be directly associated with firms' fundamentals such as firm value. Likewise, the probability for the changes in firm value to affect liquidity variation generated by the policy change is rather remote. Third, several studies caution that the decimalization-induced liquidity shock might be overstated as it coincides with Enron scandal, WorldCom fraud, the passage of Sarbanes–Oxley Act and the burst of dot-com bubble (see Fang et al., 2014; Huang et al., 2017). However, there is no market-wide confounding event surrounding the lot size reduction by Bursa Malaysia in 2003.

Thus, this study uses the lot size reduction in May 2003 as the liquidity-increasing exogenous shock. Following Fang et al. (2009), the baseline model (3.4) is augmented with all the dependent and continuous independent variables specified in terms of changes, written as follows:

[21] In April 2003, the Kuala Lumpur Stock Exchange (KLSE, renamed as Bursa Malaysia on 14 April 2004) commenced standardizing lot size at 100 units in stages for all securities listed on the Main Board, Second Board and MESDAQ market. The exercise, fully completed on 26 May 2003, serves to eliminate multiple board lots of 100, 200 and 1000 units. In the total 906 stocks listed on KLSE in 2003, all the 32 MESDAQ stocks were already traded in lot size of 100 units, about 16 blue-chip stocks have been traded in lots of 200 units since 1995, while 1000 units are the common lot size for more than 90% of the listed stocks. According to the stock exchange, the aim of the lot size standardization is to make the securities more accessible and affordable especially to retail investors, and thus improve liquidity. See https://www.thestar.com.my/business/business-news/2003/02/01/board-lots-to-be-fixed-at-100/ and http://bursa.listedcompany.com/misc/market_review_2002.pdf (retrieved on 31 May 2018).

$$
\begin{aligned}
\Delta Q_{i,t-1\ to\ t+1} = {} & \gamma_0 + \gamma_1 \Delta CPQS_{i,t-1\ to\ t+1} + \gamma_2 \Delta CPQS^2_{i,t-1\ to\ t+1} + \gamma_3 \Delta \ln SIZE_{i,t-1\ to\ t+1} \\
& + \gamma_4 \ln \Delta AGE_{i,t-1\ to\ t+1} + \gamma_5 \Delta LEV_{i,t-1\ to\ t+1} + \gamma_6 \Delta SALES_{i,t-1\ to\ t+1} \\
& + \gamma_7 \Delta CAPEX_{i,t-1\ to\ t+1} + \gamma_8 \Delta VOL_{i,t-1\ to\ t+1} + \gamma_9 \Delta ROA_{i,t-1\ to\ t+1} \\
& + \gamma_{10} \Delta \ln BSIZE_{i,t-1\ to\ t+1} + \gamma_{11} \Delta BINDEP_{i,t-1\ to\ t+1} \\
& + \sum_{j=1}^{J-1} \gamma_{12j} IND_j + \varepsilon_{i,t-1\ to\ t+1}
\end{aligned} \tag{3.29}
$$

where the changes are computed from the pre-shock year (t –1) to the post-shock year (t +1), with t the calendar year during which the reduction of lot size occurred for firm i.

3.7 Summary of the Chapter

This chapter first discusses the theories that motivate the five hypotheses formulated in the thesis. The nonlinear relationship between shareholder base and liquidity (hypothesis H_1) can arise due to the countervailing effects of investor recognition, information competition, asymmetric information, noise trading and stock volatility. This applies equally to the nonlinear relationship between stock liquidity and firm value (hypothesis H_2). While the pioneering work of Fang et al. (2009) lays out five possible theoretical channels (liquidity premium, sentiment, positive feedback, pay-for-performance sensitivity and blockholder intervention) through which liquidity might improve firm value, these authors also highlight two negative mechanisms (activist exit and negative feedback) through which liquidity might reduce firm value.

On the other hand, the moderating role of political connections on the liquidity-firm value relationship (hypothesis H_3) is motivated by the theoretical model of Amihud and Mendelson (1986). These authors show that the greater the liquidity of a stock, the lower the cost of capital, and hence higher market valuation of the firm through increases in stock prices. Empirically, there is evidence that political connections influence the key channel of cost of capital (Boubakri et al., 2012; Houston et al., 2014). The moderating role of foreign nominee ownership on the liquidity-firm value relationship (hypothesis

H_4) is motivated by the theoretical models of Kyle (1985) and Easley and O'Hara (2004). These models show that liquidity improves the informativeness of stock prices. Using Malaysian public listed firms, Lim et al. (2016) find that foreign nominee ownership influences the key channel of stock price informativeness that links liquidity to firm value. Last but not least, the moderating role of local institutional ownership on the liquidity-firm value relationship (hypothesis H_5) is motivated by existing exit threat models (see the survey papers by Edmans, 2014 and Edmans & Holderness, 2017). In these models, higher liquidity allows blockholders to dispose their shares easily when they are unhappy with firm performance. This exerts downward pressure on stock prices and affects firm value. In the Malaysian context, there is evidence that local institutional ownership influences the key channel of corporate governance that links liquidity to firm value (Abdul Wahab et al., 2007; Ameer & Abdul Rahman, 2009).

After outlining the theories, this chapter specifies the empirical models for testing the five formulated hypotheses of H_1, H_2, H_3, H_4 and H_5. All the variables used in models (3.1), (3.2), (3.3), (3.4), (3.5) and (3.6) are explained in Sections 3.3 and 3.4, and further summarized in Table 3. All continuous variables, with the exception of dummies, are winsorized at the 1^{st} and 99^{th} percentiles to reduce the influence of outliers. While these models are estimated with pooled OLS, a series of robustness checks as outlined in Section 3.6 are conducted to ensure the statistical inferences are reliable.

Given that annual reports for public listed companies are only available in Bursa Malaysia's website from year 2000, the sample period thus covers 2000-2015. Financial firms are excluded because the Malaysian financial system is governed under a different regulatory and supervisory framework set up by the Central Bank of Malaysia. To avoid survivorship bias, this thesis includes both dead and active stocks on Bursa Malaysia. As a result, the final data covers 1250 Malaysian publicly listed firms over the 16-year period of 2000-2015. The data for all variables come from three sources, namely Thomson Datastream, Bursa Malaysia's dataset of "End of Year Shareholdings by Type of Investor" and annual reports of Malaysian public listed firms.

Table 3: Definitions for All Variables

Variable	Definition
CPQS	The main proxy of liquidity is the Closing Percent Quoted Spread proposed by Chung and Zhang (2014), computed as the ratio of the difference of closing ask and closing bid prices over the mid-point of these prices. The *CPQS* is computed using daily data, and then averaged to obtain the liquidity estimates for each year and each stock.
ILLIQ	Amihud (2002) illiquidity ratio is computed as the daily ratio of the absolute stock returns to the local currency trading volume. The annual *ILLIQ* estimates for each stock are obtained by averaging the computed daily ratios across all trading days for each year.
CPQSIM	The price impact version of the *CPQS* is computed as the daily ratio of the *CPQS* scaled by the local currency trading volume. The annual *CPQSIM* estimates for each stock are obtained by averaging the computed daily ratios across all trading days for each year.
Q	Tobin's *Q* ratio is the measure of firm value, computed as the market value of assets scaled by the book value of assets at year-end. Following Fang et al. (2009), the numerator is computed as the market value of common equity plus book value of assets minus the sum of the book value of common equity and balance sheet deferred taxes. The book value of assets serves as the proxy for the replacement value of assets in the denominator.
ln *NSH*	Natural logarithm of the number of common shareholders measured at year-end.
ESHB	Excess shareholder base is the residuals from model (3.8) that regresses the number of common shareholders against firm age, return on equity, firm size, book-to-market ratio, stock returns, turnover and return volatility.
LIND	Local individual ownership is computed as the proportion of shares held by local individuals relative to total shares outstanding.
LINST	Local institutional ownership is computed as the proportion of shares held by local institutions relative to total shares outstanding.
ln (1+*ANALYST*)	Natural logarithm of one plus the number of security analysts issuing earnings forecasts for a firm during a calendar year.
RETURN	Stock return is computed as the time series averages of daily returns for each year and each firm.
VOL	Return volatility is computed as the standard deviation of daily stock returns over the year.
TURNOVER	Stock turnover is computed as the number of shares traded scaled by the number of shares outstanding.
ln *SIZE*	Natural logarithm of firm size, measured by the book value of total assets at year-end.
BLOCK	Blockholding is defined as the total percentage share ownership held by shareholders with at least 5% of the outstanding shares.
ln *BSIZE*	Natural logarithm of board size, measured by the total number of directors on a firm's board at year-end.

Variable	Definition
BINDEP	Board independence is proxied by the ratio of independent non-executive directors over board size at year-end.
DUAL	A CEO duality dummy variable which takes a value of one if the chief executive officer is also the board chairman at year-end, zero otherwise.
CHAIR	A dummy variable which takes a value of one if the board chairman is an independent non-executive director at year-end, zero otherwise.
ln *INVESTOR*	Natural logarithm of the number of investors measured at year-end, proxied by the number of local individuals, number of local institutions, number of local governments, number of local nominees, number of foreign individuals, number of foreign institutions and the number of foreign nominees.
ln *AGE*	Natural logarithm of firm age, measured as the number of years since incorporation prior to year-end.
ROE	Return on equity is computed as the ratio of operating income divided by the book value of equity.
BM	Book-to-market is computed as the ratio of book value of equity divided by the market value of equity.
ln *PRICE*	Natural logarithm of price, computed as the time series averages of daily closing stock prices for each year and each firm.
LEV	Leverage is computed as the ratio of book value of debts over the book value of assets at year-end.
KLCI	A dummy variable of stock index membership which takes a value of one if a stock is included in the main index of the Malaysian stock market (namely Kuala Lumpur Composite Index prior to 6 July 2009, and FTSE Bursa Malaysia KLCI Index thereafter), and zero otherwise.
DIVIDEND	A dummy variable which takes a value of one if the firm pays a common dividend in a given year.
INTANGIBLES	Intangibles is computed as the ratio of intangible assets divided by the book value of total assets.
EARNINGS	Earnings is computed as the ratio of operating income divided by the book value of total assets.
RETAIL	Retail is proxied by the natural logarithm of the number of local individuals, percentage of the number of local individuals divided by total number of shareholders, and natural logarithm of number of shares held by local individuals divided by number of local individuals.
ln *SHSIZE*	Natural logarithm of shareholding size, computed as the total shares outstanding divided by total number of common shareholders.
SALES	Sales growth is defined as the annual percentage change in sales.
CAPEX	The ratio of capital expenditures over the book value of assets measured at year-end.
ROA	Return on assets is computed as the operating income divided by the book value of assets measured at year-end.

Variable	Definition
PCON	A dummy variable which takes a value of one if a firm is politically connected, zero otherwise. This study uses three separate lists of patronized Malaysian corporations constructed by Fung *et al*. (2015), Wong (2016) and Tee *et al.* (2017).
OWN	Corporate ownership is computed as the total shares held by each investor group divided by the total shares outstanding in each firm at year-end. From the complete ownership dataset "End of Year Shareholdings by Type of Investor" provided by Bursa Malaysia, this study computes foreign institutional ownership, foreign individual ownership, foreign nominee ownership, local institutional ownership, local individual ownership and local nominee ownership.

CHAPTER 4

NUMBER OF SHAREHOLDERS AND STOCK LIQUIDITY

This chapter presents and discusses the empirical results for the first hypothesis of this thesis, that is the relationship between the number of shareholders and liquidity for Malaysian public listed firms is predicted to be nonlinear. Section 4.1 presents the descriptive statistics for the dependent variable of Closing Percent Quoted Spread (*CPQS*), key independent variable of the number of shareholders (*NSH*) and twelve standard control variables. The correlations of these variables are reported in Section 4.2 so as to address the concern of multicollinearity plaguing the analysis. Section 4.3 then discusses the estimation results for the baseline liquidity model, with pooled Ordinary Least Squares (OLS) the key estimator. These baseline results are further subject to a series of robustness checks in Section 4.4, which include alternative shareholder base measure, alternative liquidity measures of stock liquidity (*CPQS* Impact and Amihud illiquidity ratio), alternative estimation methods (Fama-MacBeth 2-step regression and quantile regression), formal statistical test for U-shape, subsamples excluding crisis years of 2008-2009, industry-specific regressions, disaggregate investor types and endogeneity tests (lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step system GMM). Section 4.5 conduct further analyses to explore why liquidity declines when the number of shareholders becomes too large, to assess the rationale of Malaysian stock exchange's priority in boosting retail participation, and to determine the role of shareholding size in promoting liquidity. The final section then provides a summary of the key findings in this first empirical chapter.

4.1 Descriptive Statistics

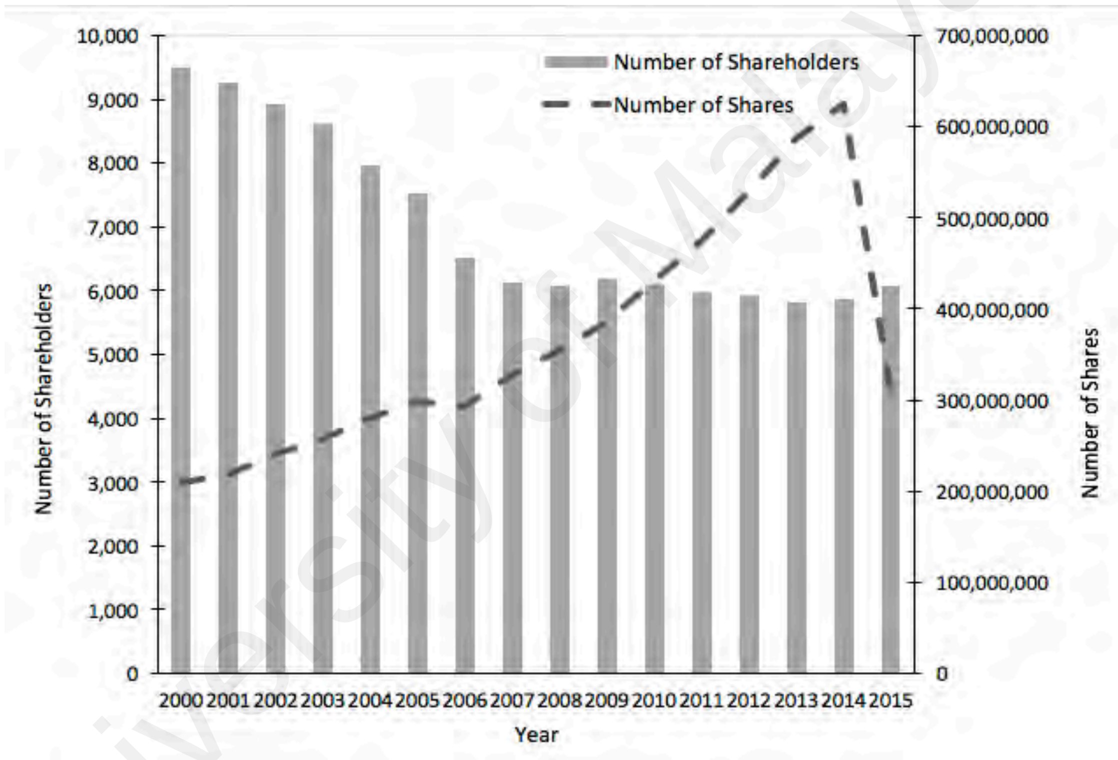
After specifying the baseline liquidity model (3.2) and outlining the sample selection process in Chapter 3, data for all fourteen variables are collected for 1250 stocks traded on Bursa Malaysia. Table 4.1 presents the descriptive statistics for all the variables in the baseline model (3.2), with varying number of observations for each variable.

Turning to the dependent variable of liquidity, this study uses the Closing Percent Quoted Spread (*CPQS*) constructed by Chung and Zhang (2014), which has been found to be the best performing liquidity measure for Malaysian stocks by Fong et al. (2017). Table 4.1 shows that the average *CPQS* for the sample firms in this study is 5.3370, which is higher than the mean *CPQS* of 2.5 in Fong et al. (2017) for 960 Malaysian stocks over the sample period of 1996-2007. Since *CPQS* is an inverse measure of liquidity, the higher value reported by this study indicates that the Malaysian stock market is becoming more illiquid over time. This can be attributed to the inclusion of additional 290 firms (mostly delisted) and data after the 2008-2009 global financial crisis.

On the other hand, the key independent variable of shareholder base is proxied by the natural logarithm of the number of shareholders (ln *NSH*). The mean value for Malaysian stocks is 6234 shareholders, which is slightly lower than the mean of 6436 for firms listed on National Association of Securities Dealers Automated Quotations (NASDAQ) exchange (Jacoby & Zheng, 2010). However, the same authors report an average of 16810 for firms traded on New York Stock Exchange (NYSE) and American Stock Exchange (AMEX). The average firms in China (Yung & Jian, 2017) and Swedish stock markets (Jankensgård & Vilhelmsson, 2018) have 50752 and 24912 shareholders on record, respectively. This suggests the average size of shareholder base for the Malaysian stock market is relatively smaller compare to other stock exchanges.

Figure 4.1 provides the cross-sectional annual averages for the number of shareholders, which depicts a clear downward trend over 16-year sample period that is not due to the reduction in number of outstanding shares available to the investing public. While expanding shareholder base remains a challenge for the Malaysian stock exchange, this thesis addresses a more fundamental questions on the benefit of having a large number of shareholders.

Figure 4.1: Shareholdings for Malaysian Public Listed Firms



Notes: The figure provides the cross-sectional annual averages for the number of shareholders across all Malaysian public listed firms over the 16-year sample period of 2000–2015. The average number of outstanding shares available to the investing public across all firms is computed for each calendar year.

Table 4.1: Descriptive Statistics for All the Variables (2000-2015)

	Mean	Median	Minimum	Maximum	Standard Deviation	*N*
CPQS	5.3370	2.7051	0.4656	44.2728	7.2572	13827
NSH	6233.7390	3136	591	51924	8575.8360	13933
LIND	32.9853	29.3464	1.4744	89.2291	21.7994	13933
LINST	25.3909	18.8527	0.1192	78.7637	22.3509	13933
ANALYST	0.9659	0.0000	0.0000	20.0000	3.1614	20161
RETURN	-0.0194	0.0000	-0.6783	0.5133	0.1882	16428
VOL	3.5105	2.9221	0.7429	13.7523	2.2864	14034
TURNOVER	0.3712	0.1223	0.0064	4.3917	0.6902	13894
SIZE	1050911	246614	7519	20700000	2794410	14464
BLOCK	0.3278	0.3400	0.0000	0.8900	0.2820	13634
BSIZE	7.4992	7.0000	4.0000	14.0000	2.0055	13941
BINDEP	0.4258	0.4000	0.1667	0.8000	0.1258	13941
DUAL[#]	0.0449					13941
CHAIR[#]	0.3391					13941

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the descriptive statistics for all the variables in the baseline liquidity model (3.2). Instead of taking natural logarithm, the table reports the original measurement unit for *NSH* (number), *ANALYST* (number), *SIZE* (Ringgit Malaysia) and *BSIZE* (number) for ease of interpretation. All the continuous variables, with the exception of two dummies (*DUAL* and *CHAIR*), are winsorized at the 1st and 99th percentiles to reduce the influence of outliers. *N* denotes the number of firm-year observations.

[#] Only the mean is reported for the dummy variables to indicate the proportion of observations that take the value of one.

The twelve control variables can be divided into three categories of market participants, firm characteristics and corporate governance. The average percentage shareholdings for local individual investors (local institutional investors) is 32.9853 (25.3909), which is slightly higher than the mean local individual ownership (local institutional ownership) of 29.70 (25.08) reported by Lim et al. (2017) for 600 Malaysian firms over the shorter sample period of 2002-2009. This indicates that the corporate ownership of Malaysian public listed firms is relatively stable after the global financial crisis. The average percentage of blockholder ownership is 32.78, suggesting the prevalence of large shareholders with at least 5% shareholdings. The average number of security analysts issuing earnings forecasts for a firm is less than one. The low level of analyst coverage in Bursa Malaysia is because sell-side analysts in brokerage firms cover mainly large stocks. This is generally a global phenomenon, as small- and medium-size companies in developed U.S. markets are also largely been neglected (Kirk, 2011). The variables for firm characteristics are stock return, return volatility, turnover ratio and firm size. All four variables exhibit great variations.

To control for the effect of corporate governance, four variables are included – board size, board independence, CEO duality and independent chairman. The table shows that Malaysian public listed firms on average have 7 directors which can be considered as optimal size. Jensen (1993) recommends a board size of not more than 7 or 8 directors to ensure the board functions effectively. In terms of board independence, the Malaysian Code of Corporate Governance (2017) requires at least one-third of the board to be independent non-executive directors, and the data suggest that this criterion has been met with an average ratio of 0.4258. However, using a stricter notion of board independence where the board chairman is an independent non-executive director, the percentage is relatively lower. The mean value of 0.0449 for the dummy variable of CEO duality suggests the incidence of one person holding both positions of CEO and chairman is relatively low for Malaysian public listed firms.

4.2 Correlation Matrix

Table 4.2 provides the correlation matrix for the variables in the baseline liquidity model. The correlation between the explanatory variables and *CPQS* provides a preliminary view of their univariate relationship. All the control variables have the expected relationship, with the exception of local individual ownership (*LIND*), board independence (*BINDEP*), and CEO duality (*DUAL*). More volatile stocks and larger blockholdings are associated with illiquidity. In contrast, local institutional ownership, number of security analysts, stock return, turnover, firm size, board size and independent chairman yield the expected negative relationship with *CPQS.*

Table 4.2: Correlation Matrix for All the Variables (2000-2015)

Variable	***CPQS***	**ln *NSH***	***LIND***	***LINST***	**ln (1+*ANALYST*)**
CPQS	1.0000				
ln *NSH*	-0.3227	1.0000			
LIND	0.2570	-0.2221	1.0000		
LINST	-0.0224	-0.0169	-0.3941	1.0000	
ln (1+*ANALYST*)	-0.2999	0.2977	-0.4216	0.0865	1.0000
RETURN	-0.1187	-0.0592	-0.0578	0.0603	0.0687
VOL	0.7013	-0.1160	0.3415	-0.1428	-0.3369
TURNOVER	-0.0855	-0.0037	0.1837	-0.1790	-0.0707
ln *SIZE*	-0.4492	0.5906	-0.5648	0.1464	0.5957
BLOCK	0.0278	-0.1005	-0.1103	0.1225	0.0369
ln *BSIZE*	-0.1780	0.1249	-0.2410	0.1038	0.2760
BINDEP	0.0421	0.0535	0.0844	-0.0840	-0.0646
DUAL	-0.0210	0.0338	-0.0370	0.0142	0.0470
CHAIR	-0.0266	-0.0109	0.0052	-0.0381	0.0166
	RETURN	***VOL***	***TURNOVER***	**ln *SIZE***	***BLOCK***
RETURN	1.0000				
VOL	-0.1290	1.0000			
TURNOVER	0.1238	0.2124	1.0000		
ln *SIZE*	0.0641	-0.4656	-0.1865	1.0000	
BLOCK	0.1308	-0.1022	-0.1264	0.0678	1.0000
ln *BSIZE*	0.0580	-0.2556	-0.0967	0.3377	0.0135
BINDEP	-0.0085	0.1165	0.0861	-0.0612	0.0493
DUAL	-0.0170	-0.0024	-0.0064	0.0453	0.0100
CHAIR	0.0211	-0.0131	0.0328	-0.0158	0.0235
	ln *BSIZE*	***BINDEP***	***DUAL***	***CHAIR***	
ln *BSIZE*	1.0000				
BINDEP	-0.3729	1.0000			
DUAL	-0.0758	0.0328	1.0000		
CHAIR	-0.0105	0.2086	-0.1628	1.0000	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the Pearson correlations between pairs of variables in the baseline liquidity model (3.2).

Turning to the key variable of interest, ln *NSH* is negatively correlated with *CPQS*, consistent with the limited evidence from U.S. studies (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). This thesis, however, hypothesizes that the number of shareholders-liquidity relationship is nonlinear, which will be examined through multivariate regression. The correlation coefficients between explanatory variables are within plausible ranges, ruling out the concern of multicollinearity plaguing the regression analysis.

4.3 Number of Shareholders and Stock Liquidity

Previous studies provide direct evidence on the negative relationship between number of shareholders and the bid-ask spreads (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). This thesis instead hypothesizes a nonlinear relationship because of the competing positive and negative channels driving this relationship. More specifically, liquidity is likely to decline when ownership becomes too large due to greater asymmetric information (Easley & O'Hara, 1987; Glosten & Milgrom, 1985) or higher volatility induced by noise trading (Barberis et al., 1998; De Long et al., 1990; Shleifer & Summers, 1990). To accommodate the possibility of a nonlinear relationship in line with hypothesis H_1, this thesis specifies a liquidity model by including the number of shareholders and its square term. For comparison with previous studies, the estimation results from pooled OLS are presented for both linear and nonlinear relationship between the number of shareholders and liquidity, reproduced from equations (3.1) and (3.2), respectively:

Linear relationship between number of shareholders and stock liquidity:

$$\begin{aligned} CPQS_{it} = {} & \alpha_0 + \alpha_1 \ln NSH_{it} + \alpha_2 LIND_{it} + \alpha_3 LIND^2{}_{it} + \alpha_4 LINST_{it} \\ & + \alpha_5 \ln(1+ANALYST)_{it} + \alpha_6 RETURN_{it} + \alpha_7 VOL_{it} + \alpha_8 TURNOVER_{it} \\ & + \alpha_9 \ln SIZE_{it} + \alpha_{10} BLOCK_{it} + \alpha_{11} \ln BSIZE_{it} + \alpha_{12} BINDEP_{it} \\ & + \alpha_{13} DUAL_{it} + \alpha_{14} CHAIR_{it} + \sum_{j=1}^{J} \alpha_{15j} IND_j + \sum_{t=1}^{T} \alpha_{16t} YR_t + \varepsilon_{it} \end{aligned}$$

Nonlinear relationship between number of shareholders and stock liquidity:

$$
\begin{aligned}
CPQS_{it} = {} & \gamma_0 + \gamma_1 \ln NSH_{it} + \gamma_2 \ln NSH^2{}_{it} + \gamma_3 LIND_{it} + \gamma_4 LIND^2{}_{it} + \gamma_5 LINST_{it} \\
& + \gamma_6 \ln(1 + ANALYST)_{it} + \gamma_7 RETURN_{it} + \gamma_8 VOL_{it} + \gamma_9 TURNOVER_{it} \\
& + \gamma_{10} \ln SIZE_{it} + \gamma_{11} BLOCK_{it} + \gamma_{12} \ln BSIZE_{it} + \gamma_{13} BINDEP_{it} \\
& + \gamma_{14} DUAL_{it} + \gamma_{15} CHAIR_{it} + \sum_{j=1}^{J} \gamma_{16j} IND_j + \sum_{t=1}^{T} \gamma_{17t} YR_t + \varepsilon_{it}
\end{aligned}
$$

The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). To ensure valid statistical inferences for pooled OLS, all the regressions are estimated using White heteroscedastic-robust, firm-clustered, time-clustered and double-clustered standard errors since the precise form of within-cluster correlation is unknown. As demonstrated by Petersen (2009) and Gow et al. (2010), the OLS estimator produces biased standard errors when within-cluster correlations are not properly accounted for.

4.3.1 Linear Relationship between Number of Shareholders and Stock Liquidity

Table 4.3 presents the pooled OLS results, and shows that the coefficient of ln *NSH* is negative and highly significant at the 1% level. The result is robust across all four adjustments of standard errors. This indicates that the issue of within-cluster correlation is not a major concern. Since *CPQS* is an inverse measure of liquidity, the significant negative sign of ln *NSH* implies that larger number of shareholders correlates with higher liquidity. This monotonic positive relationship is consistent with previous evidence from the U.S. stock markets (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). The finding lends support to the numerous policy measures undertaken by the Malaysian stock exchange regulators to boost investor participation. Theoretically, the increase in liquidity due to a larger shareholder base can be attributed to greater investor recognition, information competition among informed traders or the liquidity trading of noise traders.

Table 4.3: Linear Relationship between Number of Shareholders and Liquidity (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
ln *NSH*	-1.1853***	-1.1853***	-1.1853***	-1.1853***
	(0.0506)	(0.0803)	(0.1156)	(0.1313)
LIND	-0.0489***	-0.0489***	-0.0489***	-0.0489***
	(0.0077)	(0.0107)	(0.0106)	(0.0129)
$LIND^2$	0.0006***	0.0006***	0.0006***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
LINST	0.0094***	0.0094***	0.0094***	0.0094***
	(0.0017)	(0.0026)	(0.0026)	(0.0033)
ln (1+*ANALYST*)	-0.0397	-0.0397	-0.0397	-0.0397
	(0.0465)	(0.0764)	(0.0616)	(0.0864)
RETURN	-0.1135	-0.1135	-0.1135	-0.1135
	(0.3195)	(0.3093)	(1.0510)	(1.0479)
VOL	1.9296***	1.9296***	1.9296***	1.9296***
	(0.0465)	(0.0558)	(0.1553)	(0.1583)
TURNOVER	-2.0589***	-2.0589***	-2.0589***	-2.0589***
	(0.0862)	(0.1089)	(0.2509)	(0.2596)
ln *SIZE*	-0.4443***	-0.4443***	-0.4443***	-0.4443***
	(0.0529)	(0.0794)	(0.0929)	(0.1101)
BLOCK	1.1661***	1.1661***	1.1661***	1.1661***
	(0.2021)	(0.2414)	(0.2088)	(0.2471)
ln *BSIZE*	0.4101***	0.4101*	0.4101**	0.4101*
	(0.1553)	(0.2205)	(0.1896)	(0.2459)
BINDEP	-0.4374	-0.4374	-0.4374	-0.4374
	(0.3698)	(0.5410)	(0.2995)	(0.4956)
DUAL	-0.2598*	-0.2598	-0.2598**	-0.2598
	(0.1457)	(0.2374)	(0.0918)	(0.2087)
CHAIR	-0.1153	-0.1153	-0.1153*	-0.1153
	(0.0773)	(0.1189)	(0.0629)	(0.1101)
CONSTANT	17.1145***	17.1145***	17.1145***	17.1145***
	(0.7263)	(1.0529)	(1.5529)	(1.7299)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	10,664	10,664	10,664	10,664
Adj. R^2	0.6382	0.6382	0.6382	0.6382

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for liquidity model (3.1) where the dependent variable is *CPQS* over the sample period 2000-2015. Following Petersen (2009), the analysis accommodates the possible existence of within-cluster correlation by estimating all regressions using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors as reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Turning to the control variables, only seven regressors are statistically significant across all four adjustments of standard errors. First, the relationship between local individual ownership (*LIND*) and *CPQS* is nonlinear, consistent with the previous finding of Lim et al. (2017) for 600 Malaysian stocks over the sample period 2002-2009. The coefficient for *LIND* is negative whereas its squared term is positive, and both are highly significant at the 1% level. This indicates that liquidity improves when the ownership for individual investors increases, but starts to decline when their shareholdings exceed the threshold level. Second, higher local institutional ownership (*LIND*) is associated with lower liquidity. Lim et al. (2017) attribute such relationship to the large shareholdings held by government-owned institutions (such as Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization). These five institutions account for approximately 70% of total local institutional shareholdings in Bursa Malaysia. The large shareholdings give these government-owned institutions privileged access to private information, thus increase the level of information asymmetry and reduce stock liquidity. Third, higher return volatility (*VOL*) is associated with lower liquidity, consistent with the conjecture that volatile stocks reflect greater uncertainty and higher inventory costs (Agarwal, 2007; Brockman et al., 2009; Lim et al., 2017; Wang & Zhang, 2015). Fourth, higher turnover (*TURNOVER*) is associated with higher liquidity, consistent with the findings of Agarwal (2007), Rhee and Wang (2009) and Lim et al. (2017). Fifth, firm size (ln *SIZE*) yields the expected relationship as larger firms are more visible to investors, have lower information asymmetry, and hence exhibit higher liquidity (Agarwal, 2007; Lim et al., 2017; Rhee & Wang, 2009). Sixth, larger blockholdings (*BLOCK*) are associated with lower liquidity because blockholders with at least 5% of shareholdings are expected to have privileged access to private information, which increase information asymmetry and further reduce liquidity (Attig et al., 2006; Brockman et al., 2009; Heflin & Shaw, 2000; Lee & Chung, 2018; Ng et al., 2016). Last but not least, larger board size (ln *BSIZE*) is associated with lower liquidity, but the coefficient is significant only at the 10% level when the standard errors are adjusted using firm clustering and double clustering.

4.3.2 Nonlinear Relationship between Number of Shareholders and Stock Liquidity

The previous section finds consistent results with the existing literature that the number of shareholders and stock liquidity is positively related. However, this thesis argues it is rather strong to assume the relationship is confined to a linear form because the underlying forces are competing with opposing effects. Table 4.4 thus presents the estimation results for the baseline liquidity model (3.2) which includes the squared term of the number of shareholders. All regressions are estimated using the four adjustments of standard errors to accommodate the possible existence of within-cluster correlation, in line with the recommendations of Petersen (2009).

The results for the control variables are consistent with Table 4.3, with the exception of board size (ln *BSIZE*) which turns insignificant when the standard errors are adjusted for clustering. The remaining six regressors retain their signs and are highly significant at the 1% level across all four adjustments of standard errors – local individual ownership, local institutional ownership, return volatility, turnover, firm size and blockholdings. Even though corporate governance has been found to be an important determinant of liquidity (see Al-Jaifi et al., 2017; Chung et al., 2010), Table 4.4 suggests the contrary for a large sample of Malaysian firms. This is because none of the four corporate governance proxies – board size (ln *BSIZE*), board independence (*BINDEP*), CEO duality (*DUAL*) and independent chairman (*CHAIR*) – are statistically significant especially when the standard errors are adjusted for within-cluster correlation.

Table 4.4: Nonlinear Relationship between Number of Shareholders and Liquidity (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
ln *NSH*	-7.4241***	-7.4241***	-7.4241***	-7.4241***
	(0.5758)	(0.8649)	(0.8514)	(1.0684)
ln NSH^2	0.3662***	0.3662***	0.3662***	0.3662***
	(0.0328)	(0.0499)	(0.0492)	(0.0619)
LIND	-0.0473***	-0.0473***	-0.0473***	-0.0473***
	(0.0076)	(0.0106)	(0.0105)	(0.0129)
$LIND^2$	0.0006***	0.0006***	0.0006***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
LINST	0.0090***	0.0090***	0.0090***	0.0090***
	(0.0017)	(0.0026)	(0.0027)	(0.0033)
ln (1+*ANALYST*)	-0.0634	-0.0634	-0.0634	-0.0634
	(0.0457)	(0.0714)	(0.0579)	(0.0798)
RETURN	-0.1964	-0.1964	-0.1964	-0.1964
	(0.3178)	(0.3066)	(1.0577)	(1.0544)
VOL	1.9141***	1.9141***	1.9141***	1.9141***
	(0.0466)	(0.0563)	(0.1578)	(0.1609)
TURNOVER	-2.0325***	-2.0325***	-2.0325***	-2.0325***
	(0.0859)	(0.1087)	(0.2542)	(0.2628)
ln *SIZE*	-0.4262***	-0.4262***	-0.4262***	-0.4262***
	(0.0525)	(0.0782)	(0.0899)	(0.1069)
BLOCK	1.1341***	1.1341***	1.1341***	1.1341***
	(0.2006)	(0.2393)	(0.2291)	(0.2637)
ln *BSIZE*	0.3420**	0.3420	0.3420	0.3420
	(0.1548)	(0.2191)	(0.1973)	(0.2509)
BINDEP	-0.4053	-0.4053	-0.4053	-0.4053
	(0.3664)	(0.5298)	(0.2744)	(0.4709)
DUAL	-0.3188**	-0.3188	-0.3188***	-0.3188
	(0.1449)	(0.2253)	(0.0973)	(0.1981)
CHAIR	-0.1158	-0.1158	-0.1158*	-0.1158
	(0.0769)	(0.1177)	(0.0610)	(0.1080)
CONSTANT	42.1284***	42.1284***	42.1284***	42.1284***
	(2.5549)	(3.7128)	(3.8231)	(4.6769)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	10,664	10,664	10,664	10,664
Adj. R^2	0.6427	0.6427	0.6427	0.6427

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS* over the sample period 2000-2015. Following Petersen (2009), the analysis accommodates the possible existence of within-cluster correlation by estimating all regressions using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors as reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Turning to the key variable of the number of shareholders, the first-order ln *NSH* is negative and highly significant at the 1% level. The squared term, on the other hand, is positively and significantly associated with *CPQS*. Notably, the inclusion of the three ownership variables (*LIND*, *LINST* and *BLOCK*) does not subsume the explanatory power of shareholder base. This suggests that the number of shareholders represents distinct dimension of shareholdings that should not be ignored in future studies. The statistically significant coefficients with opposite signs for ln *NSH* and ln NSH^2 imply a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms. This empirical evidence thus supports hypothesis H_1. The empirical result highlights the importance of functional form, showing that a linear model might yield imprecise inferences when the relationship is driven by competing channels with opposing effects.

The finding of a U-shape curve between ln *NSH* and *CPQS* suggests that at levels of shareholder base before the tipping point, a larger number of shareholders is associated with lower spread and thus higher liquidity. However, when the shareholder base exceeds a certain threshold level and becomes too large, the negative effect dominates and causes liquidity to drop. This liquidity declines might arise from higher adverse selection costs imposed by informed trading or higher volatility from noise trading. While the result supports shareholder-boosting strategies by Malaysian authorities to improve liquidity, the existence of a threshold point suggests the potential costs of maintaining a very large shareholder base outweigh its associated benefits. The nonlinear U-shaped curve not only challenges the popular view that "more is better", but prescribes a threshold maximum level for the number of shareholders beyond which the liquidity of firms will decline.[22] In the sample, only 627 firm-year observations exceed the threshold level of 25253

[22] The threshold level can be computed using the estimated coefficients of ln *NSH* and ln NSH^2 in the baseline liquidity model (3.2) from Table 4.4, that is $-\gamma_1/2\gamma_2$, which gives ln *NSH* = 10.1367. Taking $e^{10.1367}$, the threshold maximum level is 25253 shareholders.

shareholders. This represents 4.5% of the total observations, suggesting there is still much room for shareholder expansion in the local bourse, and greater prospect for liquidity improvement. It is worth highlighting that some stock exchanges explicitly include the minimum number of shareholders in their listing requirements. One possible reason is to ensure adequate liquidity for listed stocks.[23] This thesis thus complements the lower bound set by stock exchanges by determining the upper bound of shareholder base beyond which the negative liquidity effect might kick in.

4.4 Robustness Checks

In this section, a series of robustness checks are performed to ensure the reliability of the statistical inferences drawn from the baseline liquidity model (3.2). First, the baseline model is re-estimated using alternative shareholder base measure. Second, the re-estimation uses two alternative liquidity proxies, namely the *CPQS* Impact and Amihud (2002) illiquidity ratio. Third, the baseline model is re-estimated using alternative estimation methods, namely the Fama-MacBeth 2-step regression and quantile regression. Fourth, the U-shape relationship between the number of shareholders and *CPQS* is re-examined using a formal U-test proposed by Lind and Mehlum (2010). Fifth, the re-estimation excludes the years of 2008-2009 due to the global financial crisis. Sixth, the baseline liquidity model is re-estimated for all industry sectors with more than 100 firm-year observations. Seventh, the baseline model is re-estimated for seven different investor types, namely local individuals, local institutions, local government, local nominees, foreign individuals, foreign institutions and foreign nominees. Last but not least, the concern of endogeneity is addressed in four ways, namely lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step system GMM.

[23] Browsing through the websites of selected stock exchanges, this study finds that the minimum number of shareholders is included in their listing requirements, for example, by Bursa Malaysia (1000 shareholders), Indonesia Stock Exchange (1000 shareholders for Main Board, and 500 for Development Board), Singapore Exchange (500 shareholders), Stock Exchange of Thailand (1000 shareholders), Nasdaq Stock Market and New York Stock Exchange (both 2200 shareholders).

4.4.1 Alternative Measure of Shareholder Base

The first robustness check replaces the number of shareholders with excess shareholder base (*ESHB*). In the baseline liquidity model (3.2), shareholder base is proxied by the natural logarithm of the number of shareholders. Citing previous empirical evidence, Bodnaruk and Östberg (2013) caution the strong correlation between the number of shareholders and some control variables such as firm size and firm age. Following their orthogonalization method, this study constructs excess shareholder base (*ESHB*) by collecting the residuals from model (3.8), reproduced as follows:

$$\ln NSH_{it} = \beta_0 + \beta_1 \ln AGE_{it} + \beta_2 ROE_{it} + \beta_3 \ln SIZE_{it} + \beta_4 BM_{it} + \beta_5 RETURN_{it} + \beta_6 TURNOVER_{it} + \beta_7 VOL_{it} + \sum_{j=1}^{J} \beta_{8j} IND_j + \sum_{t=1}^{T} \beta_{9t} YR_t + \varepsilon_{it}$$

where ln refers to natural logarithm, the dependent variable is the number of shareholders (*NSH*), while the regressors consist of firm age in years since incorporation (*AGE*), return on equity (*ROE*), firm size measured by book value of total assets (*SIZE*), the ratio of book value to market value of equity (*BM*), annual stock returns (*RETURN*), stock turnover (*TURNOVER*) and stock return volatility (*VOL*). IND_j and YR_t are industry and year dummies, respectively.

Table 4.5 presents the re-estimation results using the orthogonalized excess shareholder base. The signs and statistical significance for all the regressors are consistent with the findings reported in Table 4.3 and Table 4.4 for linear and nonlinear relationships, respectively. In the first two columns, *ESHB* has a significant negative coefficient, reinforcing that a larger shareholder base is associated with lower spread and hence higher liquidity. When a quadratic term for *ESHB* is added to the model, the relationship becomes U-shaped which imposes an upper bound to liquidity benefit for firms pursuing shareholder-boosting strategies. Since the results are qualitatively similar, the number of shareholders is a robust measure not driven by firm characteristics.

Table 4.5: Robustness Check with Orthogonalized Excess Shareholder Base (2000-2015)

	Linear Relationship		Nonlinear Relationship	
	White	**Double-Clustered**	**White**	**Double-Clustered**
ESHB	-1.3638***	-1.3638***	-1.4501***	-1.4501***
	(0.0528)	(0.1376)	(0.0594)	(0.1394)
$ESHB^2$			0.3296***	0.3296***
			(0.0559)	(0.0754)
LIND	-0.0437***	-0.0437***	-0.0410***	-0.0410***
	(0.0076)	(0.0127)	(0.0076)	(0.0128)
$LIND^2$	0.0005***	0.0005***	0.0005***	0.0005***
	(0.0001)	(0.0002)	(0.0001)	(0.0002)
LINST	0.0100***	0.0100***	0.0101***	0.0101***
	(0.0017)	(0.0033)	(0.0017)	(0.0033)
ln (1+*ANALYST*)	0.0266	0.0266	0.0449	0.0449
	(0.0466)	(0.0874)	(0.0464)	(0.0887)
RETURN	0.5867*	0.5867	0.6285**	0.6285
	(0.3169)	(1.0577)	(0.3162)	(1.0570)
VOL	1.8372***	1.8372***	1.8234***	1.8234***
	(0.0451)	(0.1495)	(0.0449)	(0.1505)
TURNOVER	-2.1265***	-2.1265***	-2.1248***	-2.1248***
	(0.0853)	(0.2521)	(0.0849)	(0.2506)
ln *SIZE*	-0.9553***	-0.9553***	-0.9693***	-0.9693***
	(0.0431)	(0.1146)	(0.0428)	(0.1144)
BLOCK	1.0460***	1.0460***	1.0736***	1.0736***
	(0.2023)	(0.2447)	(0.2021)	(0.2449)
ln *BSIZE*	0.3772**	0.3772	0.3577**	0.3577
	(0.1543)	(0.2466)	(0.1543)	(0.2491)
BINDEP	-0.5044	-0.5044	-0.4646	-0.4646
	(0.3681)	(0.5012)	(0.3672)	(0.4962)
DUAL	-0.2777*	-0.2777	-0.2959**	-0.2959
	(0.1442)	(0.2057)	(0.1450)	(0.2059)
CHAIR	-0.1220	-0.1220	-0.1199	-0.1199
	(0.0768)	(0.1095)	(0.0766)	(0.1085)
CONSTANT	11.2937***	11.2937***	11.4285***	11.4285***
	(0.7324)	(1.5715)	(0.7293)	(1.5741)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	10,629	10,629	10,629	10,629
Adj. R^2	0.6435	0.6435	0.6448	0.6448

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for liquidity models (3.1) and (3.2) where the dependent variable is *CPQS*, but replaces the number of shareholders (ln *NSH*) with excess shareholder base (*ESHB*) generated as the residuals from model (3.8). White heteroscedastic-robust and double-clustered standard errors are reported in parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

4.4.2 Alternative Liquidity Measures

The "Closing Percent Quoted Spread" (*CPQS*) is selected as the main liquidity measure in the baseline liquidity model because it is the best performing percent-cost proxy for Malaysian stocks (see Fong et al., 2017). Moreover, it captures an important dimension of liquidity: the transaction cost incurred by investors to trade immediately. Another liquidity dimension that is widely considered in the literature, however, is the price impact of trade. The Amihud (2002) illiquidity ratio is accepted as the standard proxy of price impact in the empirical finance research (see Lou & Shu, 2017). However, for Malaysian stocks, the horserace conducted by Fong et al. (2017) finds that the price impact version of *CPQS* performs best at the monthly frequency, and as well as the Amihud illiquidity ratio at the daily interval. The second robustness check thus determines whether the nonlinear relationship between the number of shareholders and liquidity still holds when the latter is measured as the price impact of trade. Lee and Chung (2018) show that it is important to distinguish the different dimensions of liquidity – adverse selection risks versus trading costs. They find that foreign ownership correlates positively with the price impact of trades but negatively with the bid-ask spread.

This section considers two price impact measures: (1) *CPQS* Impact (hereafter referred to as *CPQSIM*), which is the daily ratio of the *CPQS* scaled by local currency trading volume; and (2) Amihud illiquidity ratio (hereafter referred to as *ILLIQ*), which is computed as the daily ratio of the absolute stock returns to the local currency trading volume. In both cases, the annual liquidity estimates for each stock are obtained by averaging the computed daily ratios across all trading days for each calendar year. Since the Amihud (2002) illiquidity ratio is highly skewed, this study follows the literature in taking natural logarithm of one plus *ILLIQ* x 10^6. The same approach is applied for *CPQS* Impact by taking the natural logarithm of one plus *CPQSIM* x 10^4. Similar to *CPQS*, these two price impact proxies are inverse measure of liquidity, where higher values indicate greater degree of illiquidity. The required daily date for computing *CPQSIM* and *ILLIQ* are all sourced from Thomson Datastream.

The first two columns of Table 4.6 present the pooled OLS estimation results for both models but replace *CPQS* with *CPQSIM* as the liquidity proxy. In the first column, the coefficient of ln *NSH* is negative and significant at the 1% level, consistent with the linear relationship in Table 4.3. In the second column, ln *NSH* retains its negative sign and statistical significance, but its squared term is not statistically significant. This implies that there is no evidence to support H_1 that the relationship between the number of shareholders and liquidity is nonlinear. In other words, the relationship between the number of shareholders and price impact is at best linear. As for the control variables, local individual ownership, local institutional ownership, return volatility, turnover, firm size and blockholdings remain highly significant. The two exceptions are the number of security analysts and independent non-executive chairman become significant when *CPQS* Impact is used as the liquidity proxy.

The third and fourth columns of Table 4.6 present the pooled OLS estimation results using Amihud (2002) illiquidity ratio. In the third column, the coefficient of ln *NSH* is negative and significant at the 1% level, consistent with the results in Table 4.3. In the fourth column, ln *NSH* retains its negative sign and statistical significance, but its squared term is not statistically significant. Again, this confirms that the relationship between the number of shareholders and price impact is at best linear. As for the control variables, local institutional ownership, return volatility, turnover, firm size and blockholdings remain highly significant. The variable of local individual ownership and its squared term lose their explanatory power. However, the number of security analysts, stock return and independent non-executive chairman become significant when Amihud illiquidity ratio is used as the liquidity proxy.

Table 4.6: Robustness Check with Alternative Liquidity Measures (2000-2015)

	CPQSIM		*ILLIQ*	
	Linear Relationship	**Nonlinear Relationship**	**Linear Relationship**	**Nonlinear Relationship**
ln *NSH*	-0.5991***	-1.2488**	-0.5601***	-0.0457
	(0.0462)	(0.5204)	(0.0425)	(0.5090)
ln NSH^2		0.0380		-0.0302
		(0.0312)		(0.0300)
LIND	-0.0160***	-0.0159***	-0.0043	-0.0044
	(0.0041)	(0.0041)	(0.0042)	(0.0042)
$LIND^2$	0.0002***	0.0002***	0.0001*	0.0001*
	(0.00004)	(0.00004)	(0.00004)	(0.00004)
LINST	0.0042***	0.0042***	0.0031**	0.0031**
	(0.0011)	(0.0011)	(0.0012)	(0.0012)
ln (1+*ANALYST*)	-0.6043***	-0.6070***	-0.7743***	-0.7722***
	(0.0417)	(0.0405)	(0.0358)	(0.0356)
RETURN	-0.3757	-0.3858	-0.6249***	-0.6198***
	(0.2859)	(0.2893)	(0.2105)	(0.2118)
VOL	0.4884***	0.4869***	0.4521***	0.4535***
	(0.0300)	(0.0292)	(0.0303)	(0.0296)
TURNOVER	-1.0467***	-1.0446***	-1.0556***	-1.0577***
	(0.0771)	(0.0771)	(0.0671)	(0.0668)
ln *SIZE*	-0.3761***	-0.3743***	-0.3995***	-0.4008***
	(0.0402)	(0.0398)	(0.0361)	(0.0361)
BLOCK	0.5818***	0.5789***	0.4014***	0.4040***
	(0.1517)	(0.1539)	(0.1285)	(0.1267)
ln *BSIZE*	0.0971	0.0897	0.1085	0.1150
	(0.0885)	(0.0895)	(0.0839)	(0.0849)
BINDEP	-0.2673	-0.2648	-0.0708	-0.0729
	(0.1974)	(0.1973)	(0.2007)	(0.2003)
DUAL	0.0415	0.0349	0.0531	0.0587
	(0.0980)	(0.0990)	(0.0872)	(0.0876)
CHAIR	-0.1141**	-0.1144**	-0.1137**	-0.1137**
	(0.0515)	(0.0518)	(0.0501)	(0.0499)
CONSTANT	11.1694***	13.7951***	13.7849***	11.7206***
	(0.5017)	(2.0556)	(0.3832)	(2.0594)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	10,266	10,266	10,216	10,216
Adj. R^2	0.6801	0.6804	0.7170	0.7171

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for liquidity models (3.1) and (3.2) but replaces the dependent variable with *CPQS* Impact (*CPQSIM*) and Amihud illiquidity ratio (*ILLIQ*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

To summarize, when liquidity is measured as price impact of trade, there is no evidence to support H_1 that the relationship between the number of shareholders and liquidity is nonlinear. Across all four columns, it can be inferred that the relationship between the number of shareholders and price impact is at best linear. Lee and Chung (2018) find that foreign ownership correlates positively with the price impact of trades but negatively with the bid-ask spread. Their findings highlight the importance of distinguishing the adverse selection risks from trading costs. When liquidity is proxied by *CPQS*, bid-ask spread becomes broader when the number of shareholders exceeds the threshold level as reported earlier in Table 4.4. However, Table 4.6 shows that there is no such upper limit imposed when liquidity is proxied by price impact measures. The table instead shows that a larger number of shareholders is associated monotonically with lower price impact. This implies that shareholder-boosting strategies do not pose greater adverse selection risks to liquidity providers. Liew et al. (2018) reach similar conclusion on the differing liquidity effects for Malaysian stocks in that foreign trading broadens bid-ask spread but does not affect the price impact. Thus, corporate managers and stock exchange regulators can pay exclusive attention to the negative effect of a very large shareholder base on the trading costs incurred by liquidity demanders.

4.4.3 Alternative Estimation Methods

The baseline liquidity model is estimated using the pooled OLS with the standard errors adjusted to account for the possible existence of within-cluster correlation. As a robustness check, this baseline model is re-estimated using Fama-MacBeth two-step regression and quantile regression. The first estimation method is designed to pick up cross-sectional effects. The procedure involves estimating cross-sectional regression for each year separately, and then inferences are drawn from the time-series averages of the estimated coefficients. Second, the quantile regression is developed by Koenker and Bassett (1978). It examines the effects of the number of shareholders along the entire range of the liquidity conditional distribution especially at the extreme upper and lower tails (for a survey, see Koenker & Hallock, 2001). The quantile regression overcomes the shortcomings of OLS regression that estimate the conditional mean effect of the number of shareholders on liquidity, and the potential bias arises from the non-normality of the dependent variable.

Table 4.7 presents the regression results for the baseline liquidity model using these two alternative estimation methods. In the first column using Fama-MacBeth regression, the first-order ln *NSH* is negative and highly significant, whereas its squared term is positively and significantly associated with *CPQS*. This supports hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. In terms of the control variables, the six significant regressors in the baseline liquidity model using pooled OLS (local individual ownership, local institutional ownership, volatility, turnover, firm size and blockholdings) are still highly significant. The two exceptions are the number of security analysts and CEO duality now become statistically significant and correlated with higher liquidity.

The next five columns in Table 4.7 present the quantile regression estimates at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the liquidity conditional distribution. Across the five selected quantiles, the first-order ln *NSH* is negative and highly significant, whereas its squared term is positively and significantly associated with *CPQS*. This suggests the nonlinear relationship is not confined to firms with liquidity around the mean but widespread across all firms with liquidity at different quantiles of its distribution. In terms of the control variables, the six significant regressors in the baseline liquidity model using pooled OLS – local individual ownership, local institutional ownership, volatility, turnover, firm size and blockholdings – are still highly significant in Table 4.7. While most of them are significant across all five quantiles, local institutional ownership and blockholdings are statistically significant at the 0.50th, 0.75th and 0.90th quantiles of the liquidity conditional distribution.

On the other hand, four variables that have been found to be insignificant in the baseline OLS regression are now becoming statistically significant in the quantile regression. The number of security analysts is statistically significant at the 0.10th, 0.25th, 0.50th, and 0.75th quantiles. The negative coefficient suggests that a larger number of security analysts is associated with higher liquidity. The remaining three variables – stock return, board size and independent non-executive chairman – are significantly associated with liquidity across all five quantiles with the expected signs. This suggests that the above four variables are unimportant for firms with average liquidity, but they are significant determinants for firms located at different quantiles of the *CPQS* distribution.

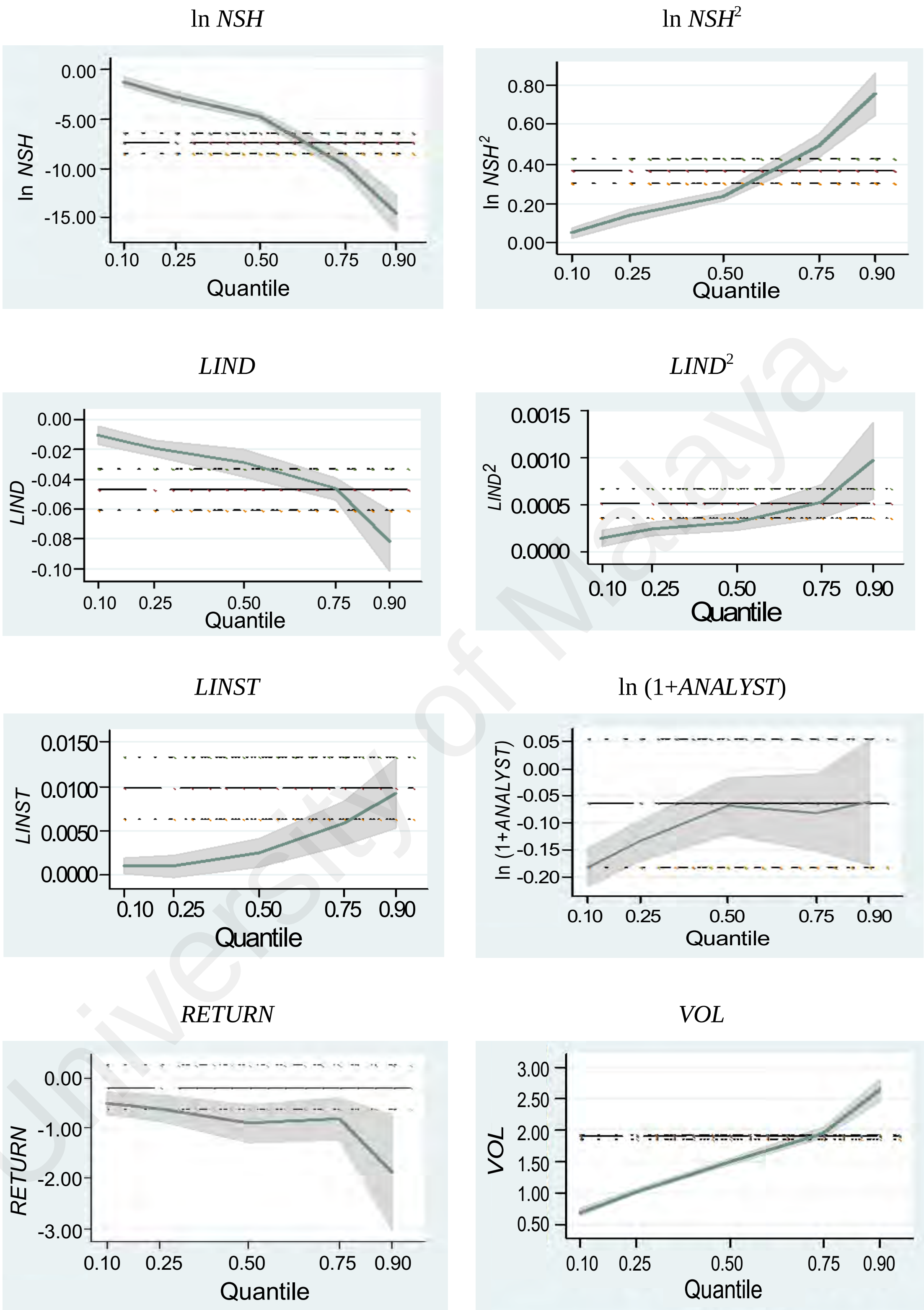
To visualize the effects for all quantiles, Figure 4.2 plots the coefficients for all regressors with their corresponding 95% confidence intervals against the entire conditional distribution of *CPQS*. Across all quantiles, the coefficient of ln *NSH* is negative and trending downward, whereas its squared term is positive and sloping upward. All the quantile-varying estimates for both ln *NSH* and ln NSH^2 are statistically significant across the entire conditional distribution of *CPQS* given that their corresponding 95% confidence intervals do not overlap with the zero value. This provides strong evidence to support the baseline pooled OLS results and hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. This also suggests a threshold level in shareholder-boosting strategies for improving liquidity. Figure 4.2 also provides useful insights on the effects of the control variables across the entire conditional distribution of *CPQS*, which complements Table 4.7.

Table 4.7: Robustness Check with Alternative Estimation Methods (2000-2015)

	Fama-MacBeth	Quantile Regression				
		10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
ln *NSH*	-8.4520***	-1.2066***	-2.8287***	-4.7616***	-9.5784***	-14.5201***
	(0.7730)	(0.1953)	(0.3284)	(0.3940)	(0.8889)	(1.7475)
ln NSH^2	0.4329***	0.0524***	0.1394***	0.2380***	0.4938***	0.7502***
	(0.0448)	(0.0113)	(0.0187)	(0.0217)	(0.0491)	(0.0974)
LIND	-0.0440***	-0.0103***	-0.0191***	-0.0291***	-0.0463***	-0.0817***
	(0.0103)	(0.0033)	(0.0030)	(0.0034)	(0.0060)	(0.0103)
$LIND^2$	0.0005***	0.0002***	0.0003***	0.0003***	0.0005***	0.0009***
	(0.0001)	(0.00004)	(0.00004)	(0.00005)	(0.0001)	(0.0002)
LINST	0.0089***	0.0006	0.0010	0.0029***	0.0048***	0.0084***
	(0.0023)	(0.0007)	(0.0007)	(0.0008)	(0.0011)	(0.0022)
ln (1+*ANALYST*)	-0.1261**	-0.1822***	-0.1322***	-0.0686**	-0.0808**	-0.0612
	(0.0507)	(0.0150)	(0.0219)	(0.0321)	(0.0391)	(0.0486)
RETURN	-0.5020	-0.5056***	-0.6098***	-0.9165***	-0.8173**	-1.8825**
	(0.7923)	(0.1090)	(0.1171)	(0.2305)	(0.3206)	(0.7363)
VOL	1.6841***	0.7098***	1.0537***	1.5199***	1.9874***	2.6667***
	(0.1171)	(0.0326)	(0.0272)	(0.0285)	(0.0472)	(0.0732)
TURNOVER	-2.1256***	-1.4691***	-1.5980***	-1.6826***	-1.6209***	-1.6346***
	(0.3042)	(0.0892)	(0.0863)	(0.0521)	(0.0729)	(0.1025)
ln *SIZE*	-0.4353***	-0.1993***	-0.2584***	-0.2964***	-0.2789***	-0.3117***
	(0.1000)	(0.0215)	(0.0106)	(0.0198)	(0.0310)	(0.0367)
BLOCK	1.0099***	-0.0621	0.0935	0.4943***	0.8801***	1.0789***
	(0.2795)	(0.0942)	(0.1013)	(0.1301)	(0.1676)	(0.1729)
ln *BSIZE*	0.2255	0.1320*	0.2458***	0.4080***	0.3095***	0.3111**
	(0.1831)	(0.0676)	(0.0559)	(0.0581)	(0.0767)	(0.1509)
BINDEP	-0.4991	-0.0934	-0.0540	-0.3413**	-0.8192***	0.0594
	(0.2916)	(0.1156)	(0.1336)	(0.1643)	(0.2678)	(0.3832)
DUAL	-0.2958***	0.0623	-0.0209	0.0436	-0.3045***	-0.4902***
	(0.0943)	(0.0551)	(0.0580)	(0.0824)	(0.0969)	(0.1121)
CHAIR	-0.0782	-0.0697***	-0.0907***	-0.0804**	-0.1646***	-0.1764**
	(0.0558)	(0.0262)	(0.0243)	(0.0346)	(0.0588)	(0.0776)
CONSTANT	46.0279***	9.7444***	17.3469***	27.0259***	49.4703***	72.6522***
	(3.9990)	(1.0903)	(1.4379)	(1.8911)	(3.8482)	(7.7260)
Year	No	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	10,664	10,664	10,664	10,664	10,664	10,664
R^2/Pseudo R^2	0.6110	0.1981	0.2905	0.3999	0.4842	0.5477

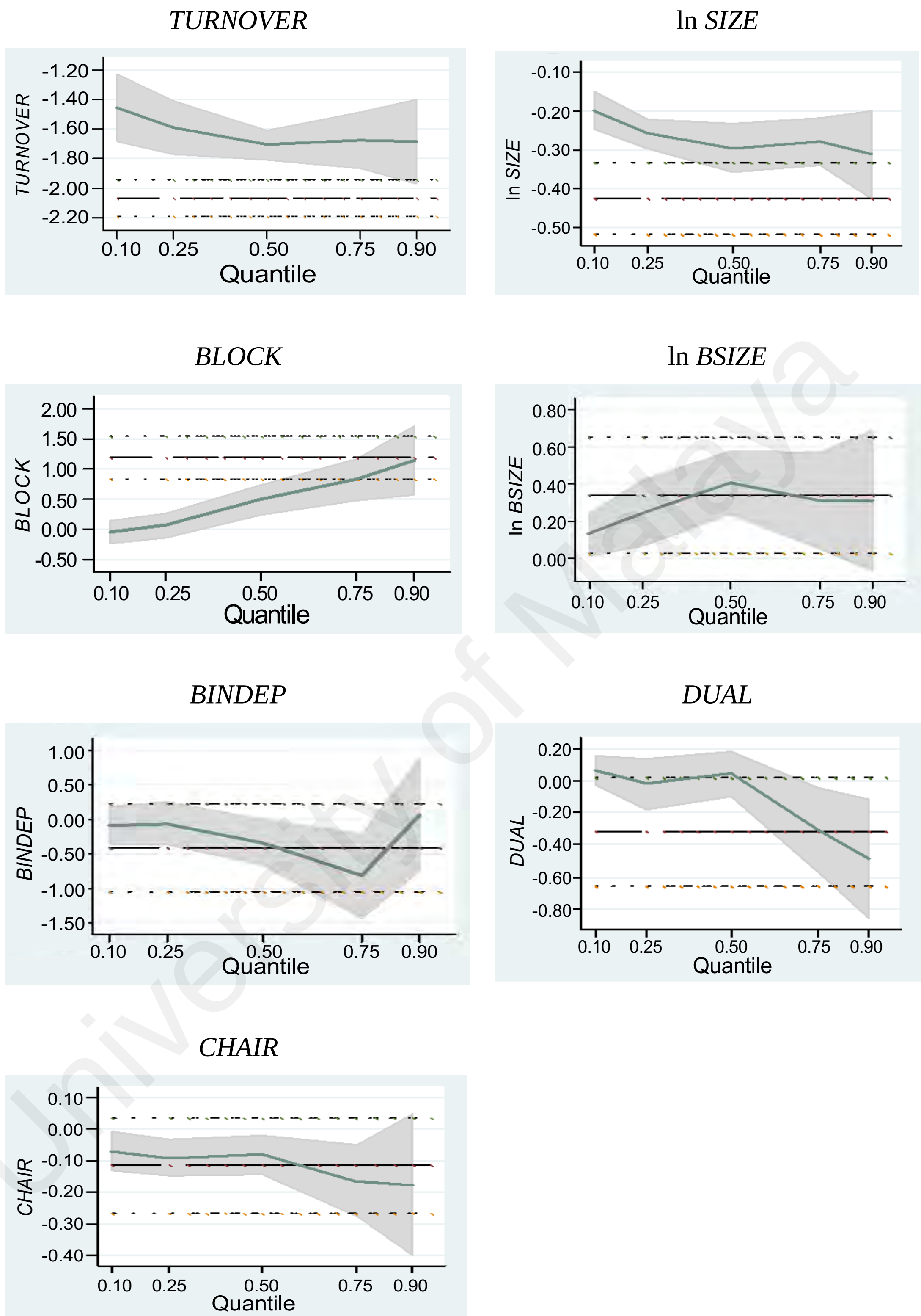
Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS* but replaces the pooled OLS estimator with Fama-MacBeth two-step regression and quantile regression. For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Figure 4.2: Graphical Plots of Quantile Regression Estimates



Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This figure presents the quantile regression results for the baseline liquidity model (3.2) where the dependent variable is *CPQS* over the sample period 2000-2015. The plots depict the coefficients for all regressors with their corresponding 95% confidence intervals against the entire conditional distribution of *CPQS*.

Figure 4.2: Graphical Plots of Quantile Regression Estimates (Continued)



Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This figure presents the quantile regression results for the baseline liquidity model (3.2) where the dependent variable is *CPQS* over the sample period 2000-2015. The plots depict the coefficients for all regressors with their corresponding 95% confidence intervals against the entire conditional distribution of *CPQS*.

4.4.4 Confirming the U-Shape Relationship

The estimation results for the baseline liquidity model (3.2) support H_1 that the number of shareholders and liquidity are nonlinearly associated, with the signs consistent with a U-shape relationship between ln *NSH* and *CPQS*. This section confirms the U-shape relationship through a formal U-test proposed by Lind and Mehlum (2010).

The formal U-test proposed by Lind and Mehlum (2010) is applied on the data. These authors not only propose a formal U-test that gives the exact necessary and sufficient conditions in the finite samples, but also the confidence intervals for the threshold point. Table 4.8 presents the results of the formal U-test, which is a joint test on the two null hypotheses of an inverted-U or monotone relationship. The test statistic strongly rejects the combined null hypotheses at the 1% level of significance in favor of a U-shape relationship. The estimated threshold point for ln *NSH* is 10.1379, which is equivalent to 25283 shareholders, with a 95% confidence intervals of [9.8974, 10.4671]. The threshold level computed from Table 4.4 for ln *NSH* is 10.1367 (equivalent to 25253 shareholders), which is close to the threshold provided by the U-test and falls within the 95% confidence intervals.

Table 4.8 also shows that the number of shareholders-illiquidity curve has a negative and statistically significant slope before the threshold level (lower bound). After the threshold level (upper bound), the number of shareholders-illiquidity curve becomes positive. This additional evidence from the formal U-test of Lind and Mehlum (2010) provides further support to hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear.

Table 4.8: Robustness Check with the Formal Statistical Test for U-Shape (2000-2015)

	ln *NSH*
Slope at Lower Bound	-2.7506 (0.0000)
Slope at Upper Bound	0.5270 (0.0002)
Lind and Mehlum (2010) Test for U-Shape	3.59 (0.0002)
Threshold Point	10.1379
Fieller 95% Confidence Interval	[9.8974, 10.4671]

Notes: This table presents the estimation results for the U-test on the baseline liquidity model (3.2) where the dependent variable is *CPQS* over the sample period 2000-2015. The U-test is a joint test on the two null hypotheses of an inverted-U or monotone relationship. Entries in parentheses indicate *p*-values.

4.4.5 Excluding the Crisis Years of 2008-2009

The next robustness check determines whether the results for the baseline liquidity model is driven by the global financial crisis of 2008-2009. A major event during the sample period is the 2008-2009 global crisis originated from the U.S. Even though its effects on Malaysia are less severe than the 1997 Asian financial crisis, a structural break analysis conducted by Liew et al. (2016) finds that the global crisis causes aggregate liquidity of the Malaysian stock market to drop sharply. On the other hand, the average number of shareholders for Malaysian public firms has been on a declining trend since the starting year of the sample period. There is thus a possibility the baseline finding is driven by the strong correlations detected during the global crisis. To address the above concern, the baseline liquidity model is re-estimated using pooled OLS for the three sub-periods: (1) 2000-2007 (before crisis); (ii) 2010-2015 (after crisis); (iii) 2000-2015 but excluding the crisis years of 2008-2009.

Table 4.9: Robustness Check with the Exclusion of Crisis Years (2000-2015)

	2000-2007 (Before Crisis)	2010-2015 (After Crisis)	2000-2015 (Excludes 2008-2009)
ln *NSH*	-5.9678***	-9.7949***	-7.5519***
	(0.8200)	(1.5577)	(1.0330)
ln NSH^2	0.2861***	0.5287***	0.3832***
	(0.0445)	(0.0879)	(0.0600)
LIND	-0.0348***	-0.0342**	-0.0382***
	(0.0121)	(0.0144)	(0.0098)
$LIND^2$	0.0004***	0.0004**	0.0004***
	(0.0001)	(0.0002)	(0.0001)
LINST	0.0052**	0.0066**	0.0050**
	(0.0026)	(0.0031)	(0.0021)
ln (1+*ANALYST*)	-0.1947**	-0.0307	-0.0592
	(0.0758)	(0.1166)	(0.0787)
RETURN	-1.0197*	-1.7610**	-1.2051**
	(0.6033)	(0.7774)	(0.5655)
VOL	1.2866***	1.8914***	1.6197***
	(0.0978)	(0.1742)	(0.1227)
TURNOVER	-1.1225***	-2.5119***	-1.6886***
	(0.1571)	(0.3298)	(0.2298)
ln *SIZE*	-0.2295**	-0.4808***	-0.3998***
	(0.0927)	(0.1118)	(0.0839)
BLOCK	1.7324***	0.2228	0.9076**
	(0.4577)	(0.3912)	(0.3579)
ln *BSIZE*	0.4051*	-0.1955	0.1946
	(0.2269)	(0.2059)	(0.1867)
BINDEP	-0.6172	-0.6876	-0.4894
	(0.5273)	(0.5855)	(0.4205)
DUAL	-0.2102	-0.4377	-0.3004
	(0.1941)	(0.2711)	(0.1938)
CHAIR	-0.1574	-0.0162	-0.0875
	(0.1233)	(0.1311)	(0.0980)
CONSTANT	33.5354***	52.3004***	41.7657***
	(4.1302)	(6.7765)	(4.7466)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	4,138	5,007	9,145
Adj. R^2	0.5868	0.6221	0.6102

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS* over three sample periods that exclude the crisis years of 2008-2009. For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The first column of Table 4.9 shows that, for the pre-crisis period of 2000-2007, the first-order ln *NSH* is negative and highly significant, whereas its squared term is positively and significantly associated with *CPQS*. This nonlinear relationship still holds for the post-crisis period of 2010-2015. The last column then re-estimates the baseline liquidity model for the whole sample period of 2000-2015 but excludes the crisis years of 2008-2009. Again, both the ln *NSH* and ln NSH^2 are highly significant at the 1% level, with the signs unchanged. In summary, the three columns in Table 4.9 show that the nonlinear relationship is not driven by the global financial crisis.

In terms of the control variables, only five of the six significant regressors in the baseline liquidity model using pooled OLS are not driven by the global financial crisis – local individual ownership, local institutional ownership, volatility, turnover and firm size. These five variables remain significant across all three columns in Table 4.9. The only exception is the variable of blockholdings, which becomes insignificant in the sample period after the 2008-2009 crisis.

4.4.6 Industry-Specific Regressions

The sample in this study consists of all non-financial firms that have been listed on Bursa Malaysia over the sample period of 2000-2015. Since the sample covers a large number of industries, it is possible that the significant baseline results from pooled sample might be net effect of varying relationships across industries offsetting each other. Bursa Malaysia uses the following industry classifications: (1) Consumer Products; (2) Constructions; (3) Closed-End Funds; (4) Exchange-Traded Funds; (5) Finance; (6) Hotels; (7) Industries Products; (8) Infrastructure Project PLCs; (9) Mining; (10) Plantations; (11) Properties; (12) Real Estate Investment Trusts; (13) Special Purpose Acquisition Company; (14) Technology; (15) Trading/Services.

To address the above concern, the baseline liquidity model is re-estimated using pooled OLS for each industry in the sample. Even though the original sample excludes financial sector, the re-estimation also runs a regression for this industry. However, to ensure sufficient sample size, those industries with less than 100 firm-year observations are excluded. Only nine industries meet this criterion, namely consumer products, construction, finance, industrial products, plantations, properties, real estate investment trusts, technology and trading/service.

Table 4.10: Number of Shareholders-Liquidity Relationship by Industry (2000-2015)

Industry	ln *NSH*	ln NSH^2	*N*	Adjusted R^2
Construction	-3.2184 (2.8264)	0.1485 (0.1658)	630	0.5958
Consumer Products	-14.5777*** (3.8995)	0.8271*** (0.2363)	1,547	0.6518
Finance	-2.0600 (1.3625)	0.0947 (0.0750)	555	0.6480
Industrial Products	-7.2787*** (2.3492)	0.3512** (0.1419)	3,212	0.6482
Plantation	-12.3088*** (2.4152)	0.6530*** (0.1353)	528	0.5618
Properties	-4.9667** (2.1973)	0.2126* (0.1219)	1,172	0.6079
Real Estate Investment Trusts	-3.4673** (1.6203)	0.2132** (0.0984)	137	0.7841
Technology	-12.1743*** (3.5470)	0.6646*** (0.2139)	859	0.6990
Trading/Services	-7.9766*** (1.6092)	0.4004*** (0.0917)	2,398	0.6174

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS*, for industries with more than 100 firm-year observations. For brevity, estimates for control variables, constant and year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The within-industry results are presented in Table 4.10. Both the ln *NSH* and ln NSH^2 retain their significant coefficients in seven industries, with finance and construction the notable exceptions. Since the baseline analysis excludes financial firms due to different regulatory framework, it is thus reasonable to conclude the nonlinear relationship is widespread across industries, thus supporting the baseline results and hypothesis H_1.

4.4.7 Disaggregate Investors Types

The proxy for shareholder base in the baseline results is the total number of shareholders for Malaysian public listed firms. Motivated by the growing research on investor heterogeneity, this section further determines whether the nonlinear relationship prevails across all investor types – local individuals, local institutions, local government, local nominees, foreign individuals, foreign institutions and foreign nominees.

Table 4.11: Number of Shareholders-Liquidity Relationship by Investor Types (2000-2015)

Investor Type	ln *NSH*	ln NSH^2	*N*	Adjusted R^2
Local Individuals	-5.9430***	0.2913***	10,664	0.6388
	(1.0129)	(0.0607)		
Local Institutions	-1.5567***	0.1152**	10,664	0.6268
	(0.4720)	(0.0516)		
Local Government	-0.8130***	0.2994***	10,664	0.6217
	(0.1960)	(0.0770)		
Local Nominees	-7.7765***	0.4949***	10,664	0.6662
	(1.0642)	(0.0829)		
Foreign Individuals	-1.7174***	0.1416***	10,664	0.6308
	(0.3065)	(0.0334)		
Foreign Institutions	-0.9726***	0.3067***	10,664	0.6228
	(0.1892)	(0.0606)		
Foreign Nominees	-1.2903***	0.1041***	10,664	0.6324
	(0.1642)	(0.0163)		

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS*, but disaggregate the number of shareholders according to investor types. For brevity, estimates for control variables, constant, industries and year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The results in Table 4.11 confirm the robustness of the baseline results since both the ln *NSH* and ln NSH^2 are highly significant across all seven investor types with the signs that are consistent with a U-shaped curve. This adds further credence to the inclusion of shareholder base in liquidity model, as its explanatory power is not subsumed by percentage ownership variables and not driven by specific investor types.

4.4.8 Endogeneity

Endogeneity, in particularly reverse causality, is a valid concern given the close-knit relationship between shareholder base and liquidity. There are three potential candidates in the literature for drawing causal inference, but all do not provide a clean test. First, Bodnaruk and Östberg (2013) establish the causal relationship from shareholder base to dividend payout and cash holdings using the 2001 decimalization of tick size as exogenous shock to shareholder base. However, this natural experiment has also been widely used as a standard exogenous liquidity shocks for U.S. studies (see Bharath et al., 2013; Dou et al., 2018; Fang et al., 2009, 2014). This illustrates the difficulty of disentangling shareholder base from liquidity. Second, even though lot size reduction is another potential candidate of exogenous shock, evidence from Japan shows that the reduction in minimum trading unit expands substantially the number of small individual investors and increases liquidity (see Ahn et al., 2014; Amihud et al., 1999). Thus, it is difficult to identify shock to shareholder base that is unrelated to liquidity. Third, Jankensgård and Vilhelmsson (2018) employ the number of shares as an exogenous instrument for shareholder base in a two-stage least squares (2SLS) approach. They argue that there is no reason for the former to be correlated with volatility. However, this is a strong assumption given recent evidence that liquidity increases when more shares are available either by altering trading activities or alleviating information asymmetries (Ding, Ni, & Zhong, 2016; El-Nader, 2018).

Ding et al. (2016) encounter similar challenges when establishing the causal relationship from free-float shares to liquidity, prompting them to resort to some mechanical approaches. Given the lack of natural experiments and strictly exogenous instruments, this study follows similar route and employs four tests to tackle endogeneity.[24] The results are presented in Table 4.12, and the discussions here focus on the nonlinear relationship between the number of shareholders and liquidity.

First, the baseline liquidity model is re-estimated using one-year lagged explanatory variables instead of taking their contemporaneous values (see Bellemare et al., 2017). Column (1) in Table 4.12 shows the result from the predictive regression. The first-order ln *NSH* is negative and highly significant, whereas its squared term is positively and significantly associated with *CPQS*. Thus, the main conclusion on the nonlinear relationship between the number of shareholders and liquidity remains intact.

Second, the baseline liquidity model is re-estimated with all the dependent and continuous independent variables specified in terms of annual changes, which reflect short-term movements after removal of any longer-term effects (see Chung et al., 2010). However, the results from change-in-variable regression in Column (2) of Table 4.12 show that both the ln *NSH* and ln NSH^2 expressed in changes completely lose their explanatory power. This is more likely due to the nonlinear relationship between shareholder base and liquidity that exists over longer term.

Third, it is possible that some unobserved time-invariant firm characteristics simultaneously determine both the number of shareholders and liquidity. To rule out the unobserved omitted variable concern, the fixed effects approach is used. Gormley and Matsa (2014) demonstrate that the firm fixed effects estimator yields consistent estimates in the presence of unobserved heterogeneity. Column (3) in Table 4.12 shows that the

[24] In untabulated analysis, this study follows Jankensgård and Vilhelmsson (2018) in using two-stage least squares (2SLS) regression with the number of shares as an external instrument. In the first stage, the analysis regresses the number of shareholders against the number of shares and a set of control variables. The instrumental variable is positively associated with the number of shareholders, and statistically significant at the 1% level. In the second stage, the number of shareholders in the baseline liquidity model is replaced with its fitted values from the previous regression. The results continue to show a nonlinear relationship between shareholder base and liquidity. However, these 2SLS results are not reported due to the concern that the number of shares is not strictly exogenous.

coefficients for ln *NSH* and ln NSH^2 are still statistically significant with the expected signs. It is thus unlikely that the documented number of shareholders-liquidity relationship is driven by their correlation with common unobservable firm factors.

Last but not least, the baseline liquidity model is re-estimated in a generalized method-of-moments (GMM) dynamic panel framework. Given the difficulty of finding strictly exogenous external instrument, Wintoki et al. (2012) recommend the use of lagged explanatory variables as internal instruments. The lagged dependent variable of *CPQS* is added to the right-hand-side of the baseline liquidity model, and the resulting dynamic panel model is estimated using a two-step system GMM. Column (4) in Table 4.12 shows that both the coefficients for ln *NSH* and ln NSH^2 are still statistically significant with the expected signs. This suggests a causal relationship running from the number of shareholders to liquidity.

The consistency of the GMM estimator depends on two types of specification tests: (1) *AR*(1) and *AR*(2) tests are under the null of no first-order and second-order serial correlation, respectively, in the first-differenced residuals; (2) Sargan and Hansen tests of over-identifying restrictions are under the null that all instruments are valid. The *p*-values for *AR*(1) and *AR*(2) tests are 0.0000 and 0.3077, respectively. The *p*-values for Sargan and Hansen tests are 0.9690 and 0.4410, respectively. Thus, the regression satisfies the specification tests in that there is no evidence of second-order serial correlation, and both the Sargan and Hansen tests fail to reject the null that all instruments are valid. It is unlikely that the documented number of shareholders-liquidity relationship is driven by reverse causality.

In summary, while the results provide strong corroborative evidence that supports hypothesis H_1, this study refrains from claiming that the endogeneity problem has been entirely resolved.

Table 4.12: Robustness Checks on Endogeneity (2000-2015)

	Lag in Variables (1)	Changes in Variables (2)	Firm Fixed Effects (3)	2-Step System GMM (4)
ln *NSH*	-6.7538***	-27.1735	-7.5051***	-3.9524**
	(1.1695)	(24.3751)	(0.5465)	(1.7321)
ln NSH^2	0.3354***	12.2284	0.3712***	0.1991*
	(0.0658)	(11.7961)	(0.0319)	(0.1064)
LIND	-0.0277	0.5008***	-0.0492***	-0.0016
	(0.0181)	(0.1203)	(0.0071)	(0.0159)
$LIND^2$	0.0004	-0.1650***	0.0006***	-0.0001
	(0.0002)	(0.0438)	(0.0001)	(0.0002)
LINST	0.0069*	0.0035	0.0089***	0.0107***
	(0.0038)	(0.0037)	(0.0018)	(0.0036)
ln (1+*ANALYST*)	-0.1548*	-0.0888**	-0.0740	-0.1113
	(0.0910)	(0.0392)	(0.0606)	(0.0863)
RETURN	-5.9671***	-0.0002	-0.1723	-1.0804***
	(1.6475)	(0.0013)	(0.2285)	(0.2554)
VOL	1.4283***	0.3062***	1.9029***	1.4073***
	(0.1374)	(0.0749)	(0.0212)	(0.0491)
TURNOVER	-1.7385***	-0.0752***	-2.0101***	-1.6146***
	(0.3083)	(0.0105)	(0.0644)	(0.0958)
ln *SIZE*	-0.6826***	-1.7329*	-0.4477***	-0.8142***
	(0.1577)	(0.9727)	(0.0482)	(0.1577)
BLOCK	1.7689***	-0.0475**	1.0795***	0.4095*
	(0.5175)	(0.0228)	(0.1802)	(0.2360)
ln *BSIZE*	0.1218	-0.0180	0.3486**	-0.3632
	(0.2184)	(0.1896)	(0.1585)	(0.2964)
BINDEP	-0.3338	-0.0185	-0.4403	-0.1834
	(0.5891)	(0.0347)	(0.3298)	(0.5650)
DUAL	-0.2325		-0.2973*	-0.0804
	(0.2842)		(0.1720)	(0.3113)
CHAIR	-0.1146		-0.1205	0.1708
	(0.1262)		(0.0773)	(0.1848)
$CPQS_{t-1}$				0.2542***
				(0.0149)
CONSTANT	44.6522***	0.8464***	41.8808***	28.3717***
	(5.9588)	(0.1146)	(4.2652)	(7.3079)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	No	Yes
N	9,743	1,727	10,664	9,012
R^2	0.5112	0.3236	0.6512	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS*, but specifies the independent variables in one-year lagged (t-1) and annual changes (Δ) in Columns (1) and (2), respectively. Column (3) estimates the baseline liquidity model (3.2) with firm fixed effects estimator, while Column (4) specifies the baseline as a dynamic panel model that is estimated with two-step system GMM. Entries in parentheses are standard errors, with Columns (1) & (2) the double-clustered standard errors. *N* denotes the number of observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

4.5 Further Analyses

The richness of the data allows this thesis to conduct further analyses to explore why liquidity declines when the number of shareholders becomes too large, to assess the rationale of Malaysian stock exchange's priority in boosting retail participation, and to determine the role of shareholding size in promoting liquidity.

4.5.1 Is the Negative Liquidity Effect Attributable to Informed Trading?

The battery of robustness checks establish the key finding that shareholder base is nonlinearly associated with stock liquidity. Before the threshold level, the increase in liquidity with a larger number of shareholders can be attributed to greater investor recognition, information competition among informed traders or the liquidity trading of noise traders. This is consistent with theoretical predictions and conventional wisdom that a larger shareholder base is associated with higher liquidity. However, the U-shaped curve suggests the dominance of negative liquidity effect after the threshold point. This negative effect might arise from higher adverse selection costs imposed by informed trading or higher volatility from noise trading. To identify the source of this liquidity decline, the analysis needs to move beyond the size of the shareholder base to its composition of informed versus noise traders.

This section first explores whether information asymmetry is responsible for the falls in liquidity when the number of shareholders increases beyond the threshold level. Unfortunately, there is limited empirical evidence to suggest who the privately informed investors are in the Malaysian stock market. This is because information-based trade is not directly observable. In the academic literature, different approaches have been used to infer which investor groups are informed. This study follows Easley, O'Hara, and Paperman (1998) in employing the theoretically grounded probability of information-based trading (*PIN*).[25] *PIN* is defined as the ratio of orders arise from informed traders over total number of trades. Hence, it is designed to compute the proportion of trades motivated by private information. Several studies show that *PIN* is highly correlated with both the adverse selection component of spread (Brennan, Huh, & Subrahmanyam, 2016; Chung & Li, 2003) and ex-ante firm characteristics associated with information asymmetry (Aslan, Easley, Hvidkjaer, & O'Hara, 2011; Lai, Ng, & Zhang, 2014). Coming back to Easley et al. (1998), the authors explore the information role of financial analysts by computing *PIN* for a sample of U.S. stocks that differ in analyst coverage. Their results show that a larger number of analysts is associated with lower level of *PIN*. This leads them to conclude that financial analysts generate more uninformed trade, and the recommendations of analysts are based on public instead of private information.

To identify informed investors in the Malaysian stock market, this study obtains the annual *PIN* data for Malaysian stocks over a shorter sample period of 2000–2011 from Lai et al. (2014).[26] These authors compute two *PIN* measures using global stock transactions data provided by Thomson Reuters Tick History (TRTH) database for 30,095 firms from 47 countries including Malaysia – the original *PIN* measure (Easley, Kiefer, O'Hara, & Paperman, 1996) and adjusted *PIN* (Duarte & Young, 2009). In preliminary analysis, this study follows Lai et al. (2014) and Brennan et al. (2016) to assess the quality of these *PIN* estimates for Malaysian stocks based on their correlations with three illiquidity measures (*CPQS*, Amihud illiquidity ratio and *CPQS* impact). The unreported results show that *PIN* has higher positive correlations with all three illiquidity measures (0.3011–0.3736) than adjusted *PIN* (0.1094–0.1314). Hence, the regression uses *PIN*.

[25] For theoretical grounds, see Easley et al. (1996).
[26] The generosity of Bohui Zhang is acknowledged for sharing their *PIN* data for Malaysian firms from Lai et al. (2014).

More specifically, the model regresses *PIN* on investor types and a set of commonly used control variables where data are available (see Aslan et al., 2011; Brown & Hillegeist, 2007; Byun, Hwang, & Lee, 2011; Lai et al., 2014) as follows:

$$\begin{aligned} PIN_{it} = {} & \lambda_0 + \lambda_1 \ln INVESTOR_{it} + \lambda_2 \ln SIZE_{it} + \lambda_3 \ln AGE_{it} + \lambda_4 \ln PRICE_{it} \\ & + \lambda_5 \ln(1 + ANALYST)_{it} + \lambda_6 BM_{it} + \lambda_7 LEV_{it} + \lambda_8 ROE_{it} + \lambda_9 VOL_{it} \\ & + \lambda_{10} TURNOVER_{it} + \lambda_{11} BLOCK_{it} + \lambda_{12} KLCI_{it} + \sum_{j=1}^{J} \lambda_{13j} IND_j + \sum_{t=1}^{T} \lambda_{14t} YR_t + \varepsilon_{it} \end{aligned} \tag{4.1}$$

where ln refers natural logarithm and the dependent variable is the probability of information-based trading (*PIN*). The key independent variable of ln *INVESTOR* is proxied by the number of investors in a particular investor group, and separate regressions are estimated for different investor groups. The control variables included are firm size measured by book value of total assets (*SIZE*), firm age in years since incorporation (*AGE*), time-series averages of daily closing prices (*PRICE*), the number of security analysts issuing earnings forecasts (*ANALYST*), the ratio of book value to market value of equity (*BM*), leverage ratio (*LEV*), return on equity (*ROE*), return volatility (*VOL*), stock turnover (*TURNOVER*), blockholdings (*BLOCK*) and index membership (*KLCI*) that takes a value of one if the stock is a component of the main market index, and zero otherwise. IND_j and YR_t are industry and year dummies, respectively.

The results for model (4.1) using different investor types are tabulated in Table 4.13. Across all columns, the coefficients for the number of investors are negatively and significantly associated with *PIN* for all investor types. This suggests that none of the investor groups (local individuals, local institutions, local governments, local nominees, foreign individuals, foreign institutions and foreign nominees) can be regarded as informed traders who act on private information. Since shareholder base is negatively associated with *PIN* at both aggregate and disaggregate levels, this implies the dominance of information competition effect. This is because larger number of shareholders leads to lower information asymmetry (see Akins et al., 2012). Only the coefficient of blockholdings is significantly associated with higher probability of informed trading. This is consistent with the literature that blockholders have privileged access to private firm-specific information (see Brockman & Yan, 2009; He, Li, Shen, & Zhang, 2013). This result, interpreted together with the negative relationship between blockholdings and liquidity reported in Table 4.4, suggests that the consequence of higher *PIN* is lower liquidity due to greater adverse selection costs. The evidence in Table 4.13 thus rules out the possibility that the dominance of negative liquidity effect after the threshold point is due to higher adverse selection costs imposed by informed trading.

Table 4.13: Investor Types and Probability of Information-based Trading (*PIN*) (2000-2011)

	Local Individual	Local Institution	Local Government	Local Nominee	Foreign Individual	Foreign Institution	Foreign Nominee
ln *INVESTOR*	-0.0352***	-0.0323***	-0.0072***	-0.0374***	-0.0247***	-0.0159***	-0.0139***
	(0.0029)	(0.0034)	(0.0023)	(0.0033)	(0.0021)	(0.0023)	(0.0015)
ln *SIZE*	-0.0009	-0.0017	-0.0142***	-0.0010	-0.0029	-0.0098***	-0.0060***
	(0.0023)	(0.0026)	(0.0016)	(0.0024)	(0.0022)	(0.0020)	(0.0020)
ln *AGE*	0.0006	0.00004	-0.0053***	-0.0005	0.0054***	-0.0021	0.0026
	(0.0021)	(0.0021)	(0.0020)	(0.0019)	(0.0020)	(0.0023)	(0.0022)
ln *PRICE*	0.0062***	0.0110***	0.0117***	0.0054***	0.0099***	0.0117***	0.0104***
	(0.0013)	(0.0016)	(0.0018)	(0.0012)	(0.0015)	(0.0018)	(0.0017)
ln (1+*ANALYST*)	-0.0093***	-0.0050	-0.0057	-0.0041	-0.0073**	-0.0064	-0.0046
	(0.0032)	(0.0040)	(0.0043)	(0.0028)	(0.0037)	(0.0040)	(0.0040)
BM	-0.0005	-0.0007	0.0007	-0.0004	-0.0007	-0.0001	-0.0006
	(0.0011)	(0.0013)	(0.0012)	(0.0011)	(0.0011)	(0.0013)	(0.0011)
LEV	-0.0217***	-0.0293***	-0.0186***	-0.0159**	-0.0236***	-0.0225***	-0.0221***
	(0.0067)	(0.0069)	(0.0067)	(0.0065)	(0.0064)	(0.0069)	(0.0067)
ROE	-0.0027	0.0034	0.0056	-0.0041	0.0003	0.0048	0.0022
	(0.0042)	(0.0043)	(0.0042)	(0.0043)	(0.0038)	(0.0041)	(0.0042)
VOL	0.0054***	0.0036***	0.0029***	0.0057***	0.0047***	0.0035***	0.0041***
	(0.0014)	(0.0012)	(0.0011)	(0.0015)	(0.0013)	(0.0012)	(0.0012)
TURNOVER	0.0144***	0.0125***	0.0130***	0.0192***	0.0144***	0.0126***	0.0149***
	(0.0025)	(0.0028)	(0.0035)	(0.0025)	(0.0030)	(0.0033)	(0.0032)
BLOCK	0.0200***	0.0212***	0.0287***	0.0186***	0.0206***	0.0279***	0.0221***
	(0.0062)	(0.0065)	(0.0070)	(0.0054)	(0.0057)	(0.0062)	(0.0058)
KLCI	-0.0004	-0.0022	-0.0045	-0.0013	0.00002	-0.0021	-0.0002
	(0.0051)	(0.0054)	(0.0061)	(0.0050)	(0.0054)	(0.0061)	(0.0059)
CONSTANT	0.6339***	0.4969***	0.5455***	0.5753***	0.4486***	0.4869***	0.4509***
	(0.0188)	(0.0265)	(0.0228)	(0.0188)	(0.0282)	(0.0286)	(0.0274)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,872	4,872	4,872	4,872	4,872	4,872	4,872
Adj. R^2	0.2598	0.2156	0.1551	0.2758	0.2358	0.1764	0.1989

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for model (4.1) where the dependent variable is *PIN* over a shorter sample period of 2000-2011. For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

4.5.2 Can Volatility Explain the Negative Relationship between Shareholder Base and Liquidity?

This section now addresses the second possibility of whether the drop in liquidity after the number of shareholders exceeds the threshold point is attributable to higher volatility induced by noise trading. Existing market microstructure models predict a positive relationship between noise trading and liquidity due to lower adverse selection costs (see Glosten & Milgrom, 1985; Holmström & Tirole, 1993). However, the negative effect can arise through the return volatility channel as predicted by noise trader models (Barberis et al., 1998; De Long et al., 1990; Shleifer & Summers, 1990). This can be rationalized by the consensus in the literature that a higher volatility is associated with lower liquidity (Chung & Chuwonganant, 2014; Stoll, 1978a, 1978b, 2000). In a recent paper, Jankensgård and Vilhelmsson (2018) explore the relationship between shareholder base and return volatility. Contrary to theoretical predictions, the authors find that volatility increases with an increase in the total number of shareholders, the number of large shareholders, the number of small investors, and the number of institutional investors.

Since the results in Table 4.13 provide no evidence of trading on private information by any investor groups, it is imperative to further explore the volatility channel. This is because it is highly likely that they engage in noise trading. This study follows Jankensgård and Vilhelmsson (2018) to explore the relationship between shareholder base and return volatility by replicating their model subject to data availability:

$$\begin{aligned} VOL_{it} = {} & \delta_0 + \delta_1 \ln INVESTOR_{it} + \delta_2 \ln SIZE_{it} + \delta_3 LEV_{it} + \delta_4 CPQS_{it} \\ & + \delta_5 DIVIDEND_{it} + \delta_6 BM_{it} + \delta_7 INTANGIBLES_{it} + \delta_8 EARNINGS_{it} \\ & + \sum_{j=1}^{J} \delta_{9j} IND_j + \sum_{t=1}^{T} \delta_{10t} YR_t + \varepsilon_{it} \end{aligned} \quad (4.2)$$

where ln refers to natural logarithm and the dependent variable is return volatility computed as the standard deviation of daily stock returns (*VOL*). The key independent variable of ln *INVESTOR* is proxied by the number of investors in a particular investor group, and the regression is estimated separately for different investor groups. The control variables are firm size measured by book value of total assets (*SIZE*), leverage ratio (*LEV*), Closing Percent Quoted Spread (*CPQS*), the ratio of book value to market value of equity (*BM*), the ratio of intangible assets to book value of total assets (*INTANGIBLES*), the ratio of operating income to book value of total assets (*EARNINGS*), as well as the *DIVIDEND* dummy that takes a value of one if a firm pays dividend in a given year and zero otherwise. IND_j and YR_t are industry and year dummies, respectively.

The estimated results for model (4.3) for different investor types are tabulated in Table 4.14. Across all columns, the coefficients for the number of investors are positively and significantly associated with return volatility for all investor types. This suggests that higher volatility is not driven by any specific group of investors. Instead, volatility increases when the shareholder base expands. This applies to all investor groups – local individuals, local institutions, local governments, local nominees, foreign individuals, foreign institutions and foreign nominees. Since the earlier *PIN* results suggest none of the investor groups are informed traders but they are more likely to engage in noise trading, the higher volatility is consistent with the prediction of noise trader models (Barberis et al., 1998; De Long et al., 1990; Shleifer & Summers, 1990). Thus, the decline in liquidity when shareholder base exceeds the threshold level can be attributed to higher volatility induced by noise trading.

Table 4.14: Investor Types and Stock Volatility (2000-2015)

	Local Individual	Local Institution	Local Government	Local Nominee	Foreign Individual	Foreign Institution	Foreign Nominee
ln *INVESTOR*	0.3927***	0.1328***	0.1037***	0.5215***	0.1764***	0.1005***	0.1299***
	(0.0355)	(0.0369)	(0.0290)	(0.0361)	(0.0250)	(0.0242)	(0.0183)
ln *SIZE*	-0.3912***	-0.3085***	-0.2738***	-0.4396***	-0.3382***	-0.2820***	-0.3508***
	(0.0272)	(0.0305)	(0.0287)	(0.0314)	(0.0274)	(0.0286)	(0.0329)
LEV	1.3635***	1.3989***	1.3839***	1.3076***	1.4075***	1.3969***	1.4210***
	(0.1498)	(0.1548)	(0.1530)	(0.1467)	(0.1548)	(0.1578)	(0.1597)
CPQS	0.1487***	0.1414***	0.1392***	0.1597***	0.1432***	0.1393***	0.1424***
	(0.0076)	(0.0079)	(0.0079)	(0.0069)	(0.0079)	(0.0078)	(0.0077)
DIVIDEND	-0.7717***	-0.9202***	-0.9308***	-0.6897***	-0.8675***	-0.9218***	-0.8754***
	(0.0506)	(0.0525)	(0.0539)	(0.0490)	(0.0510)	(0.0529)	(0.0511)
BM	-0.0033	0.0127	0.0111	0.0026	0.0126	0.0145	0.0231
	(0.0316)	(0.0318)	(0.0330)	(0.0301)	(0.0319)	(0.0325)	(0.0322)
INTANGIBLES	0.6680***	0.8674***	0.8482***	0.5773**	0.7704***	0.8424***	0.7548***
	(0.2523)	(0.2550)	(0.2568)	(0.2424)	(0.2550)	(0.2557)	(0.2581)
EARNINGS	-1.8931***	-2.2117***	-2.2669***	-1.7726***	-2.0840***	-2.2580***	-2.1352***
	(0.2783)	(0.2708)	(0.2659)	(0.2617)	(0.2735)	(0.2627)	(0.2644)
CONSTANT	2.8657***	5.2654***	5.4872***	4.0882***	5.6250***	5.5303***	6.0106***
	(0.4697)	(0.3733)	(0.3653)	(0.3966)	(0.3519)	(0.3967)	(0.3988)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12,953	12,953	12,953	12,953	12,953	12,953	12,953
Adj. R^2	0.6631	0.6489	0.6481	0.6764	0.6530	0.6485	0.6529

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for model (4.2) where the dependent variable is stock return volatility (*VOL*) over the sample period of 2000-2015. For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

4.5.3 Boosting Retail Participation in the Malaysian Stock Market

For the Malaysian stock market, Bursa Malaysia and Securities Commission Malaysia are the prime drivers of investor participation. Their strategy places greater emphasis on boosting retail participation in small- and mid-sized listed firms. Despite Malaysia having the highest level of fixed deposits in Southeast Asia, retail trading at Bursa Malaysia is relatively low which stood at 22 percent as at 31 July 2018.[27] The exchange operator and regulator have embarked on numerous initiatives over the years to spur retail participation, with year 2018 witnessed a series of aggressive measures – relaxing margin financing rules, removal of intraday short-selling restrictions, 3-year stamp duty waiver for trading

[27] https://www.nst.com.my/business/2018/09/408893/bursa-malaysia-provides-growth-opportunity-regulated-environment (retrieved on 8 September 2018).

of mid- and small-cap stocks, and 6-month waiver on trading and clearing fees for new individual investors.

Motivated by the efforts of Malaysian authorities dedicated to boost retail participation, further analysis is conducted on the liquidity role of individual investors. This section re-estimates the baseline liquidity model but replaces the key independent variable of number of shareholders (ln *NSH*) with *RETAIL*, which is proxied by the number of local individuals (in natural logarithm), percentage of local individuals per total number of shareholders, and average number of shares per local individual (in natural logarithm).

The first column of Table 4.15 shows that, for the number of local individuals, the first-order *RETAIL* is negative and highly significant, whereas its squared term is positively and significantly associated with *CPQS*. This nonlinear relationship still holds for the percentage of local individual in second column, calculated as the percentage of number of local individuals divided by the total number of shareholders. The first two proxies depict a U-shaped relationship with *CPQS* as shown in the results reported in Table 4.15. This indicates liquidity increases with the number and percentage of individual investors. While Bursa Malaysia should be commended for their continuous efforts in expanding the number of individual account holders, there is a caveat that liquidity will decline when the firms have too many retail investors (more than 26925 account holders or 74% of total shareholders) as their noise trading induces higher volatility. However, this should not be a cause of concern because the average number of local individual investors for the sample of Malaysian public listed firms is 5190. Only 387 firm-year observations exceed the threshold level, which represents 2.78% of the total observations. This suggests more efforts are needed to expand the size of local individual investors in Bursa Malaysia.

Table 4.15: Local Individual Investors and Liquidity (2000-2015)

	Number of Local Individuals	Percentage of Local Individuals	Number of Shares Per Local Individual
RETAIL	-5.9430***	-1.2170***	2.2535**
	(1.0129)	(0.2596)	(0.9580)
$RETAIL^2$	0.2913***	0.0082***	-0.1136**
	(0.0607)	(0.0017)	(0.0508)
LIND	-0.0496***	-0.0866***	-0.0946***
	(0.0130)	(0.0171)	(0.0176)
$LIND^2$	0.0006***	0.0009***	0.0010***
	(0.0002)	(0.0002)	(0.0002)
LINST	0.0097***	0.0076**	0.0105***
	(0.0034)	(0.0035)	(0.0035)
ln (1+*ANALYST*)	-0.0940	0.0962	-0.0605
	(0.0814)	(0.0916)	(0.0839)
RETURN	-0.1357	0.1669	0.3569
	(1.0636)	(1.0016)	(1.0689)
VOL	1.9131***	1.8275***	1.8520***
	(0.1613)	(0.1622)	(0.1643)
TURNOVER	-2.0663***	-1.9572***	-2.1470***
	(0.2655)	(0.2575)	(0.2746)
ln *SIZE*	-0.4830***	-1.0095***	-1.0803***
	(0.1081)	(0.1215)	(0.1250)
BLOCK	1.2022***	1.3446***	1.5703***
	(0.2558)	(0.2373)	(0.2293)
ln *BSIZE*	0.3936	0.3687	0.5473**
	(0.2537)	(0.2843)	(0.2679)
BINDEP	-0.4557	-1.1238**	-1.1169**
	(0.4792)	(0.5075)	(0.5245)
DUAL	-0.3213	-0.1495	-0.2821
	(0.2015)	(0.1960)	(0.2162)
CHAIR	-0.1189	-0.0882	-0.1041
	(0.1093)	(0.1211)	(0.1202)
CONSTANT	35.5070***	54.8029***	3.0836
	(4.2188)	(9.4045)	(4.5094)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	10,664	10,664	10,664
Adj. R^2	0.6388	0.6303	0.6211

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS*, but replace the key independent variable of number of shareholders (ln *NSH*) with local retail participation (*RETAIL*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The last column of Table 4.15 then re-estimates the baseline liquidity model using the number of shares per local individual. The first-order *RETAIL* is positive and significant at the 5% level, whereas its squared term is negatively and significantly associated with *CPQS*. This inverted-U shape relationship between *RETAIL* and *CPQS* implies that the liquidity benefit will only kick in when the number of shares per local individual exceeds the threshold level of 20305 shares. Since the minimum trading unit for most stocks listed on Bursa Malaysia is 100 shares, the threshold level implies that the policy focus should also give equal weight to the shares per account holder. This is because large shareholding size exerts greater liquidity impact. This remains a challenge because only 30.14% of total firm-year observations exceed the threshold level. On the other hand, the Malaysian firms on average record 12780 shares per local individual account holder.

4.5.4 The Role of Shareholding Size

The previous section notes that the number of shares per account holder should also be taken into account when formulating liquidity-enhancing policies. To further assess the explanatory power of this new variable of shareholding size (ln *SHSIZE*), Table 4.16 presents the estimation results using pooled OLS, Fama-MacBeth and quantile regressions. Across all three methods, ln *SHSIZE* exhibits an inverted U-shaped relationship with *CPQS*, implying that the liquidity benefit will only kick in when the number of shares per account holder exceeds the threshold level. This evidence thus suggests liquidity is determined not only by shareholder base (proxied by the number of shareholders), but also shareholding size measured as the number of shares per account holder. Moreover, the explanatory power of shareholding size is not subsumed by percentage ownership variables.

Table 4.16: Shareholding Size and Stock Liquidity (2000-2015)

	Pooled OLS	Fama-MacBeth	Quantile Regression		
			10^{th}	50^{th}	90^{th}
ln *SHSIZE*	7.1513***	3.7192***	2.3904***	2.8630***	6.0530***
	(1.4748)	(1.2070)	(0.3113)	(0.4890)	(0.9841)
ln *SHSIZE*^{2}	-0.3227***	-0.1672***	-0.1056***	-0.1240***	-0.2670***
	(0.0676)	(0.0549)	(0.0142)	(0.0227)	(0.0470)
LIND	-0.0801***	-0.0734***	-0.0161***	-0.0430***	-0.1534***
	(0.0181)	(0.0145)	(0.0034)	(0.0030)	(0.0119)
LIND^2	0.0009***	0.0008***	0.0002***	0.0005***	0.0018***
	(0.0002)	(0.0002)	(0.0000)	(0.0000)	(0.0002)
LINST	0.0104***	0.0102***	0.0005	0.0032***	0.0138***
	(0.0036)	(0.0025)	(0.0007)	(0.0010)	(0.0031)
ln (1+*ANALYST*)	-0.0730	-0.0709	-0.1890***	-0.0931***	-0.0691
	(0.0840)	(0.0561)	(0.0251)	(0.0252)	(0.0539)
RETURN	0.2613	-0.0874	-0.4486***	-0.4907***	-1.1726*
	(1.0667)	(0.8229)	(0.0714)	(0.1444)	(0.6434)
VOL	1.8674***	1.6516***	0.6719***	1.4721***	2.7343***
	(0.1620)	(0.1215)	(0.0346)	(0.0323)	(0.0821)
TURNOVER	-2.1480***	-2.1937***	-1.4893***	-1.7362***	-1.7234***
	(0.2744)	(0.3030)	(0.1260)	(0.1014)	(0.1079)
ln *SIZE*	-1.0739***	-1.0657***	-0.3550***	-0.6500***	-1.1916***
	(0.1241)	(0.1108)	(0.0208)	(0.0150)	(0.0554)
BLOCK	1.6341***	1.6467***	0.0353	0.7289***	1.8769***
	(0.2357)	(0.2378)	(0.0694)	(0.0743)	(0.3033)
ln *BSIZE*	0.5168*	0.4066**	0.1487**	0.4812***	0.6708***
	(0.2643)	(0.1819)	(0.0619)	(0.1140)	(0.2170)
BINDEP	-0.9883*	-0.9464***	-0.2260	-0.3478**	-0.5149
	(0.5154)	(0.2781)	(0.1654)	(0.1716)	(0.5472)
DUAL	-0.2438	-0.1942*	0.0399	-0.0226	-0.0969
	(0.2191)	(0.0977)	(0.0529)	(0.0861)	(0.2120)
CHAIR	-0.1170	-0.0673	-0.0712*	-0.1098***	-0.3304***
	(0.1188)	(0.0631)	(0.0367)	(0.0376)	(0.1061)
CONSTANT	-25.2913***	-6.7148	-8.1281***	-8.2088***	-18.3377***
	(8.1412)	(7.3072)	(1.7126)	(2.6093)	(5.3081)
Year	Yes	No	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
N	10,664	10,664	10,664	10,664	10,664
R^2/Pseudo R^2	0.6250	0.5800	0.1899	0.3816	0.5208

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the baseline liquidity model (3.2) where the dependent variable is *CPQS*, but replace the key independent variable of number of shareholders (ln *NSH*) with shareholding size (ln *SHSIZE*). For brevity, year and industry dummies are suppressed. Entries in parentheses are standard errors, with pooled OLS the double-clustered standard errors. *N* denotes the number of observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively

4.6 Summary of Empirical Results

This empirical chapter examines the relationship between the number of shareholders and liquidity using data for all non-financial firms listed on Bursa Malaysia over the sample period of 2000-2015. The prevailing view among corporate managers and stock exchange regulators is that more shareholders are associated with higher liquidity for the traded stocks. The limited empirical studies from U.S. also provide direct evidence on the negative relationship between the number of shareholders and the bid-ask spreads (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). The preliminary analysis in this chapter first estimates a similar model and finds consistent result of a positive linear relationship between the number of shareholders and liquidity. This linear relationship is robust to different illiquidity proxies, namely *CPQS* (Table 4.3), *CPQSIM* (Table 4.6) and *ILLIQ* (Table 4.6).

However, assuming a linear relationship implicitly ignores the possibility of a negative liquidity effect that is predicted to kick in only when the number of shareholders becomes too large. Motivated by this theoretical prediction, this thesis hypothesizes a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms. Thus, the liquidity model is augmented with the addition of the squared term for the number of shareholders. This baseline model is estimated using pooled OLS, with the standard errors adjusted for the possible existence of within-cluster correlation. The baseline results show that the first-order ln *NSH* is negative and highly significant at the 1% level. The squared term, on the other hand, is positively and significantly associated with *CPQS*. The statistically significant coefficients with opposite signs for ln *NSH* and ln NSH^2 imply a nonlinear relationship between the number of shareholders and liquidity. It is important to highlight that this nonlinear relationship is robust across all adjustments of standard errors.

Further robustness checks strongly support hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. These robustness checks include alternative shareholder base measure (Table 4.5), alternative liquidity measures of *CPQS* Impact and Amihud illiquidity ratio (Table 4.6), alternative estimation methods of Fama-MacBeth two-step regression and quantile regression at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the liquidity conditional distribution (Table 4.7), formal statistical test for U-shape (Table 4.8), excluding the crisis years of 2008-2009 (Table 4.9), industry-specific regressions for all industries (Table 4.10), seven different investor types (Table 4.11) and endogeneity tests using lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step system GMM (Table 4.12). It is important to note that the inclusion of three ownership variables (*LIND*, *LINST* and *BLOCK*) in the liquidity model does not subsume the explanatory power of shareholder base in all analyses. This suggests that the number of shareholders represents distinct dimension of shareholdings that should not be ignored in future specification of liquidity model.

Despite the strong support for hypothesis H_1, there are two exceptions. First, when liquidity is measured as the price impact of trade using *CPQS* Impact and Amihud illiquidity ratio, Table 4.6 shows that there is no evidence to support hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. Instead, their relationship is at best linear. Putting the results into perspective, when liquidity is proxied by *CPQS*, bid-ask spread becomes broader when the number of shareholders exceeds the threshold level as reported in Table 4.4. However, Table 4.6 shows that there is no such upper limit imposed when liquidity is proxied by price impact measures, since a larger number of shareholders is associated monotonically with lower price impact. This implies that shareholder-boosting strategies do not pose greater adverse selection risks to liquidity providers. Thus, corporate managers and stock exchange regulators can pay exclusive attention to the negative effect of a very large shareholder base on the trading costs incurred by liquidity demanders. Second, in the four endogeneity tests, only the change-in-variable regression does not find evidence to support H_1, as Table 4.12 shows that both ln *NSH* and ln NSH^2 expressed in changes completely lose their explanatory power. This is more likely due to the nonlinear relationship between shareholder base and liquidity that exists over longer term.

The richness of the data allows this thesis to conduct further analyses to explore why liquidity declines when the number of shareholders becomes too large (Table 4.13 and Table 4.14), to assess the rationale of Malaysian stock exchange's priority in boosting retail participation (Table 4.15), and to determine the role of shareholding size in promoting liquidity (Table 4.16).

The key findings from these additional analyses can be summarized as follows. First, when ownership becomes too large, the negative effect of wider spreads begins to kick in. The extensive analysis in Table 4.13 using the theoretically grounded probability of information-based trading (*PIN*) reveals that the liquidity decline cannot be attributed to greater adverse selection costs imposed by informed trading. Instead, subsequent analysis in Table 4.14 provides support for the alternative explanation from noise trader models that the negative liquidity effect after the threshold level is due to higher volatility induced by noise trading. Second, further analysis is conducted on the liquidity role of individual investors, proxied by the number of local individuals (in natural logarithm), percentage of local individuals per total number of shareholders, and average number of shares per local individual (in natural logarithm). The first two proxies depict a U-shaped relationship with *CPQS* in Table 4.15, indicating that liquidity will decline when the firms have too many retail investors as their noise trading induces higher volatility. However, the last proxy exhibits an inverted-U shape relationship with *CPQS*, implying that the liquidity benefit will only kick in when the number of shares per local individual exceeds the minimum number shares. Third, further analysis is conducted to assess the explanatory power of a new variable of shareholding size (ln *SHSIZE*). Across all three estimation methods of pooled OLS, Fama-MacBeth and quantile regressions, ln *SHSIZE* exhibits an inverted U-shaped relationship with *CPQS*. This implies that the liquidity benefit will only kick in when the number of shares per account holder exceeds the threshold level. This evidence thus suggests the number of shares per account holder should also be taken into account when formulating liquidity-enhancing policies. Moreover, the explanatory power of shareholding size is not subsumed by percentage ownership variables.

CHAPTER 5

STOCK LIQUIDITY AND FIRM VALUE

This second empirical chapter examines the relationship between liquidity and firm value using data from Bursa Malaysia. Unlike previous studies that assume *a priori* the underlying relationship is positive, this thesis hypothesizes the existence of a nonlinear relationship between liquidity and firm value. This is because there are competing channels through which stock liquidity can affect the market valuations of firms (see Fang et al., 2009). The empirical results for hypothesis H_2 are discussed in this chapter, with the analyses structured as follows. Section 5.1 presents the descriptive statistics for the dependent variable of Tobin's *Q*, key independent variable of liquidity as proxied by the Closing Percent Quoted Spread (*CPQS*) and twelve standard control variables. The correlations of these variables are reported in the subsequent section so as to address the concern of multicollinearity plaguing the analyses. Section 5.3 then discusses the estimation results for the benchmark linear model and baseline quadratic model, with pooled Ordinary Least Squares (OLS) the key estimator. These baseline results are further subject to a series of robustness checks in Section 5.4, which include using alternative liquidity measures of stock liquidity (*CPQS* Impact and Amihud illiquidity ratio), alternative estimation methods (Fama-MacBeth 2-step regression and quantile regression), formal statistical test for U-shape, subsamples excluding the crisis years of 2008-2009, industry-specific regressions, and endogeneity tests (lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step system GMM). The causal relationship is further established through exogenous liquidity shock. Additional analysis is conducted to address the endogeneity of liquidity. The final section then concludes this chapter.

5.1 Descriptive Statistics

After specifying the model and sample selection in Chapter 3, data for all fourteen variables are collected for 1250 stocks traded on Bursa Malaysia. Table 5.1 presents the descriptive statistics for all the variables in the baseline quadratic model, with varying number of observations for each variable.

Turning to the key variable of interest, Tobin's *Q*, its mean value for Malaysian stocks is 1.1388, which is slightly lower than the average firm value of 1.170 reported by Huang et al. (2014) for 943 Malaysian firms over the sample period of 1996-2010. Relatively, the average Tobin's *Q* value for the developed U.S. market is higher, ranging from 1.8 to 2.0 (see Bharath et al., 2013; Dass et al., 2013; Fang et al., 2009). Nevertheless, an average *Q* value of greater than unity indicates that Malaysian public listed firms in general have incentives to make additional capital investment. This signals higher future growth opportunities.

The main proxy for stock liquidity is the Closing Percent Quoted Spread (*CPQS*) constructed by Chung and Zhang (2014), which has been found to be the best performing liquidity measure for Malaysian stocks by Fong et al. (2017). Table 5.1 shows that the average *CPQS* for the sample firms in this study is 5.3370. This is higher than the mean *CPQS* of 2.5 in Fong et al. (2017) for 960 Malaysian stocks over the sample period 1996–2007. Since *CPQS* is an inverse measure of liquidity, the higher value reported by this thesis indicates that the Malaysian stock market is becoming more illiquid, partly due to the inclusion of additional 290 firms (mostly delisted) and data after the global financial crisis.

The twelve control variables can be divided into two categories of firm characteristics and corporate governance. The former consist of firm size, firm age, financial leverage, sales growth, capital expenditures, stock return volatility, return on assets and index membership, with Table 5.1 provides their descriptive statistics in the original units of measurement, in which all the above eight variables exhibit great variations. To control for the effect of corporate governance, four variables are included – board size, board independence, CEO duality and independent chairman. The table shows that Malaysian public listed companies on average have 7 directors which can be considered as optimal size. Jensen (1993) recommends a board size of not more than 7 or 8 directors to ensure the board functions effectively. In terms of board independence, the Malaysian Code of Corporate Governance (2017) requires at least one-third of the board to be independent non-executive directors. The data suggest that this criterion has been met with an average ratio of 0.4258. However, using a stricter notion of board independence where the board chairman is an independent non-executive director, the percentage is relatively lower but still very encouraging. The mean value of 0.0449 for the dummy variable of CEO duality suggests the incidence of one person holding both positions of CEO and chairman is relatively low for Malaysian stocks.

5.2 Correlation Matrix

Table 5.2 provides the correlation matrix for the variables in the baseline quadratic model. The correlation between the explanatory variables and Tobin's *Q* provides a preliminary view of their univariate relationship. All the control variables have the expected relationship, with the sole exception of board independence *(BINDEP).* Larger, older and volatile stocks are associated with smaller firm value. In contrast, leverage, sales growth, capital expenditures, return on assets and index membership yield the expected positive relationship with firm value. Moving to corporate governance variables, larger board size along with the chairman is an independent non-executive director are associated with higher firm value. However, the common proxy of board independence used in the literature, the proportion of independent non-executive directors, yields a puzzling negative relationship. Last but not least, CEO duality is associated with smaller firm value. However, it remains to be determined whether these univariate relationships still hold in a multivariate framework.

Table 5.1: Descriptive Statistics for All the Variables (2000-2015)

	Mean	Median	Minimum	Maximum	Standard Deviation	*N*
Q	1.1388	0.9267	0.3923	5.6492	0.7796	13479
CPQS	5.3370	2.7051	0.4656	44.2728	7.2572	13827
SIZE	1050911	246614	7519	20700000	2794410	14464
AGE	21.6347	17.0000	0.0000	92.0000	17.4876	18655
LEV	0.2355	0.1872	0.0000	1.6470	0.2518	14441
SALES	13.5744	5.8350	-82.4100	351.3900	54.6952	13848
CAPEX	0.0403	0.0219	0.0000	0.2748	0.0509	14014
VOL	3.5105	2.9221	0.7429	13.7523	2.2864	14034
ROA	0.0271	0.0372	-0.5760	0.3113	0.1171	14393
KLCI#	0.0500					20161
BSIZE	7.4992	7.0000	4.0000	14.0000	2.0055	13941
BINDEP	0.4258	0.4000	0.1667	0.8000	0.1258	13941
DUAL#	0.0449					13941
CHAIR#	0.3391					13941

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the descriptive statistics for all the variables in the baseline quadratic model (3.4). Instead of taking natural logarithm, this study reports firm size (Ringgit Malaysia), firm age (year) and board size (number) in the original unit for ease of interpretation. All the continuous variables, with the exception of the three dummies (*KLCI*, *DUAL*, *CHAIR*), are winsorized at the 1st and 99th percentiles to reduce the influence of outliers. *N* denotes the number of firm-year observations.

Only the mean is reported for the dummy variables to indicate the proportion of observations that take the value of one.

Turning to the key variable of interest, *CPQS* is negatively correlated with Tobin's *Q*, consistent with the consensus in the empirical literature. This thesis, however, postulates that the liquidity-firm value relationship is nonlinear. The correlation coefficients between explanatory variables are within plausible ranges. This rules out the concern of collinearity plaguing the regression analysis.

Table 5.2: Correlation Matrix for All the Variables (2000-2015)

Variable	*Q*	*CPQS*	ln *SIZE*	ln *AGE*	*LEV*
Q	1.0000				
CPQS	-0.1069	1.0000			
ln *SIZE*	-0.0675	-0.4350	1.0000		
ln *AGE*	-0.0838	-0.0901	0.3450	1.0000	
LEV	0.0645	0.0719	0.1563	0.0336	1.0000
SALES	0.0415	-0.0726	0.0334	-0.0790	-0.0397
CAPEX	0.1083	-0.1153	0.0356	-0.1630	-0.0172
VOL	-0.0381	0.6782	-0.4638	-0.1486	0.2417
ROA	0.1402	-0.2760	0.2448	-0.0212	-0.3130
KLCI	0.1416	-0.1641	0.4486	0.1439	0.0236
ln *BSIZE*	0.0097	-0.1631	0.3295	0.0618	-0.0211
BINDEP	-0.0066	0.0558	-0.0361	0.1006	0.0065
DUAL	-0.0029	-0.0296	0.0462	0.0186	0.0037
CHAIR	0.0703	-0.0043	-0.0173	0.0136	-0.0039
	SALES	***CAPEX***	***VOL***	***ROA***	***KLCI***
SALES	1.0000				
CAPEX	0.0634	1.0000			
VOL	-0.0583	-0.1534	1.0000		
ROA	0.2000	0.1573	-0.4544	1.0000	
KLCI	-0.0111	0.0483	-0.1834	0.1218	1.0000
ln *BSIZE*	0.0250	0.0742	-0.2531	0.1643	0.1893
BINDEP	-0.0304	-0.0399	0.1013	-0.1187	-0.0593
DUAL	0.0032	0.0176	-0.0027	0.0016	0.0354
CHAIR	0.0039	0.0113	-0.0037	0.0129	-0.0088
	ln *BSIZE*	***BINDEP***	***DUAL***	***CHAIR***	
ln *BSIZE*	1.0000				
BINDEP	-0.3636	1.0000			
DUAL	-0.0725	0.0369	1.0000		
CHAIR	-0.0230	0.2162	-0.1570	1.0000	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the Pearson correlations between pairs of variables in the baseline quadratic model (3.4).

5.3 Nonlinear Relationship between Liquidity and Firm Value

This section presents evidence of a nonlinear relationship between liquidity and firm value for Malaysian public listed stocks. The pioneering paper by Fang et al. (2009) specifies a linear regression model with all contemporaneous variables. To accommodate the possibility of a nonlinear relationship in line with hypothesis H_2, their specification is extended by including a quadratic term for the liquidity variable. For comparison, the estimation results from pooled OLS are presented for both the linear and quadratic models, reproduced from equations (3.3) and (3.4), respectively:

Linear Model:

$$
\begin{aligned}
Q_{it} = {} & \beta_0 + \beta_1 CPQS_{it} + \beta_2 \ln SIZE_{it} + \beta_3 \ln AGE_{it} + \beta_4 LEV_{it} \\
& + \beta_5 SALES_{it} + \beta_6 CAPEX_{it} + \beta_7 VOL_{it} + \beta_8 ROA_{it} + \beta_9 KLCI_{it} \\
& + \beta_{10} \ln BSIZE_{it} + \beta_{11} BINDEP_{it} + \beta_{12} DUAL_{it} + \beta_{13} CHAIR_{it} \\
& + \sum_{j=1}^{J} \beta_{14j} IND_j + \sum_{t=1}^{T} \beta_{15t} YR_t + \varepsilon_{it}
\end{aligned}
$$

Quadratic Model:

$$
\begin{aligned}
Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\
& + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\
& + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} \\
& + \sum_{j=1}^{J} \delta_{15} IND_j + \sum_{t=1}^{T} \delta_{16} YR_t + \varepsilon_{it}
\end{aligned}
$$

5.3.1 Estimation Results for Linear Model

Following the pioneering work of Fang et al. (2009), a linear model (3.3) is specified and the results are presented in Table 5.3. To ensure valid statistical inferences for pooled OLS, all the regressions are estimated using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors since the precise form of within-cluster correlation is unknown. As demonstrated by Petersen (2009) and Gow et al. (2010), the OLS estimator produces biased standard errors when within-cluster correlations are not properly accounted for.

Table 5.3 shows that the coefficient of *CPQS* is negative and significant at the 1% level across all four adjustments of standard errors. Since *CPQS* is an inverse measure of liquidity, the significant result implies that higher stock liquidity correlates with larger firm value. This piece of evidence from the emerging Malaysian stock market further supports previous consensus in the literature on the value gains from higher liquidity.

These preliminary results are indicative that firms should pursue liquidity-enhancing policies (Bharath et al., 2013; Cheung et al., 2015; Dass et al., 2013; Fang et al., 2009; Huang et al., 2014; Jawed & Kotha, 2018; Li et al., 2012; Nguyen et al., 2016; Zhang et al., 2018).

Turning to the control variables in Table 5.3, only six regressors are statistically significant across all the four robust standard errors. The first variable is firm size, proxied by the natural logarithm of book value of total assets. Its negative coefficient suggests that larger Malaysian firms on average report lower firm value. This could be due to operational inefficiencies and costlier monitoring. The above interpretation is in line with Fama and French (1992) and Lang and Stulz (1994). Second, leverage ratio, computed as the ratio of book value of debts over the book value of assets, is positively and significantly associated with Tobin's *Q* at the 1% level. According to Jensen (1986), the positive relationship between leverage and firm value reflects the disciplinary benefits of using more debt. This is because corporate managers are forced to achieve organizational efficiency and thus generate high cash flow to repay debt and interest commitments. Modigliani and Miller (1963) instead attribute the value gains to tax savings of debt obligations. Third, the ratio of capital expenditures over the book value of assets is positively and significantly associated with firm value. This is because investors value highly those firms that invest in long-term investment projects for future growth. Fourth, profitability as reflected by higher return on assets effectively translates into larger market valuations. Fifth, membership in the main index of the Malaysian stock market is value-enhancing. This is because it improves firm visibility and attracts investors' attention. Merton (1987) argues that, in the presence of high information costs, investors are more likely to hold stocks they are familiar. Last but not least, the new dummy variable of *CHAIR*, which takes a value of one if the board chairman is an independent non-executive director, is the only significant corporate governance variable that correlates positively with firm value. In contrast, the explanatory power of the widely used empirical proxies – ln *BSIZE*, *BINDEP* and *DUAL* – have largely been subsumed and become insignificant. This implies that having a larger board size, more independent non-executive directors, and separate CEO and board chairman are no longer sufficient. Instead, a more stringent corporate governance code might be needed for Malaysian publicly listed firms to deliver higher market valuations.

5.3.2 Estimation Results for Quadratic Model

As a benchmark, the previous section estimates a linear model and finds consistent results with the existing literature that stock liquidity and firm value are positively related. However, this thesis argues it is rather strong to assume the relationship is confined to a linear form because the underlying forces are competing with opposing effects. Table 5.4 presents the estimation results for the baseline quadratic model (3.4) in which the squared term of liquidity is added to the linear model. All regressions are estimated using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors to accommodate the possible existence of within-cluster correlation. The results for the control variables are consistent with Table 5.3. Only six regressors are statistically significant across all the four robust standard errors– firm size, leverage, capital expenditures, return on asset, index membership, and chairman being independent non-executive director. In brief, higher firm value is associated with smaller firm size, higher leverage ratio, larger expenditure on capital investment, higher return on asset, inclusion in major stock index and having independent non-executive chairman on the board.

For the key variable of liquidity, the first-order *CPQS* is negative and highly significant at the l% level. The squared term, on the other hand, is positively and significantly associated with Tobin's *Q*. The statistically significant coefficients with opposite signs for *CPQS* and $CPQS^2$ imply a nonlinear relationship between liquidity and firm value. It is important to highlight that this nonlinear relationship is robust across all four adjustments of standard errors. This strongly supports hypothesis H_2 and challenges the widely documented positive linear relationship between liquidity and firm value.

Table 5.3: Linear Relationship between Liquidity and Firm Value (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQS	-0.0145***	-0.0145***	-0.0145***	-0.0145***
	(0.0014)	(0.0020)	(0.0028)	(0.0032)
ln *SIZE*	-0.1431***	-0.1431***	-0.1431***	-0.1431***
	(0.0096)	(0.0206)	(0.0210)	(0.0278)
ln *AGE*	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0107)	(0.0260)	(0.0146)	(0.0278)
LEV	0.6714***	0.6714***	0.6714***	0.6714***
	(0.0609)	(0.0964)	(0.1029)	(0.1271)
SALES	-0.000004	-0.000004	-0.000004	-0.000004
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.8014***	0.8014***	0.8014***	0.8014***
	(0.1445)	(0.2501)	(0.2030)	(0.2879)
VOL	0.0109**	0.0109	0.0109	0.0109
	(0.0054)	(0.0075)	(0.0086)	(0.0101)
ROA	1.5406***	1.5406***	1.5406***	1.5406***
	(0.1451)	(0.3108)	(0.2530)	(0.3736)
KLCI	0.5756***	0.5756***	0.5756***	0.5756***
	(0.0367)	(0.0958)	(0.0451)	(0.0993)
ln *BSIZE*	0.0649**	0.0649	0.0649	0.0649
	(0.0272)	(0.0486)	(0.0417)	(0.0581)
BINDEP	0.0521	0.0521	0.0521	0.0521
	(0.0605)	(0.1072)	(0.0407)	(0.0975)
DUAL	-0.0417	-0.0417	-0.0417	-0.0417
	(0.0257)	(0.0484)	(0.0278)	(0.0496)
CHAIR	0.0744***	0.0744**	0.0744***	0.0744**
	(0.0142)	(0.0338)	(0.0110)	(0.0326)
CONSTANT	2.5617***	2.5617***	2.5617***	2.5617***
	(0.1446)	(0.2793)	(0.3180)	(0.3978)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349
Adj. R^2	0.1684	0.1684	0.1684	0.1684

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for linear model (3.3) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. Following Petersen (2009), the analysis accommodates the possible existence of within-cluster correlation by estimating all regressions using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors as reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5.4: Nonlinear Relationship between Liquidity and Firm Value (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQS	-0.0677***	-0.0677***	-0.0677***	-0.0677***
	(0.0032)	(0.0051)	(0.0060)	(0.0072)
$CPQS^2$	0.0014***	0.0014***	0.0014***	0.0014***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
ln *SIZE*	-0.1824***	-0.1824***	-0.1824***	-0.1824***
	(0.0100)	(0.0214)	(0.0189)	(0.0268)
ln *AGE*	0.0061	0.0061	0.0061	0.0061
	(0.0106)	(0.0257)	(0.0143)	(0.0274)
LEV	0.7115***	0.7115***	0.7115***	0.7115***
	(0.0582)	(0.0929)	(0.0982)	(0.1220)
SALES	-0.00004	-0.00004	-0.00004	-0.00004
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5964***	0.5964**	0.5964***	0.5964**
	(0.1425)	(0.2485)	(0.1900)	(0.2785)
VOL	0.0154***	0.0154**	0.0154	0.0154
	(0.0053)	(0.0076)	(0.0096)	(0.0110)
ROA	1.4343***	1.4343***	1.4343***	1.4343***
	(0.1401)	(0.3014)	(0.2275)	(0.3507)
KLCI	0.5660***	0.5660***	0.5660***	0.5660***
	(0.0364)	(0.0953)	(0.0487)	(0.1006)
ln *BSIZE*	0.0679**	0.0679	0.0679	0.0679
	(0.0266)	(0.0472)	(0.0399)	(0.0558)
BINDEP	-0.0086	-0.0086	-0.0086	-0.0086
	(0.0588)	(0.1046)	(0.0415)	(0.0959)
DUAL	-0.0400	-0.0400	-0.0400	-0.0400
	(0.0248)	(0.0474)	(0.0264)	(0.0483)
CHAIR	0.0682***	0.0682**	0.0682***	0.0682**
	(0.0139)	(0.0331)	(0.0110)	(0.0319)
CONSTANT	3.1606***	3.1606***	3.1606***	3.1606***
	(0.1484)	(0.2893)	(0.2816)	(0.3755)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349
Adj. R^2	0.1987	0.1987	0.1987	0.1987

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. Following Petersen (2009), the analysis accommodates the possible existence of within-cluster correlation by estimating all regressions using White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors as reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The finding of a U-shape curve between *CPQS* and Tobin's *Q* suggests that when liquidity is at lower levels, liquidity and firm value are negatively related. However, the relationship turns positive when liquidity increases and exceeds a certain threshold level.[28] This occurs because the negative effect of liquidity on firm value dominates at lower levels of liquidity. The positive effect only becomes dominant at higher levels of liquidity. In other words, the evidence suggests the firm value benefit can only be attained after firms reach a high level of liquidity. This also explains why not all firms pursue liquidity-enhancing policies despite the obvious valuation premium. This is because the potential costs of maintaining high level of liquidity might outweigh the associated benefits. The empirical result also highlights the importance of functional form, showing that a linear model might yield imprecise inferences when the relationship is driven by competing channels with opposing effects.

5.4 Robustness Checks

In this section, a series of robustness checks are performed to ensure the reliability of the statistical inferences drawn from the baseline quadratic model (3.4). First, the re-estimation uses two alternative liquidity measures, namely the *CPQS* Impact and Amihud (2002) illiquidity ratio. Second, the baseline model is re-estimated using alternative estimation methods, namely the Fama-MacBeth 2-step regression and quantile regression. Third, the U-shape relationship between illiquidity measures and firm value is re-examined using a formal U-test proposed by Lind and Mehlum (2010). Fourth, the re-estimation excludes the years of 2008-2009 global financial crisis. Fifth, the baseline quadratic model is estimated for all industry sectors with firm-year observations more than 100. Sixth, the concern of endogeneity is addressed in four ways, namely lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step

[28] The threshold liquidity level can be computed using the estimated coefficients of *CPQS* and $CPQS^2$ in the baseline quadratic model (3.4), i.e., $-\gamma_1/2\gamma_2$, which yields a value of 24.1786.

system GMM. Last but not least, an exogenous event is selected to establish the causal relationship from liquidity to firm value, and the endogeneity of liquidity is addressing the predicted value of *CPQS.*

5.4.1 Alternative Liquidity Measures

The "Closing Percent Quoted Spread" (*CPQS*) is selected as the main liquidity measure in the baseline quadratic model (3.4) because it is the best performing percent-cost proxy for Malaysian stocks (see Fong et al., 2017). Moreover, it captures an important dimension of liquidity: the transaction cost incurred by investors to trade immediately. Another liquidity dimension that is widely considered in the literature, however, is the price impact of trade. The Amihud (2002) illiquidity ratio is accepted as the standard proxy of price impact in the empirical finance research (see Lou & Shu, 2017). However, for Malaysian stocks, the horserace conducted by Fong et al. (2017) finds that the price impact version of *CPQS* performs best at the monthly frequency, and as well as the Amihud illiquidity ratio at the daily interval. The first robustness check is to determine whether the liquidity-firm value relationship still holds when liquidity is measured as the price impact of trade.

This section considers two price impact measures: (1) *CPQS* Impact (hereafter referred to as *CPQSIM*), which is the daily ratio of the *CPQS* scaled by local currency trading volume; and (2) Amihud illiquidity ratio (hereafter referred to as *ILLIQ*), which is computed as the daily ratio of the absolute stock returns to the local currency trading volume. In both cases, the annual liquidity estimates for each stock are obtained by averaging the computed daily ratios across all trading days for each calendar year. Since the Amihud illiquidity ratio is highly skewed, this study follows the literature in taking natural logarithm of one plus *ILLIQ* x 10^6. The same approach is applied for *CPQS* Impact by taking natural logarithm of one plus *CPQSIM* x 10^4. Again, these two price impact proxies are inverse measures of liquidity, where higher values indicate greater degree of illiquidity. The required daily data for computing *CPQSIM* and *ILLIQ* are all sourced from Thomson Datastream.

Table 5.5 presents the pooled OLS estimation results for the baseline quadratic model (3.4) but replaces *CPQS* with *CPQSIM* as the liquidity proxy. The first-order *CPQSIM* is negative and highly significant at the l% level. The squared term is positively and significantly associated with Tobin's *Q*. This implies a nonlinear relationship between liquidity and firm value, and it is robust across all four adjustments of standard errors. This supports the baseline results and hypothesis H_2 that the relationship between liquidity and firm value is nonlinear. As for the control variables, firm size, leverage, return on asset, stock index membership and chairman being independent non-executive director are still statistically significant. Only the variable of capital expenditure loses its explanatory power when *CPQS* Impact is used as the liquidity proxy.

Table 5.6 presents the pooled OLS estimation results for the baseline quadratic model but replaces *CPQS* with the Amihud illiquidity ratio as the liquidity proxy. The first-order *ILLIQ* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. This nonlinear relationship between liquidity and firm value is robust across all four adjustments of standard errors. Again, firm size, leverage, return on asset, stock index membership and chairman being independent non-executive director are still statistically significant. The variable of capital expenditure loses its explanatory power, but return volatility becomes significant.

Table 5.5: Robustness Check with *CPQS* Impact (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQSIM	-0.3131***	-0.3131***	-0.3131***	-0.3131***
	(0.0128)	(0.0244)	(0.0141)	(0.0251)
CPQSIM ^{2}	0.0255***	0.0255***	0.0255***	0.0255***
	(0.0016)	(0.0027)	(0.0020)	(0.0030)
ln *SIZE*	-0.2607***	-0.2607***	-0.2607***	-0.2607***
	(0.0113)	(0.0235)	(0.0172)	(0.0268)
ln *AGE*	0.0157	0.0157	0.0157	0.0157
	(0.0102)	(0.0237)	(0.0120)	(0.0245)
LEV	0.7334***	0.7334***	0.7334***	0.7334***
	(0.0578)	(0.0921)	(0.0880)	(0.1136)
SALES	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
CAPEX	0.3442**	0.3442	0.3442*	0.3442
	(0.1413)	(0.2451)	(0.1835)	(0.2717)
VOL	-0.0134**	-0.0134*	-0.0134*	-0.0134
	(0.0061)	(0.0078)	(0.0076)	(0.0090)
ROA	1.4784***	1.4784***	1.4784***	1.4784***
	(0.1354)	(0.2915)	(0.1714)	(0.3099)
KLCI	0.4300***	0.4300***	0.4300***	0.4300***
	(0.0340)	(0.0845)	(0.0538)	(0.0942)
ln *BSIZE*	0.0523**	0.0523	0.0523	0.0523
	(0.0261)	(0.0453)	(0.0384)	(0.0534)
BINDEP	-0.1246**	-0.1246	-0.1246***	-0.1246
	(0.0571)	(0.0978)	(0.0403)	(0.0890)
DUAL	-0.0333	-0.0333	-0.0333	-0.0333
	(0.0241)	(0.0451)	(0.0282)	(0.0474)
CHAIR	0.0636***	0.0636**	0.0636***	0.0636**
	(0.0137)	(0.0317)	(0.0085)	(0.0298)
CONSTANT	4.1825***	4.1825***	4.1825***	4.1825***
	(0.1654)	(0.3187)	(0.2480)	(0.3684)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	11,650	11,650	11,650	11,650
Adj. R^2	0.2719	0.2719	0.2719	0.2719

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with *CPQS* Impact (*CPQSIM*). For brevity, year and industry dummies are suppressed. White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors are reported in parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5.6: Robustness Check with Amihud (2002) Illiquidity Ratio (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
ILLIQ	-0.3948***	-0.3948***	-0.3948***	-0.3948***
	(0.0151)	(0.0311)	(0.0161)	(0.0316)
$ILLIQ^2$	0.0259***	0.0259***	0.0259***	0.0259***
	(0.0014)	(0.0028)	(0.0016)	(0.0029)
ln *SIZE*	-0.3005***	-0.3005***	-0.3005***	-0.3005***
	(0.0114)	(0.0236)	(0.0177)	(0.0272)
ln *AGE*	0.0176*	0.0176	0.0176	0.0176
	(0.0099)	(0.0225)	(0.0139)	(0.0245)
LEV	0.8135***	0.8135***	0.8135***	0.8135***
	(0.0584)	(0.0910)	(0.1078)	(0.1285)
SALES	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.2618*	0.2618	0.2618	0.2618
	(0.1404)	(0.2363)	(0.1937)	(0.2714)
VOL	-0.0187***	-0.0187***	-0.0187**	-0.0187**
	(0.0057)	(0.0072)	(0.0068)	(0.0081)
ROA	1.2828***	1.2828***	1.2828***	1.2828***
	(0.1321)	(0.2736)	(0.2042)	(0.3148)
KLCI	0.3579***	0.3579***	0.3579***	0.3579***
	(0.0333)	(0.0777)	(0.0421)	(0.0819)
ln *BSIZE*	0.0448*	0.0448	0.0448	0.0448
	(0.0254)	(0.0457)	(0.0338)	(0.0508)
BINDEP	-0.0848	-0.0848	-0.0848**	-0.0848
	(0.0564)	(0.0964)	(0.0355)	(0.0859)
DUAL	-0.0300	-0.0300	-0.0300	-0.0300
	(0.0235)	(0.0433)	(0.0276)	(0.0457)
CHAIR	0.0614***	0.0614**	0.0614***	0.0614**
	(0.0133)	(0.0311)	(0.0110)	(0.0302)
CONSTANT	5.7996***	5.7996***	5.7996***	5.7996***
	(0.2045)	(0.3833)	(0.2988)	(0.4409)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	11,794	11,794	11,794	11,794
Adj. R^2	0.3072	0.3072	0.3072	0.3072

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with Amihud (2002) illiquidity ratio (*ILLIQ*). For brevity, year and industry dummies are suppressed. White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors are reported in parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

To summarize, the nonlinear relationship between liquidity and firm value is robust to alternative liquidity measures of *CPQS* Impact and the Amihud illiquidity ratio. This suggests that strategies aimed at lowering transaction cost and price impact are of equal importance in delivering higher firm value. However, the value gains will only be realized when liquidity exceeds their respective threshold levels. Among the firm characteristics, the consistent results from Tables 5.4–5.6 show that Tobin's *Q* is higher for firms with fewer total assets, more leverage, larger return on assets, and greater visibility with index membership. In terms of board characteristics, Tables 5.4–5.6 again present a consistent result in which only the dummy variable of *CHAIR* is highly significant with positive coefficient. This suggests having a larger board size, more independent non-executive directors, and separate CEO and board chairman are not sufficient to reap value gains. Instead, a more stringent corporate governance code might be needed for Malaysian public listed firms to deliver higher market valuations.

5.4.2 Alternative Estimation Methods

The baseline quadratic model (3.4) is estimated using the pooled OLS with the standard errors adjusted to account for the possible existence of within-cluster correlation. As a robustness check, the baseline model is re-estimated using Fama-MacBeth two-step regression and quantile regression. The first estimator is designed to pick up cross-sectional effects. The procedure involves estimating cross-sectional regression for each year separately, and then inferences are drawn from the time-series averages of the estimated coefficients. Second, the quantile regression is developed by Koenker and Bassett (1978). It examines the effects of liquidity along the entire range of the firm value conditional distribution especially at the extreme upper and lower tails (for a survey, see Koenker & Hallock, 2001). The quantile regression overcomes the shortcomings of OLS regression that estimates the conditional mean effect of liquidity on firm value, and the potential bias arises from the non-normality of the dependent variable.

Table 5.7 presents the regression results for the baseline quadratic model using these two alternative estimation methods. In the first column using Fama-MacBeth regression, the first-order *CPQS* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. This again supports the nonlinear relationship between liquidity and firm value. In terms of the control variables, the six significant regressors in the baseline model using pooled OLS (firm size, leverage, capital expenditures, return on asset, stock index membership, and chairman being independent non-executive director) are still highly significant in Table 5.7. The only exception is board size now becomes statistically significant at the 5% level with a positive coefficient.

The next five columns in Table 5.7 present the quantile regression estimates at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the firm value conditional distribution. Across the five representative quantiles, the first-order *CPQS* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. This suggests the widespread influence of liquidity on all firms. However, the magnitudes of the coefficients gradually increase when moving from lower to higher firm value quantiles. This indicates that the effect of liquidity is more pronounced for firms with higher Tobin's *Q*. The result is consistent with earlier interpretation that the value benefits can only be attained when liquidity is high and exceeds a certain threshold level.

In terms of the control variables, the six significant regressors in the baseline model using pooled OLS (firm size, leverage, capital expenditures, return on asset, stock index membership, and chairman being independent non-executive director) are still highly significant in Table 5.7 across all five representative quantiles. This suggests the widespread influence of these six variables on all firms. On the other hand, four variables that have been found to be insignificant in the baseline OLS regression are now becoming statistically significant in the quantile regression. First, firm age is statistically significant at the 0.10^{th}, 0.25^{th}, 0.50^{th} and 0.75^{th} quantiles. The negative coefficient suggests that older firms are associated with lower firm value. Second, annual sales growth is positively and significantly associated with Tobin's *Q* at the 0.10^{th}, 0.25^{th}, 0.50^{th} and 0.75^{th} quantiles. Third, return volatility is statistically significant at certain quantiles but the sign changes from negative to positive at higher quantiles. Fourth, board size is positively and statistically significant across all five quantiles. Thus, while these four variables (firm age, annual sales growth, return volatility and board size) appear unimportant for average firms, they are significant determinants for firms located at different quantiles of the Tobin's *Q* distribution.

To visualize the effects for all quantiles, Figure 5.1 plots the coefficients for all regressors with their corresponding 95% confidence intervals against the entire conditional distribution of Tobin's *Q*. It is clear that the magnitudes of the coefficients for all variables vary across the firm value distribution. In the case of *CPQS*, the magnitudes of the coefficients gradually increase when moving from lower to higher firm value quantiles. On the other hand, the estimates for $CPQS^2$ exhibit an upward trend. Figure 5.1 shows that the coefficients for *CPQS* and $CPQS^2$ are statistically significant across the entire conditional distribution of Tobin's *Q* given that their corresponding 95% confidence intervals do not overlap with the zero value. This provides strong evidence to support the baseline pooled OLS results and hypothesis H_2 that the relationship between liquidity and firm value is nonlinear.

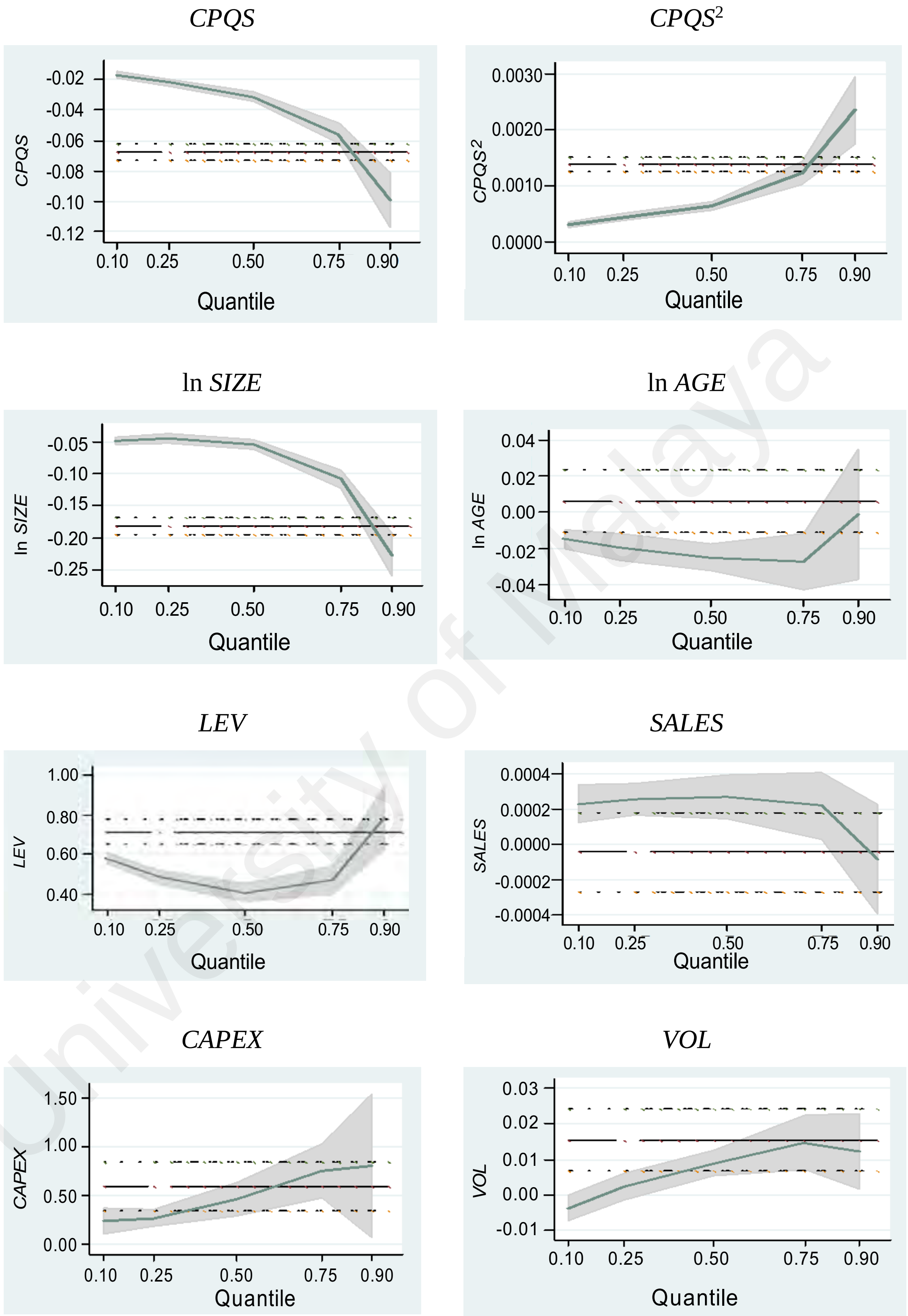
Table 5.7: Robustness Check with Alternative Estimation Methods (2000-2015)

	Fama-MacBeth	Quantile Regression				
		10th	25th	50th	75th	90th
CPQS	-0.0754***	-0.0167***	-0.0218***	-0.0310***	-0.0554***	-0.0990***
	(0.0071)	(0.0012)	(0.0012)	(0.0017)	(0.0029)	(0.0071)
CPQS^2	0.0021***	0.0003***	0.0004***	0.0006***	0.0012***	0.0024***
	(0.0003)	(0.00003)	(0.00002)	(0.00004)	(0.0001)	(0.0002)
ln *SIZE*	-0.1956***	-0.0488***	-0.0451***	-0.0543***	-0.1082***	-0.2270***
	(0.0205)	(0.0039)	(0.0041)	(0.0046)	(0.0068)	(0.0182)
ln *AGE*	0.0154	-0.0149***	-0.0193***	-0.0250***	-0.0275***	-0.0012
	(0.0156)	(0.0036)	(0.0040)	(0.0059)	(0.0091)	(0.0211)
LEV	0.5286***	0.5816***	0.4843***	0.4055***	0.4687***	0.7800***
	(0.0786)	(0.0141)	(0.0165)	(0.0248)	(0.0502)	(0.1025)
SALES	-0.0001	0.0002***	0.0003***	0.0003***	0.0002*	-0.0001
	(0.0001)	(0.00005)	(0.00004)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5432**	0.2378***	0.2719***	0.4669***	0.7568***	0.8074***
	(0.2119)	(0.0467)	(0.0464)	(0.0870)	(0.1674)	(0.2192)
VOL	0.0174	-0.0036**	0.0023	0.0090***	0.0148***	0.0123
	(0.0103)	(0.0016)	(0.0020)	(0.0035)	(0.0052)	(0.0084)
ROA	1.4425***	0.5357***	0.6096***	0.6775***	0.8280***	1.4777***
	(0.2251)	(0.0576)	(0.0618)	(0.0651)	(0.1138)	(0.1602)
KLCI	0.7616***	0.1057***	0.1371***	0.2314***	0.5216***	0.9876***
	(0.0712)	(0.0124)	(0.0131)	(0.0199)	(0.0366)	(0.1192)
ln *BSIZE*	0.0924**	0.0561***	0.0602***	0.0502***	0.0843***	0.0962*
	(0.0343)	(0.0087)	(0.0108)	(0.0150)	(0.0269)	(0.0537)
BINDEP	0.0337	-0.0231	-0.0509**	-0.0433	0.0019	0.1188
	(0.0356)	(0.0261)	(0.0238)	(0.0277)	(0.0528)	(0.1354)
DUAL	-0.0352	-0.0304*	-0.0195	0.0071	0.0118	-0.0333
	(0.0276)	(0.0163)	(0.0154)	(0.0138)	(0.0221)	(0.0614)
CHAIR	0.0627***	0.0135***	0.0147***	0.0132*	0.0629***	0.1254***
	(0.0158)	(0.0038)	(0.0056)	(0.0070)	(0.0152)	(0.0318)
CONSTANT	3.1802***	1.2285***	1.2502***	1.5238***	2.2858***	3.8612***
	(0.3733)	(0.0747)	(0.0828)	(0.0912)	(0.1345)	(0.3239)
Year	No	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349	12,349	12,349
R^2/Pseudo R^2	0.2795	0.1514	0.1177	0.0957	0.1177	0.1690

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces pooled OLS estimator with Fama-MacBeth two-step regression and quantile regression. For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

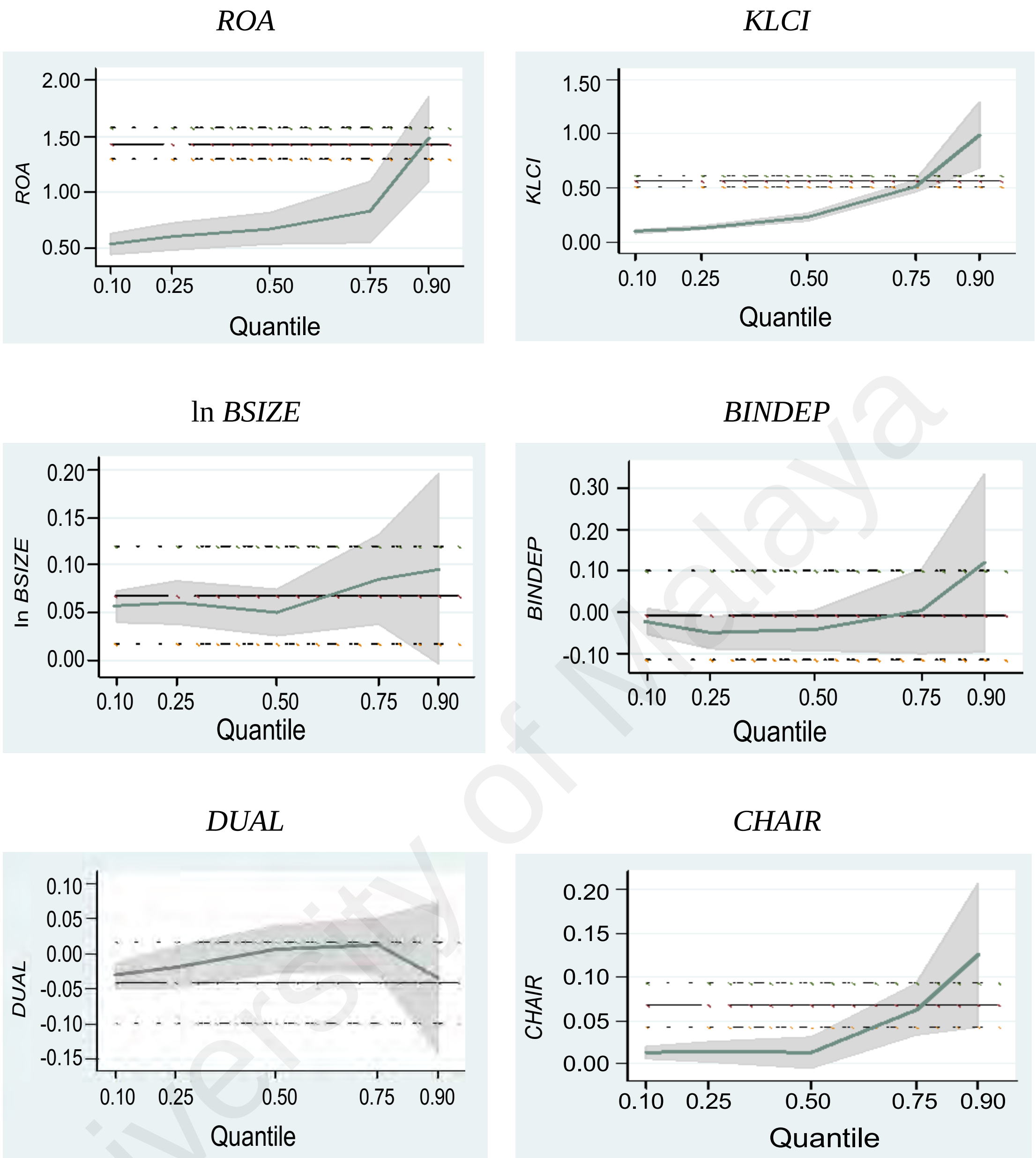
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Figure 5.1: Graphical Plots of Quantile Regression Estimates



Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This figure presents the quantile regression results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The plots depict the coefficients for all regressors in the baseline quadratic model with their corresponding 95% confidence intervals against the entire conditional distribution of Tobin's *Q*.

Figure 5.1: Graphical Plots of Quantile Regression Estimates (Continued)



Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This figure presents the quantile regression results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The plots depict the coefficients for all regressors in the baseline quadratic model with their corresponding 95% confidence intervals against the entire conditional distribution of Tobin's *Q*.

Figure 5.1 also provides useful insights on the effects of the control variables. It can be concluded that firm size (ln *SIZE*), leverage (*LEV*), capital expenditures (*CAPEX*), return on assets (*ROA*), stock index membership (*KLCI*) and independent non-executive chairman (*CHAIR*) are crucial drivers for the firm value of Malaysian stocks. This is because they are highly significant across three different estimation methods – pooled

OLS, Fama-MacBeth regression and quantile analysis. Moreover, they are significant across all four adjustments of standard errors (White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors) and the entire conditional distribution of Tobin's *Q*.

5.4.3 Confirming the U-Shape Relationship

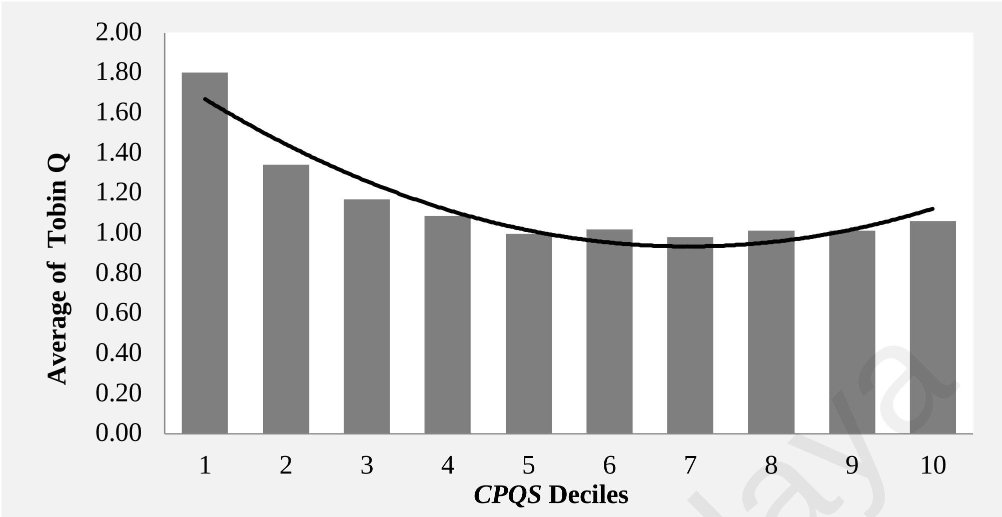
The estimation results for the quadratic model support hypothesis H_2 that stock liquidity and firm value are nonlinearly associated, with the signs consistent with a U-shape relationship. This section confirms the U-shape relationship through graphical plots and a formal U-test proposed by Lind and Mehlum (2010).

To plot the relationship between liquidity and firm value, the entire firm-year observations are sorted from lowest to highest based on liquidity estimates, and then partitioned into deciles labelled from 1 to 10. Decile 1 contains the smallest *CPQS* values, whereas decile 10 has the highest *CPQS* estimates. In each liquidity decile, the mean value of the Tobin's *Q* is computed. Figure 5.2 then plots the mean Tobin's *Q* values against the liquidity deciles, from lowest to highest. It is obvious from the graphical plots that all three liquidity measures (*CPQS*, Amihud illiquidity ratio and *CPQS* Impact) exhibit a U-shape curve. This univariate evidence provides further support to hypothesis H_2.

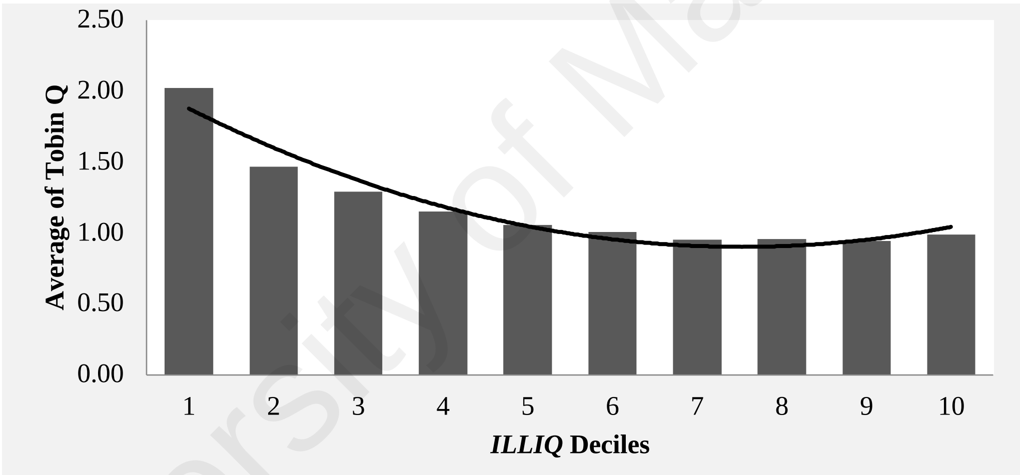
Next, the formal U-test proposed by Lind and Mehlum (2010) is applied on the data. These authors not only propose a formal U-test that gives the exact necessary and sufficient conditions in finite samples, but also the confidence intervals for the threshold point. Table 5.8 presents the results of the formal U-test, which is a joint test on the two null hypotheses of an inverted-U or monotone relationship. To ensure robustness, the U-test is applied on all three liquidity measures – *CPQS*, *CPQS* Impact and Amihud illiquidity ratio.

Figure 5.2: Tobin's *Q* across Stock Liquidity Deciles

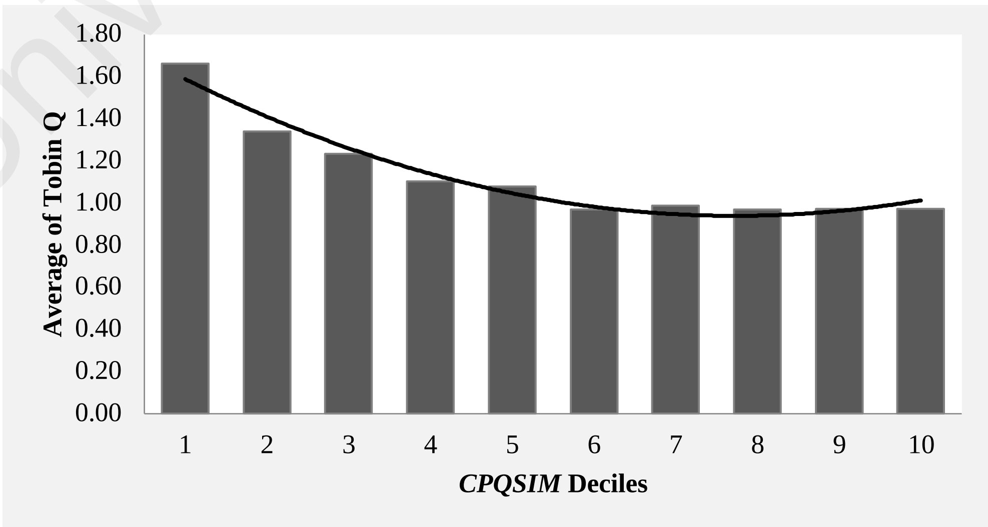
Panel A: Closing Percent Quoted Spread (*CPQS*)



Panel B: Amihud Illiquid Ratio (*ILLIQ*)



Panel C: Closing Percent Quoted Spread Impact (*CPQSIM*)



Notes: This figure provides graphical plots of the mean Tobin's *Q* values against liquidity deciles, in which decile 1 contains the smallest *CPQS* values, whereas decile 10 has the highest *CPQS* estimates.

For the main liquidity measure of *CPQS*, the test statistic rejects the combined null hypotheses at the 1% level of significance in favor of a U-shape relationship. The estimated threshold level for *CPQS* is 24.2458, with a 95% confidence intervals of [23.1709, 25.4700]. The threshold level computed from Table 5.4 for *CPQS* is 24.1786, which is close to the threshold provided by the U-test and falls within the 95% confidence intervals. The table also shows that the illiquidity-firm value curve has a negative and statistically significant slope before the threshold level (lower bound). After the threshold level (upper bound), the illiquidity-firm value curve becomes positive. This statistical evidence provides further support to hypothesis H_2 that the relationship between liquidity and firm value is nonlinear.

For the alternative liquidity measure of *CPQS* Impact, the test statistic rejects the combined null hypotheses at the 1% level of significance in favor of a U-shape relationship. The estimated threshold level for *CPQS* Impact is 6.1468, with a 95% confidence interval of [5.8440, 6.5195]. In the case of Amihud illiquidity ratio, the test statistic again rejects the combined null hypotheses at the 1% level of significance in favor of a U-shape relationship, with a threshold *ILLIQ* level of 7.6252. In both cases of *CPQSIM* and *ILLIQ*, the illiquidity-firm value curve has a negative and statistically significant slope before the threshold level (lower bound). After the threshold level (upper bound), the illiquidity-firm value curve becomes positive.

In summary, the graphical plots in Figure 5.2 and formal statistical evidence in Table 5.8 provide strong support to the baseline quadratic results and hypothesis H_2 that the relationship between liquidity and firm value is nonlinear. This evidence is robust across all three measures of *CPQS*, *CPQS* Impact and Amihud illiquidity ratio.

Table 5.8: Robustness Check with the Formal Statistical Test for U-Shape (2000-2015)

	CPQS	*CPQSIM*	*ILLIQ*
Slope at Lower Bound	-0.0664 (0.0000)	-0.3129 (0.0000)	-0.3948 (0.0000)
Slope at Upper Bound	0.0559 (0.0000)	0.1191 (0.0000)	0.1098 (0.0000)
Lind and Mehlum (2010) Test for U-Shape	12.98 (0.0000)	7.72 (0.0000)	7.64 (0.0000)
Threshold Point	24.2458	6.1468	7.6252
Fieller 95% Confidence Interval	[23.1709, 25.4700]	[5.8440, 6.5195]	[7.3167, 7.9960]

Notes: The definitions for *CPQS*, *CPQSIM* and *ILLIQ* are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the U-test on the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The U-test is a joint test on the two null hypotheses of an inverted-U or monotone relationship. Entries in parentheses indicate *p*-values.

5.4.4 Excluding the Crisis Years of 2008-2009

In an exclusive study on the Malaysian stock market, Liew et al. (2016) report a huge drop in the aggregate liquidity of the local bourse during the 2008-2009 global crisis. Anecdotal reports also suggest that the market valuations of Malaysian firms were severely affected by the crisis. To address this concern, the baseline quadratic model (3.4) is re-estimated using pooled OLS for three sub-periods: (i) 2000-2007 (before crisis); (ii) 2010-2015 (after crisis); (iii) 2000-2015 but excluding the crisis years of 2008-2009.

The first column of Table 5.9 shows that, for the pre-crisis period of 2000-2007, the first-order *CPQS* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. This nonlinear relationship still holds for the post-crisis period of 2010-2015. The last column then re-estimates the baseline quadratic model for the whole sample period of 2000-2015 but excludes the crisis years of 2008-2009. Again, both the *CPQS* and $CPQS^2$ are highly significant at the 1% level, with the signs unchanged. In summary, the three columns in Table 5.9 show that the nonlinear relationship is not driven by the global financial crisis.

Table 5.9: Robustness Check with the Exclusion of Crisis Years (2000-2015)

	2000-2007 (Before Crisis)	2010-2015 (After Crisis)	2000-2015 (Excludes 2008-2009)
CPQS	-0.1268***	-0.0850***	-0.1010***
	(0.0155)	(0.0091)	(0.0095)
$CPQS^2$	0.0054***	0.0020***	0.0030***
	(0.0007)	(0.0003)	(0.0003)
ln *SIZE*	-0.2690***	-0.1252***	-0.1955***
	(0.0346)	(0.0210)	(0.0278)
ln *AGE*	0.0285	0.0031	0.0142
	(0.0378)	(0.0286)	(0.0289)
LEV	0.8960***	0.1288	0.7625***
	(0.1004)	(0.1033)	(0.1302)
SALES	0.0002	-0.0005***	-0.0001
	(0.0002)	(0.0002)	(0.0002)
CAPEX	-0.0534	1.2103**	0.5462*
	(0.2369)	(0.4932)	(0.3042)
VOL	0.0068	0.0415***	0.0232*
	(0.0157)	(0.0113)	(0.0126)
ROA	1.4936***	2.0184***	1.6600***
	(0.3297)	(0.4189)	(0.3426)
KLCI	0.5820***	1.0598***	0.5823***
	(0.1093)	(0.1951)	(0.1161)
ln *BSIZE*	-0.0453	0.2316***	0.0486
	(0.0493)	(0.0750)	(0.0570)
BINDEP	0.0113	0.0080	-0.0357
	(0.1202)	(0.1342)	(0.0958)
DUAL	0.0202	-0.1352**	-0.0411
	(0.0722)	(0.0568)	(0.0523)
CHAIR	0.0402	0.1002***	0.0650**
	(0.0408)	(0.0367)	(0.0330)
CONSTANT	4.5108***	1.4806***	3.3944***
	(0.4331)	(0.2977)	(0.3891)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	5,887	4,704	10,591
Adj. R^2	0.2613	0.2768	0.2101

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* and the whole sample period is 2000-2015. For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

In terms of the control variables, only three of the six significant regressors in the baseline model using pooled OLS are not driven by the global financial crisis – firm size, return on asset and stock index membership. These three variables remain highly significant across the three columns in Table 5.9. Leverage is only significant in the pre-crisis period, whereas the variable of capital expenditures is significant in the post-crisis period. For the board characteristics, board size, CEO duality and chairman being independent non-executive director are only significant in the sub-period of 2010-2015. This suggests that the global financial crisis has made corporate governance an important driver of firm market valuations, which is consistent with the empirical findings reported by Fauver, Hung, Li and Taboada (2017) and Hooy and Hooy (2017).

5.4.5 Industry-Specific Regressions

The sample in this study consists of all non-financial firms that have been listed on Bursa Malaysia over the sample period of 2000-2015. Since the sample covers a large number of industries, it is possible that the significant baseline results from pooled sample might be the net effect of varying relationships across industries offsetting each other. Bursa Malaysia uses the following industry classifications: (1) Consumer Products; (2) Construction; (3) Closed-End Funds; (4) Exchange-Traded Funds; (5) Finance; (6) Hotels; (7) Industrial Products; (8) Infrastructure Project PLCs; (9) Mining; (10) Plantations; (11) Properties; (12) Real Estate Investment Trusts; (13) Special Purpose Acquisition Company; (14) Technology; (15) Trading/Services.

To address the above concern, the baseline quadratic model (3.4) is re-estimated using pooled OLS for each industry in the sample. Even though the original sample excludes financial sector, the re-estimation also runs a regression for this industry. However, to ensure sufficient sample size, those industries with less than 100 firm-year observations are excluded. Only nine industries meet this criterion, namely consumer products, construction, finance, industrial products, plantations, properties, real estate investment trusts, technology and trading/service.

Table 5.10: Liquidity-Firm Value Relationship by Industry (2000-2015)

	Consumer Products	Construction	Finance
CPQS	-0.0650***	-0.0472***	-0.0517
	(0.0117)	(0.0170)	(0.0416)
CPQS^2	0.0014***	0.0014***	0.0028
	(0.0002)	(0.0004)	(0.0025)
ln *SIZE*	-0.1746***	-0.1298***	-0.0719
	(0.0473)	(0.0410)	(0.0456)
ln *AGE*	0.1870***	-0.1467***	0.0766
	(0.0600)	(0.0486)	(0.0647)
LEV	0.8073***	0.8588***	0.1622
	(0.3065)	(0.2405)	(0.2509)
SALES	-0.0011**	0.0002	0.0007**
	(0.0005)	(0.0003)	(0.0003)
CAPEX	0.0167	0.6925	-0.4844
	(0.5683)	(0.9900)	(2.3376)
VOL	0.0108	0.0177	0.0338*
	(0.0187)	(0.0320)	(0.0195)
ROA	3.0311***	-0.5039*	0.1149
	(0.9085)	(0.2845)	(1.4047)
KLCI	0.8892**	0.2969**	0.0938
	(0.3898)	(0.1388)	(0.0715)
ln *BSIZE*	0.1164	0.2182*	0.4074
	(0.1287)	(0.1246)	(0.2787)
BINDEP	-0.0728	-0.0291	0.3883*
	(0.3191)	(0.2460)	(0.2146)
DUAL	0.0958		0.1215
	(0.0844)		(0.1939)
CHAIR	0.2812***	0.0526	-0.0381
	(0.0900)	(0.0652)	(0.0885)
CONSTANT	2.3376***	2.5588***	0.9466**
	(0.6669)	(0.5466)	(0.3999)
Year	Yes	Yes	Yes
Industry	No	No	No
N	1870	730	623
Adj. R^2	0.3378	0.3490	0.0893

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5.10: Liquidity-Firm Value Relationship by Industry (Continued) (2000-2015)

	Industrial Products	Plantation	Properties
CPQS	-0.0553***	-0.1187**	-0.0220***
	(0.0087)	(0.0493)	(0.0078)
$CPQS^2$	0.0010***	0.0078***	0.0005***
	(0.0002)	(0.0024)	(0.0002)
ln *SIZE*	-0.1944***	-0.2337*	-0.0081
	(0.0538)	(0.1233)	(0.0263)
ln *AGE*	0.0305	0.0429	0.0000
	(0.0556)	(0.0599)	(0.0245)
LEV	0.8291***	1.0886**	0.5143***
	(0.1623)	(0.5102)	(0.0989)
SALES	0.0003	-0.0003	0.0003**
	(0.0002)	(0.0007)	(0.0001)
CAPEX	0.7727	-0.5711	0.4408
	(0.5174)	(0.9027)	(0.3358)
VOL	0.0081	0.0404	0.0057
	(0.0130)	(0.0580)	(0.0100)
ROA	0.6967*	4.0295***	0.7391*
	(0.3745)	(1.4163)	(0.4093)
KLCI	0.4942***	0.5617*	0.0348
	(0.1608)	(0.3026)	(0.0722)
ln *BSIZE*	0.0720	0.2363	0.0424
	(0.0761)	(0.2024)	(0.0637)
BINDEP	0.2475	0.7570	0.0521
	(0.1530)	(0.5134)	(0.1067)
DUAL	-0.1517**	0.0835	0.0469
	(0.0698)	(0.1972)	(0.0805)
CHAIR	-0.0363	-0.0836	-0.0135
	(0.0397)	(0.1107)	(0.0348)
CONSTANT	3.1823***	3.2178*	0.8422**
	(0.6848)	(1.8374)	(0.3435)
Year	Yes	Yes	Yes
Industry	No	No	No
N	3813	632	1311
Adj. R^2	0.1578	0.2180	0.1669

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5.10: Liquidity-Firm Value Relationship by Industry (Continued) (2000-2015)

	Real Estate Investment Trusts	Technology	Trading/Services
CPQS	-0.0656**	-0.1475***	-0.0718***
	(0.0327)	(0.0230)	(0.0147)
$CPQS^2$	0.0086*	0.0028***	0.0016***
	(0.0045)	(0.0005)	(0.0004)
ln *SIZE*	0.0344	-0.4492***	-0.1286***
	(0.0228)	(0.0600)	(0.0351)
ln *AGE*	-0.0722**	0.0026	-0.1397***
	(0.0282)	(0.0850)	(0.0438)
LEV	0.3331***	0.7051***	0.4133***
	(0.1035)	(0.2173)	(0.1435)
SALES	0.0002	0.0002	-0.0001
	(0.0001)	(0.0005)	(0.0003)
CAPEX	0.4538***	0.2402	0.2620
	(0.1551)	(0.5830)	(0.3677)
VOL	0.0235	0.0113	0.0226
	(0.0437)	(0.0256)	(0.0157)
ROA	3.8638***	0.8125*	2.0989***
	(1.3824)	(0.4546)	(0.5980)
KLCI		0.6056**	0.4744***
		(0.2439)	(0.1069)
ln *BSIZE*	0.0664	-0.0319	0.0611
	(0.0781)	(0.2349)	(0.0938)
BINDEP	0.2547	-0.5098	-0.1271
	(0.2635)	(0.3702)	(0.2157)
DUAL	-0.0273	-0.1287	0.1358
	(0.0193)	(0.1309)	(0.0886)
CHAIR	0.0548	0.0468	0.0860
	(0.0422)	(0.1203)	(0.0698)
CONSTANT	0.0232	7.8662***	3.0958***
	(0.4782)	(0.8309)	(0.4755)
Year	Yes	Yes	Yes
Industry	No	No	No
N	110	1020	2659
Adj. R^2	0.8412	0.2427	0.1971

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the baseline quadratic model (3.4) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The within-industry results are presented in Table 5.10. It is clearly shown that the nonlinear relationship between liquidity and firm value is widespread across industries, thus supporting the baseline quadratic results and hypothesis H_2. The only exception is the financial sector, which the original sample has excluded. This industry-specific evidence challenges the conjecture of Cheung et al. (2015) that the value gain of higher liquidity is more pronounced in the real estate investment trust industry. It is worth highlighting only leverage and return on asset remain statistically significant across all industries except the financial sector.

5.4.6 Endogeneity

To address the concern of endogeneity plaguing empirical finance research, a number of robustness checks are conducted. The results are presented in Table 5.11, and the discussions here focus on the nonlinear relationship between liquidity and firm value. First, the baseline quadratic model is re-estimated using one-year lagged explanatory variables instead of taking their contemporaneous values (see Bellemare et al., 2017). Column (1) in Table 5.11 shows the result from the predictive regression. The first-order *CPQS* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. Thus, the main conclusion on the nonlinear relationship between liquidity and firm value remains intact.

Second, the baseline quadratic model is re-estimated with all the dependent and continuous independent variables specified in terms of annual changes. Chung et al. (2010) argue that using changes in the variables instead of variables in levels can detect stronger causal relation. Column (2) in Table 5.11 shows that the year-to-year changes in liquidity are significantly associated with changes in firm value. This reinforces the main conclusion drawn from variables in levels.

Third, it is possible that some unobserved time-invariant firm characteristics simultaneously determine both liquidity and firm value. To rule out the unobserved omitted variable concern, the fixed effects approach is used. Gormley and Matsa (2014) demonstrate that the firm fixed effects estimator yields consistent estimates in the presence of unobserved heterogeneity. Column (3) in Table 5.11 shows that the coefficients for *CPQS* and $CPQS^2$ are still statistically significant with the expected signs. It is thus unlikely that the documented liquidity-firm value relationship is driven by their correlation with common unobservable firm factors.

Last but not least, the baseline quadratic model is re-estimated in a generalized method-of-moments (GMM) dynamic panel framework. Given the difficulty of finding a strictly exogenous external instrument, Wintoki et al. (2012) recommend the use of dynamic GMM in empirical finance research. The lagged dependent variable of Tobin's *Q* is added to the right-hand-side of the baseline model, and the resulting dynamic panel model is estimated using a two-step system GMM. Column (4) in Table 5.11 shows that the coefficients for *CPQS* and $CPQS^2$ are still statistically significant with the expected signs, suggesting a causal relationship running from liquidity to firm value.

The consistency of the GMM estimator depends on two types of specification tests: (1) *AR*(1) and *AR*(2) tests are under the null of no first-order and second-order serial correlation, respectively, in the first-differenced residuals; (2) Sargan and Hansen tests of over-identifying restrictions are under the null that all instruments are valid. The *p*-values for *AR*(1) and *AR*(2) tests are 0.0060 and 0.3430, respectively. The *p*-values for Sargan and Hansen tests are 0.8910 and 0.7660, respectively. Thus, the regression satisfies the specification tests in that there is no evidence of second-order serial correlation, and both the Sargan and Hansen tests fail to reject the null that all instruments are valid. It is unlikely that the documented liquidity-firm value relationship is driven by reverse causality.

Table 5.11: Robustness Checks on Endogeneity (2000-2015)

	Lag in Variables (1)	Changes in Variables (2)	Firm Fixed Effects (3)	2-Step System GMM (4)
CPQS	-0.0549***	-0.1853***	-0.0671***	-0.0321***
	(0.0051)	(0.0289)	(0.0028)	(0.0100)
$CPQS^2$	0.0011***	0.0218***	0.0014***	0.0006***
	(0.0001)	(0.0048)	(0.0001)	(0.0002)
ln *SIZE*	-0.1608***	-2.9214***	-0.1805***	-0.2034***
	(0.0241)	(0.3540)	(0.0068)	(0.0616)
ln *AGE*	0.0248	-0.0612	0.0074	-0.0372
	(0.0266)	(0.0578)	(0.0088)	(0.1032)
LEV	0.6543***	0.0081***	0.7019***	2.6202***
	(0.1558)	(0.0017)	(0.0325)	(0.3296)
SALES	-0.0004**	0.0001	-0.0001	0.0020*
	(0.0002)	(0.0004)	(0.0001)	(0.0011)
CAPEX	0.2917	0.0008*	0.5697***	6.4132***
	(0.2689)	(0.0005)	(0.1279)	(2.0880)
VOL	0.0119	0.0615***	0.0152***	0.0284
	(0.0097)	(0.0169)	(0.0044)	(0.0345)
ROA	1.3942***	0.0031***	1.4295***	1.2937*
	(0.3828)	(0.0007)	(0.0705)	(0.7306)
KLCI	0.5938***		0.5686***	0.8093**
	(0.1045)		(0.0261)	(0.3984)
ln *BSIZE*	0.0287	0.0653	0.0620**	0.4835
	(0.0572)	(0.0557)	(0.0263)	(0.5272)
BINDEP	-0.0310	0.0184	0.0126	-1.0542
	(0.0991)	(0.0144)	(0.0562)	(0.8604)
DUAL	-0.0555		-0.0448	-0.5872
	(0.0468)		(0.0292)	(1.0406)
CHAIR	0.0801**		0.0756***	0.2297
	(0.0327)		(0.0131)	(0.3274)
Q_{t-1}				-0.2447***
				(0.0523)
CONSTANT	2.9211***	-0.0421*	3.4779***	2.3148*
	(0.3347)	(0.0241)	(0.1131)	(1.3040)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	No	Yes
N	11,146	9,738	12,349	11,536
R^2	0.1709	0.1608	0.2165	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). Columns (1) and (2) present the pooled OLS regression results for the baseline quadratic model (3.4) but specify the independent variables in one-year lagged (*t*-1) and annual changes (Δ), respectively. Column (3) estimates the baseline quadratic model with firm fixed effects estimator, while Column (4) specifies the baseline quadratic model as a dynamic panel and estimates with two-step system GMM. Entries in parentheses are standard errors, with Columns (1) & (2) the double-clustered standard errors. *N* denotes the number of observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

5.4.7 Exogenous Liquidity Shock

The standard in the empirical finance literature to establish causal relation is through natural experiments or strictly exogenous experiments. For the Malaysian stock market, the reduction of lot size from 1000 units to 100 units in May 2003 is a good candidate to generate exogenous variation in liquidity. This study thus augments the baseline quadratic model with all the dependent and continuous independent variables specified in terms of changes, reproduced from equation (3.29):

$$\begin{aligned}\Delta Q_{i,t-1\ to\ t+1} = {} & \gamma_0 + \gamma_1 \Delta CPQS_{i,t-1\ to\ t+1} + \gamma_2 \Delta CPQS^2_{i,t-1\ to\ t+1} + \gamma_3 \Delta \ln SIZE_{i,t-1\ to\ t+1} \\ & + \gamma_4 \ln \Delta AGE_{i,t-1\ to\ t+1} + \gamma_5 \Delta LEV_{i,t-1\ to\ t+1} + \gamma_6 \Delta SALES_{i,t-1\ to\ t+1} \\ & + \gamma_7 \Delta CAPEX_{i,t-1\ to\ t+1} + \gamma_8 \Delta VOL_{i,t-1\ to\ t+1} + \gamma_9 \Delta ROA_{i,t-1\ to\ t+1} \\ & + \gamma_{10} \Delta \ln BSIZE_{i,t-1\ to\ t+1} + \gamma_{11} \Delta BINDEP_{i,t-1\ to\ t+1} \\ & + \sum_{j=1}^{J-1} \gamma_{12j} IND_j + \varepsilon_{i,t-1\ to\ t+1}\end{aligned}$$

To operationalize the above model, this study computes the changes from the pre-shock year ($t-1$) to the post-shock year ($t+1$), where t is the calendar year during which the reduction of lot size occurred for firm *i*. Table 5.12 presents the endogeneity test with exogenous liquidity shock. The objective is to examine the change in Tobin's *Q* in response to change in *CPQS* induced by lot size reduction. The OLS estimation results in Column (1) establish that the nonlinear relationship between liquidity and firm value is robust to reverse causality. From the table, the coefficients for *CPQS* and $CPQS^2$ are still highly significant and the signs consistent with a U-shape. Column (2) considers a narrower measurement window from year ($t-1$) to year t. This is to ensure that the change in liquidity is induced entirely by the mandated policy and not confounded by other market-wide events. Again, the results confirm the direction of causality running from liquidity to firm value and not vice versa.

Table 5.12: Robustness Check with Exogenous Liquidity Shock

	2002-2004 (1)	2002-2003 (2)
$\Delta CPQS$	-0.4008***	-0.3451**
	(0.0811)	(0.1437)
$\Delta CPQS^2$	0.0863***	0.1146*
	(0.0255)	(0.0603)
$\Delta \ln SIZE$	-3.3115***	-3.0493***
	(0.6646)	(0.6579)
$\Delta \ln AGE$	0.1789	0.5568**
	(0.1802)	(0.2298)
ΔLEV	0.0047***	0.0024
	(0.0015)	(0.0043)
$\Delta SALES$	-0.0009	-0.0022**
	(0.0015)	(0.0010)
$\Delta CAPEX$	0.0037**	0.0074**
	(0.0018)	(0.0032)
ΔVOL	0.1090***	0.0412
	(0.0363)	(0.0314)
ΔROA	0.0005	0.0047*
	(0.0025)	(0.0025)
$\Delta \ln BSIZE$	-0.0838	-0.1141
	(0.1451)	(0.1388)
$\Delta BINDEP$	0.0164	0.0037
	(0.0465)	(0.0470)
CONSTANT	0.0892	0.0219
	(0.1152)	(0.0630)
Year	No	No
Industry	Yes	Yes
N	589	600
Adj. R^2	0.1910	0.1153

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the OLS estimation results for the augmented model (3.29) where the exogenous liquidity shock is the reduction of lot size from 1000 to 100 units by the Malaysian stock exchange in May 2003. Column (1) computes the changes (Δ) from the pre-shock year (t –1) to the post-shock year (t +1), where t is the calendar year 2003 during which the reduction of lot size occurred for firm i. Column (2) considers a narrower measurement window from year (t – 1) to year t. To conserve space, the coefficients for industry dummies are not reported. Entries in parentheses are standard errors adjusted for heteroskedasticity. *N* denotes the number of observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively

5.4.8 Endogeneity of Liquidity

To address the concern that liquidity is endogenous in the baseline liquidity model (3.4), this section re-estimates all the previous regressions using the predicted value of *CPQS*. The predicted value is obtained from the liquidity model of (3.2), reproduced here:

$$
\begin{aligned}
CPQS_{it} = {} & \gamma_0 + \gamma_1 \ln NSH_{it} + \gamma_2 \ln NSH^2{}_{it} + \gamma_3 LIND_{it} + \gamma_4 LIND^2{}_{it} + \gamma_5 LINST_{it} \\
& + \gamma_6 \ln(1 + ANALYST)_{it} + \gamma_7 RETURN_{it} + \gamma_8 VOL_{it} + \gamma_9 TURNOVER_{it} \\
& + \gamma_{10} \ln SIZE_{it} + \gamma_{11} BLOCK_{it} + \gamma_{12} \ln BSIZE_{it} + \gamma_{13} BINDEP_{it} \\
& + \gamma_{14} DUAL_{it} + \gamma_{15} CHAIR_{it} + \sum_{j=1}^{J} \gamma_{16j} IND_j + \sum_{t=1}^{T} \gamma_{17t} YR_t + \varepsilon_{it}
\end{aligned}
$$

All the re-estimation results using the predicted value of *CPQS* are appended at the end of this thesis (A5.1-A5.8). Across all tables, the key results for liquidity remain intact. In other words, there is strong evidence to hypothesis H_2 that the relationship between liquidity and firm value is nonlinear.

5.5 Summary of Empirical Results

This empirical chapter re-examines the relationship between liquidity and firm value using data for all non-financial firms listed on Bursa Malaysia over the sample period of 2000-2015. Previous studies all find a positive relationship between liquidity and firm value, but their models are specified in the linear form. The preliminary analysis in this chapter first estimates a similar linear model and finds consistent result of a positive relationship. However, this thesis challenges the consensus because the underlying forces are competing with opposing effects. Thus, a baseline quadratic model is specified to test hypothesis H_2 that the relationship between liquidity and firm value is nonlinear.

The baseline quadratic model (3.4) is estimated using pooled OLS, with the standard errors adjusted for the possible existence of within-cluster correlation. The baseline results show that the first-order *CPQS* is negative and highly significant at the l% level. The squared term, on the other hand, is positively and significantly associated with Tobin's *Q*. The statistically significant coefficients with opposite signs for *CPQS* and $CPQS^2$ imply a nonlinear relationship between liquidity and firm value. It is important to highlight that this nonlinear relationship is robust across all four adjustments of standard errors. Further robustness checks strongly support hypothesis H_2 – alternative liquidity measures of price impact (*CPQS* Impact and Amihud illiquidity ratio), alternative estimation methods (Fama-MacBeth two-step regression and quantile regressions), alternative checks on U-shape (graphical plots and formal U-test), excluding the crisis years of 2008-2009, industry-specific regressions, endogeneity tests (lagged explanatory variables, change-in-variable regression, firm fixed effects and two-step system GMM), and exogenous liquidity shock.

The finding of a U-shape curve between *CPQS* and Tobin's *Q* suggests that when liquidity is at lower levels, liquidity and firm value are negatively related. However, the relationship turns positive when liquidity increases and exceeds a certain threshold level. In other words, the evidence suggests the firm value benefit can only be attained after firms reach a high level of liquidity. This also explains why not all firms pursue liquidity-enhancing policies because the potential costs of maintaining high level of liquidity might outweigh the associated benefits.

CHAPTER 6

CORPORATE POLITICAL CONNECTIONS, CORPORATE OWNERSHIP AND LIQUIDITY-FIRM VALUE RELATIONSHIP

This third empirical chapter extends the liquidity-firm value literature by exploring the potential moderating variables. Chapter 5 documents a nonlinear relationship between liquidity and firm value using data for all non-financial firms that have been listed on Bursa Malaysia over the sample period of 2000-2015, providing strong empirical support to hypothesis H_2. Using the same dataset, this chapter further explores how corporate political connections and corporate ownership moderates the documented nonlinear relationship between liquidity and firm value. First, hypothesis H_3 states that Malaysian public listed firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. Second, hypothesis H_4 (H_5) states that Malaysian public listed firms with high foreign nominee (local institutional) ownership require higher level of liquidity than those with low foreign nominee (local institutional) ownership in order to reap the benefit of larger firm value. The empirical results for hypotheses H_3, H_4 and H_5 are discussed in this chapter, with the analyses structured as follows. Sections 6.1 and 6.2 present the estimation results for the moderating effects of corporate political connections and corporate ownership (foreign nominee ownership and local institutional ownership), respectively. The estimations for all two sections include the baseline interaction models using pooled Ordinary Least Squares (OLS). A series of robustness checks are also conducted which include alternative liquidity measures of liquidity (*CPQS* Impact and Amihud illiquidity ratio), alternative estimation methods (Fama-MacBeth 2-step regression and quantile regression), subsamples excluding crisis years of 2008-2009, industry-specific regressions, and endogeneity tests (lagged explanatory variables, change-in-variable regression, firm fixed effect and two-step system GMM). The final section then concludes this chapter.

6.1 Corporate Political Connections and Liquidity-Firm Value Relationship

Given the entrenched culture of state patronage in Malaysian business, this thesis hypothesizes that corporate political connections strengthen the liquidity-firm value relationship. This implies that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. This section presents the estimation results for the moderating effect of corporate political connections, starting with the baseline interaction model and then a series of robustness checks.

6.1.1 Baseline Results

To test hypothesis H_3, Chapter 3 specifies the following interaction model, with the dummy variable of political connections (*PCON*) interacts with the key variable of liquidity. The model is reproduced from equation (3.5) here as follows:

$$\begin{aligned} Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\ & + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\ & + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} + \delta_{15} PCON_{it} \\ & + \delta_{16} PCON_{it} \cdot CPQS_{it} + \delta_{17} PCON_{it} \cdot CPQS_{it}^2 + \sum_{j=1}^{J} \delta_{18j} IND_j + \sum_{t=1}^{T} \delta_{19t} YR_t + \varepsilon_{it} \end{aligned}$$

The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). *PCON* is a dummy variable which takes a value of one if a firm is politically connected, zero otherwise. This thesis uses three separate lists of patronized Malaysian corporations constructed by Fung et al. (2015), Wong (2016) and Tee et al. (2017).

The baseline interaction model (3.5) is estimated using pooled OLS, and the estimation results are presented in Tables 6.1-6.3. Table 6.1 uses the list of patronized

Malaysian corporations constructed by Fung et al. (2015), which is updated to 2007 and has 122 *PCON* firms. Despite the inclusion of *PCON* in the model, liquidity remains a highly significant determinant of firm value across all four adjustments of standard errors. The coefficient of *CPQS* is negative and significant at the 1% level, whereas $CPQS^2$ is positively and significantly associated with Tobin's *Q*. The statistically significant coefficients with opposite signs for *CPQS* and $CPQS^2$ imply a nonlinear relationship between liquidity and firm value.

Turning to the dummy variable of *PCON*, all four columns in Table 6.1 consistently show that political connections are positively and significantly associated with firm value. This supports the existing empirical evidence that firms derive value benefits from their close ties with politicians or political parties in power (Faccio, 2006; Goldman et al., 2009; Johnson & Mitton, 2003). In the Malaysian context, reports in the media suggest well-connected firms receive preferential state treatment that grants them economic advantages. These include lucrative concessions, licenses or monopoly rights, favourable regulations, easy access to credit financing, and government subsidies. Empirically, Johnson and Mitton (2003) estimate a $60 billion loss in market value for their sampled 67 politically connected firms during the early phase of the Asian financial crisis from July 1997 to August 1998. The loss is due to market's perception that the Malaysian government would be unable to continue subsidizing those politically connected firms. However, Johnson and Mitton (2003) find evidence that the subsequent imposition of capital controls in September 1998 facilitates the government's financial support of patronized firms badly hit by the crisis. The capital controls led to a rebound of the stock prices for politically connected firms to the tune of a $5 billion gain in market value. The evidence from Johnson and Mitton (2003) shows that investors generally react positively when firms are under the patronage of top politicians. This is consistent with the positive coefficient of *PCON* in Table 6.1.

Table 6.1: Corporate Political Connections (Fung et al., 2015) and Liquidity-Firm Value Relationship (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQS	-0.0680***	-0.0680***	-0.0680***	-0.0680***
	(0.0032)	(0.0051)	(0.0059)	(0.0071)
$CPQS^2$	0.0014***	0.0014***	0.0014***	0.0014***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
ln *SIZE*	-0.2042***	-0.2042***	-0.2042***	-0.2042***
	(0.0106)	(0.0237)	(0.0194)	(0.0287)
ln *AGE*	0.0048	0.0048	0.0048	0.0048
	(0.0105)	(0.0252)	(0.0143)	(0.0270)
LEV	0.7234***	0.7234***	0.7234***	0.7234***
	(0.0576)	(0.0918)	(0.0959)	(0.1196)
SALES	-0.00003	-0.00003	-0.00003	-0.00003
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5908***	0.5908**	0.5908***	0.5908**
	(0.1405)	(0.2395)	(0.1844)	(0.2676)
VOL	0.0135**	0.0135*	0.0135	0.0135
	(0.0053)	(0.0075)	(0.0096)	(0.0110)
ROA	1.4433***	1.4433***	1.4433***	1.4433***
	(0.1382)	(0.2931)	(0.2226)	(0.3411)
KLCI	0.5039***	0.5039***	0.5039***	0.5039***
	(0.0344)	(0.0826)	(0.0468)	(0.0885)
ln *BSIZE*	0.0604**	0.0604	0.0604	0.0604
	(0.0265)	(0.0476)	(0.0407)	(0.0568)
BINDEP	-0.0155	-0.0155	-0.0155	-0.0155
	(0.0584)	(0.1034)	(0.0408)	(0.0945)
DUAL	-0.0335	-0.0335	-0.0335	-0.0335
	(0.0251)	(0.0497)	(0.0265)	(0.0505)
CHAIR	0.0643***	0.0643**	0.0643***	0.0643**
	(0.0138)	(0.0323)	(0.0112)	(0.0313)
PCON	0.8660***	0.8660***	0.8660***	0.8660***
	(0.0772)	(0.2108)	(0.0443)	(0.2011)
PCON x *CPQS*	-0.7061***	-0.7061***	-0.7061***	-0.7061***
	(0.0674)	(0.1631)	(0.0379)	(0.1533)
PCON x $CPQS^2$	0.1188***	0.1188***	0.1188***	0.1188***
	(0.0115)	(0.0263)	(0.0067)	(0.0246)
CONSTANT	3.4757***	3.4757***	3.4757***	3.4757***
	(0.1568)	(0.3249)	(0.2830)	(0.4012)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349
Adj. R^2	0.2119	0.2119	0.2119	0.2119

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, and the *PCON* firms are taken from Fung et al. (2015). For brevity, year and industry dummies are suppressed. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The next step is to turn to the coefficients of *PCON* x *CPQS* and *PCON* x $CPQS^2$, because these two interaction variables determine the moderating effect of political connections on the liquidity-firm value relationship. The coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ in Table 6.1 are highly significant across all four adjustments of standard errors. However, the coefficients suggest that stocks of connected firms must be traded at a relatively higher level of liquidity before reaping the benefit of larger firm value. This provides empirical support to hypothesis H_3. Huang et al. (2014) establish that the legal protection provided to investors plays an important role in shaping the liquidity-firm value relationship. The results in Table 6.1 complement Huang et al. (2014) and show that the patronage offered by politicians to firms also exerts similar effect.

The moderating effect of political connections on the liquidity-firm value relationship is likely to operate through the channel of cost of capital. For instance, Houston et al. (2014) report a lower cost of bank loans for politically connected firms in the U.S. market. This is because lenders perceive them as having high creditworthiness. The cross-country study by Boubakri et al. (2012) finds that investors require a lower cost of equity for *PCON* firms that enjoy implicit government guarantee. It is possible for political connections to strengthen the liquidity-firm value relationship through the cost of capital channel. The unresolved issue of the exact mechanisms driving the liquidity-firm value is left for future research as this is not central to the thesis.

Turning to the control variables, the six significant regressors in the baseline quadratic model in Chapter 5 are still significant in Table 6.1 – firm size (ln *SIZE*), leverage (*LEV*), capital expenditures (*CAPEX*), return on assets (*ROA*), stock index membership (*KLCI*) and independent non-executive chairman (*CHAIR*). This suggests that the above firm and board characteristics are crucial drivers for the market value of Malaysian stocks.

Table 6.2 uses the list of patronized Malaysian corporations constructed by Wong (2016), which is updated to 2013 and has 256 *PCON* firms. Table 6.3 uses the list of politically connected Malaysian firms constructed by Tee et al. (2017), which is updated to 2011 and has 69 *PCON* firms. Despite using different lists, the main results are unaffected across the two tables of 6.2 and 6.3. First, the nonlinear relationship between liquidity and firm value still holds. The coefficient of *CPQS* is negative and significant at the 1% level, whereas $CPQS^2$ is positively and significantly associated with Tobin's *Q*. Second, the dummy variable of *PCON* is positively and significantly associated with firm value. This shows that firms derive value benefits from their close ties with politicians or political parties in power. Third, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant. This provides empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

In summary, the estimation results for the interaction model using pooled OLS in Tables 6.1–6.3 provide empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. The moderating effect of corporate political connections on the liquidity-firm value relationship is robust to three different lists of politically connected Malaysian firms and the four different adjustments of the standard errors.

Table 6.2: Corporate Political Connections (Wong, 2016) and Liquidity-Firm Value Relationship (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQS	-0.0622***	-0.0622***	-0.0622***	-0.0622***
	(0.0033)	(0.0054)	(0.0062)	(0.0075)
$CPQS^2$	0.0012***	0.0012***	0.0012***	0.0012***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
ln *SIZE*	-0.1929***	-0.1929***	-0.1929***	-0.1929***
	(0.0103)	(0.0224)	(0.0183)	(0.0270)
ln *AGE*	0.0067	0.0067	0.0067	0.0067
	(0.0108)	(0.0263)	(0.0140)	(0.0278)
LEV	0.7252***	0.7252***	0.7252***	0.7252***
	(0.0579)	(0.0933)	(0.0949)	(0.1198)
SALES	-0.00005	-0.00005	-0.00005	-0.00005
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5421***	0.5421**	0.5421**	0.5421*
	(0.1427)	(0.2497)	(0.1870)	(0.2774)
VOL	0.0143***	0.0143*	0.0143	0.0143
	(0.0053)	(0.0076)	(0.0097)	(0.0111)
ROA	1.4301***	1.4301***	1.4301***	1.4301***
	(0.1390)	(0.2982)	(0.2262)	(0.3475)
KLCI	0.5280***	0.5280***	0.5280***	0.5280***
	(0.0354)	(0.0895)	(0.0491)	(0.0958)
ln *BSIZE*	0.0658**	0.0658	0.0658*	0.0658
	(0.0268)	(0.0475)	(0.0369)	(0.0538)
BINDEP	-0.0127	-0.0127	-0.0127	-0.0127
	(0.0589)	(0.1048)	(0.0434)	(0.0970)
DUAL	-0.0395	-0.0395	-0.0395	-0.0395
	(0.0247)	(0.0461)	(0.0277)	(0.0478)
CHAIR	0.0684***	0.0684**	0.0684***	0.0684**
	(0.0139)	(0.0327)	(0.0105)	(0.0314)
PCON	0.2224***	0.2224***	0.2224***	0.2224***
	(0.0282)	(0.0778)	(0.0245)	(0.0765)
PCON x *CPQS*	-0.1115***	-0.1115***	-0.1115***	-0.1115***
	(0.0092)	(0.0220)	(0.0069)	(0.0211)
PCON x $CPQS^2$	0.0064***	0.0064***	0.0064***	0.0064***
	(0.0005)	(0.0012)	(0.0005)	(0.0012)
CONSTANT	3.3019***	3.3019***	3.3019***	3.3019***
	(0.1551)	(0.3112)	(0.2624)	(0.3764)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349
Adj. R^2	0.2064	0.2064	0.2064	0.2064

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, and the *PCON* firms are taken from Wong (2016). For brevity, year and industry dummies are suppressed. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.3: Corporate Political Connections (Tee et al., 2017) and Liquidity-Firm Value Relationship (2000-2015)

	White	Firm-Clustered	Year-Clustered	Double-Clustered
CPQS	-0.0678***	-0.0678***	-0.0678***	-0.0678***
	(0.0031)	(0.0051)	(0.0059)	(0.0071)
$CPQS^2$	0.0014***	0.0014***	0.0014***	0.0014***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
ln *SIZE*	-0.1983***	-0.1983***	-0.1983***	-0.1983***
	(0.0106)	(0.0237)	(0.0191)	(0.0285)
ln *AGE*	0.0063	0.0063	0.0063	0.0063
	(0.0105)	(0.0253)	(0.0144)	(0.0271)
LEV	0.7228***	0.7228***	0.7228***	0.7228***
	(0.0577)	(0.0925)	(0.0970)	(0.1210)
SALES	-0.00005	-0.00005	-0.00005	-0.00005
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5899***	0.5899**	0.5899***	0.5899**
	(0.1421)	(0.2482)	(0.1915)	(0.2794)
VOL	0.0140***	0.0140*	0.0140	0.0140
	(0.0053)	(0.0076)	(0.0095)	(0.0110)
ROA	1.4503***	1.4503***	1.4503***	1.4503***
	(0.1388)	(0.2959)	(0.2250)	(0.3448)
KLCI	0.5005***	0.5005***	0.5005***	0.5005***
	(0.0343)	(0.0813)	(0.0466)	(0.0872)
ln *BSIZE*	0.0555**	0.0555	0.0555	0.0555
	(0.0266)	(0.0477)	(0.0381)	(0.0549)
BINDEP	-0.0036	-0.0036	-0.0036	-0.0036
	(0.0584)	(0.1023)	(0.0405)	(0.0932)
DUAL	-0.0509**	-0.0509	-0.0509*	-0.0509
	(0.0250)	(0.0495)	(0.0257)	(0.0498)
CHAIR	0.0692***	0.0692**	0.0692***	0.0692**
	(0.0138)	(0.0327)	(0.0113)	(0.0317)
PCON	1.0463***	1.0463***	1.0463***	1.0463***
	(0.1304)	(0.3080)	(0.0932)	(0.2941)
PCON x *CPQS*	-1.1106***	-1.1106***	-1.1106***	-1.1106***
	(0.1680)	(0.3236)	(0.1301)	(0.3056)
PCON x $CPQS^2$	0.2699***	0.2699***	0.2699***	0.2699***
	(0.0471)	(0.0811)	(0.0386)	(0.0765)
CONSTANT	3.3979***	3.3979***	3.3979***	3.3979***
	(0.1558)	(0.3224)	(0.2758)	(0.3946)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349
Adj. R^2	0.2076	0.2076	0.2076	0.2076

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, and the *PCON* firms are taken from Tee et al. (2015). For brevity, year and industry dummies are suppressed. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

6.1.2 Interpreting the Moderating Effect

The baseline results in Tables 6.1–6.3 consistently show evidence to support the moderating effect of corporate political connections on the liquidity-firm value relationship. In all three tables, the coefficients for *PCON* x *CPQS* and *PCON* x *CPQS*^{2} are highly significant. This section further explains how the results from the interaction terms provide empirical support to hypothesis H_3, in which firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

To understand the moderating effect, equation (3.5) is reproduced as follows:

$$E(Q_{it}) = \delta_0 + \delta_1 CPQS + \delta_2 CPQS^2 + \ldots + \delta_{15} PCON + \delta_{16} PCON.CPQS \\ + \delta_{17} PCON.CPQS^2 + \ldots$$

which can be rewritten as:

$$E(Q_{it}) = \delta_0 + \delta_{15} PCON + (\delta_1 + \delta_{16} PCON).CPQS + (\delta_2 + \delta_{17} PCON.CPQS^2) + \ldots$$

For *PCON* = 0:

$$E(Q_{it}) = \delta_0 + \delta_1 CPQS + \delta_2 CPQS^2 + \ldots$$

Turning Point = $-\delta_1 / 2\delta_2$

For *PCON* = 1:

$$E(Q_{it}) = \delta_0 + \delta_{15} PCON + (\delta_1 + \delta_{16} PCON).CPQS + (\delta_2 + \delta_{17} PCON).CPQS^2 + \ldots \\ = (\delta_0 + \delta_{15}) + (\delta_1 + \delta_{16}).CPQS + (\delta_2 + \delta_{17}).CPQS^2$$

Turning Point = $-(\delta_1 + \delta_{16}) / 2(\delta_2 + \delta_{17})$

For hypothesis H_3 to be true, the turning point for the politically connected firms must be smaller (i.e. occurring at higher liquidity) than the turning point for the non-politically connected firms. The condition is therefore:

$$\delta_2\delta_{16} > \delta_1\delta_{17}$$

The results in Tables 6.1–6.3 show that the estimates for δ_1, δ_2, δ_{16} and δ_{17} are statistically significant. Taken together, the above condition is met for all three separate lists of *PCON* firms. This indicates that the turning point for the U-shape liquidity-firm value curve occurs at a higher liquidity level for *PCON* = 1. This supports hypothesis H_3 that the politically connected firms (*PCON*=1) require higher liquidity level than non-politically connected firms (*PCON*=0) to reap the value benefits.

To further illustrate the moderating role of corporate political connections, the quadratic model (3.5) is re-estimated for two subsamples of *PCON* and non-*PCON* firms. The nonlinear relationship remains intact, as the coefficients for *CPQS* and $CPQS^2$ in Tables 6.4 and 6.5 remain highly significant with the expected signs. Table 6.6 computes the threshold points based on the coefficient estimates of *CPQS* and $CPQS^2$. Since *CPQS* is an inverse measure of liquidity, the table shows that the turning point for *PCON*=1 occurs at a higher liquidity level. This implies that *PCON* firms need a higher threshold level of liquidity than non-*PCON* firms in order to reap the benefit of larger firm value, hence support hypothesis H_3. These sub-samples results in Tables 6.4–6.6 are consistent with the interpretation of the interaction terms ($PCON^*CPQS$ and $PCON^*CPQS^2$) in Tables 6.1–6.3.

Table 6.4: Corporate Political Connections and Liquidity-Firm Value Relationship (Subsample of *PCON* Firms) (2000-2015)

	Fung et al. (2015)	Wong (2016)	Tee et al. (2017)
CPQS	-0.2263***	-0.0583***	-0.2271***
	(0.0320)	(0.0102)	(0.0507)
$CPQS^2$	0.0130***	0.0015***	0.0213***
	(0.0021)	(0.0003)	(0.0049)
ln *SIZE*	-0.2351***	-0.0958***	-0.1273***
	(0.0397)	(0.0274)	(0.0303)
ln *AGE*	0.0199	0.0779**	0.0485
	(0.0536)	(0.0390)	(0.0627)
LEV	1.3958***	0.5176***	0.8729***
	(0.3238)	(0.1959)	(0.3100)
SALES	-0.0009***	-0.0010**	-0.0002
	(0.0004)	(0.0004)	(0.0004)
CAPEX	1.6619**	0.4793	0.9469
	(0.8032)	(0.5495)	(0.7760)
VOL	0.1287***	0.0500***	0.1293**
	(0.0403)	(0.0192)	(0.0572)
ROA	6.3840***	4.5158***	8.4569***
	(1.4940)	(0.9820)	(1.4313)
KLCI	0.4975***	0.4663***	0.3563***
	(0.1193)	(0.1003)	(0.1001)
ln *BSIZE*	0.1359	0.0316	0.2032
	(0.1251)	(0.0727)	(0.1341)
BINDEP	-0.0528	0.1473	0.0066
	(0.3046)	(0.1726)	(0.3244)
DUAL	0.1159	-0.1673***	-0.1210
	(0.1199)	(0.0629)	(0.1038)
CHAIR	0.0164	-0.0433	0.0053
	(0.0908)	(0.0432)	(0.0783)
CONSTANT	3.1893***	1.6421***	1.2636*
	(0.6001)	(0.4171)	(0.6611)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	1,362	3,577	941
Adj. R^2	0.5909	0.3760	0.7136

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the quadratic model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The sample includes only firms with political connections (*PCON*=1), where the lists of patronized Malaysian corporations are sourced from Fung et al. (2015), Wong (2016) and Tee et al. (2017). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.5: Corporate Political Connections and Liquidity-Firm Value Relationship (Subsample of Non-*PCON* Firms) (2000-2015)

	Fung et al. (2015)	Wong (2016)	Tee et al. (2017)
CPQS	-0.0642***	-0.0671***	-0.0657***
	(0.0073)	(0.0078)	(0.0070)
CPQS^2	0.0013***	0.0013***	0.0013***
	(0.0002)	(0.0002)	(0.0002)
ln *SIZE*	-0.1911***	-0.2192***	-0.1888***
	(0.0304)	(0.0319)	(0.0281)
ln *AGE*	-0.0170	-0.0120	-0.0054
	(0.0276)	(0.0321)	(0.0266)
LEV	0.6733***	0.7733***	0.6804***
	(0.1186)	(0.1244)	(0.1175)
SALES	0.0001	0.0001	-0.00001
	(0.0002)	(0.0002)	(0.0002)
CAPEX	0.4931**	0.5583**	0.6555**
	(0.2446)	(0.2751)	(0.2824)
VOL	0.0090	0.0063	0.0137
	(0.0109)	(0.0113)	(0.0102)
ROA	1.1444***	0.9524***	1.1773***
	(0.3162)	(0.3270)	(0.3160)
KLCI	0.5262***	0.4821***	0.5107***
	(0.0942)	(0.1043)	(0.0958)
ln *BSIZE*	0.0854	0.1022	0.0751
	(0.0637)	(0.0692)	(0.0614)
BINDEP	0.0411	-0.0628	0.0320
	(0.0992)	(0.1156)	(0.0961)
DUAL	-0.0240	-0.0221	-0.0298
	(0.0492)	(0.0552)	(0.0498)
CHAIR	0.0610*	0.0959***	0.0612**
	(0.0312)	(0.0371)	(0.0303)
CONSTANT	3.2811***	3.6627***	3.2545***
	(0.4421)	(0.4394)	(0.4072)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	10,987	8,772	11,408
Adj. R^2	0.1963	0.1962	0.1974

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the quadratic model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The sample includes only firms with no political connection (*PCON*=0), where the lists of patronized Malaysian corporations are sourced from Fung et al. (2015), Wong (2016) and Tee et al. (2017). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.6: Threshold Levels of Liquidity for *PCON* versus Non-*PCON* Firms (2000-2015)

	Fung et al. (2015)	Wong (2016)	Tee et al. (2017)
***PCON* Firms**			
CPQS	-0.2263	-0.0583	-0.2271
$CPQS^2$	0.0130	0.0015	0.0213
Threshold Liquidity Level	8.7038	19.4333	5.3310
Non-*PCON* Firms			
CPQS	-0.0642	-0.0671	-0.0657
$CPQS^2$	0.0013	0.0013	0.0013
Threshold Liquidity Level	24.6923	25.8077	25.2692

Notes: The coefficient estimates for *CPQS* (δ_1) and $CPQS^2$ (δ_2) are taken from Tables 6.4 and 6.5 for *PCON* and non-*PCON* firms, respectively. The threshold liquidity level is computed by using the coefficient estimates i.e. $-\delta_1/(2\delta_2)$.

6.1.3 Robustness Check with Alternative Liquidity Measures

The "Closing Percent Quoted Spread" (*CPQS*) is selected as the main liquidity measure in this thesis because it is the best performing percent-cost proxy for Malaysian stocks (see Fong et al., 2017). Moreover, it captures an important dimension of liquidity: the transaction cost incurred by investors to trade immediately. Following Chapter 5, the robustness check here further considers another dimension of liquidity, namely the price impact of trade. The *CPQS* Impact (hereafter referred to as *CPQSIM*) and Amihud (2002) illiquidity ratio (hereafter referred to as *ILLIQ*) are used to determine whether corporate political connections still moderate the liquidity-firm value relationship when liquidity is measured as the price impact of trade.

Table 6.7 presents the pooled OLS estimation results for the interaction model (3.5) but replaces *CPQS* with *CPQSIM* as the liquidity proxy. The results using all three different lists of politically connected Malaysian firms can be summarized as follows. First, the nonlinear relationship between liquidity and firm value still holds. The coefficient of *CPQSIM* is negative and significant at the 1% level, whereas $CPQSIM^2$ is positively and significantly associated with Tobin's *Q*. Second, the dummy variable of

PCON is no longer significantly associated with firm value. Third, the coefficients for *PCON* x *CPQSIM* and *PCON* x $CPQSIM^2$ are not statistically significant. This implies that there is no evidence to support H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. Fourth, five of the six significant regressors in the baseline quadratic model in Chapter 5 are still highly significant in Table 6.7, namely firm size, leverage, return on assets, stock index membership and independent non-executive chairman. Only the variable of capital expenditures loses its explanatory power.

Table 6.8 presents the pooled OLS estimation results for the interaction model (3.5) but replaces *CPQS* with *ILLIQ* as the liquidity proxy. The results using all three different lists of politically connected Malaysian firms can be summarized as follows. First, the nonlinear relationship between liquidity and firm value still holds. The coefficient of *ILLIQ* is negative and significant at the l% level, whereas $ILLIQ^2$ is positively and significantly associated with Tobin's *Q*. Second, the dummy variable of *PCON* is no longer statistically significant. Third, the coefficients for *PCON* x *ILLIQ* and *PCON* x $ILLIQ^2$ are not statistically significant. This implies that there is no evidence to support H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. Fourth, five of the six significant regressors in the baseline quadratic model in Chapter 5 are still highly significant in Table 6.8, namely firm size, leverage, return on assets, stock index membership and independent non-executive chairman. Only the variable of capital expenditures loses its explanatory power, and return volatility becomes statistically significant.

Table 6.7:
Moderating Effect of Political Connections with *CPQS* Impact
(2000-2015)

	List of Political Connected Firms		
	Fung et al. (2015)	**Wong (2016)**	**Tee et al. (2017)**
CPQSIM	-0.3087***	-0.2873***	-0.3100***
	(0.0257)	(0.0284)	(0.0245)
$CPQSIM^2$	0.0248***	0.0225***	0.0249***
	(0.0031)	(0.0034)	(0.0029)
ln *SIZE*	-0.2712***	-0.2624***	-0.2681***
	(0.0281)	(0.0271)	(0.0280)
ln *AGE*	0.0095	0.0126	0.0136
	(0.0244)	(0.0248)	(0.0243)
LEV	0.7384***	0.7343***	0.7317***
	(0.1112)	(0.1128)	(0.1132)
SALES	-0.00003	-0.00003	-0.00002
	(0.0002)	(0.0002)	(0.0002)
CAPEX	0.3599	0.3393	0.3500
	(0.2660)	(0.2720)	(0.2702)
VOL	-0.0149*	-0.0127	-0.0132
	(0.0088)	(0.0089)	(0.0089)
ROA	1.5011***	1.4853***	1.4896***
	(0.3085)	(0.3084)	(0.3090)
KLCI	0.4198***	0.4105***	0.4068***
	(0.0873)	(0.0901)	(0.0851)
ln *BSIZE*	0.0483	0.0492	0.0511
	(0.0539)	(0.0534)	(0.0532)
BINDEP	-0.1249	-0.1225	-0.1178
	(0.0889)	(0.0897)	(0.0872)
DUAL	-0.0304	-0.0379	-0.0328
	(0.0479)	(0.0475)	(0.0479)
CHAIR	0.0598**	0.0649**	0.0635**
	(0.0295)	(0.0298)	(0.0297)
PCON	0.1690	0.1330	0.1905
	(0.1277)	(0.0999)	(0.1613)
PCON x *CPQSIM*	-0.1329	-0.0896*	-0.2634
	(0.1093)	(0.0537)	(0.1901)
PCON x $CPQSIM^2$	0.0339*	0.0106	0.0805*
	(0.0195)	(0.0066)	(0.0457)
CONSTANT	4.3407***	4.2155***	4.2821***
	(0.3872)	(0.3764)	(0.3826)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	11,650	11,650	11,650
Adj. R^2	0.2759	0.2732	0.2744

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with the price impact version of *CPQS* (*CPQSIM*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.8:
Moderating Effect of Political Connections with Amihud (2002) Illiquidity Ratio (2000-2015)

	List of Political Connected Firms		
	Fung et al. (2015)	Wong (2016)	Tee et al. (2017)
ILLIQ	-0.3953***	-0.3739***	-0.3949***
	(0.0300)	(0.0334)	(0.0290)
$ILLIQ^2$	0.0257***	0.0241***	0.0257***
	(0.0027)	(0.0031)	(0.0026)
ln *SIZE*	-0.3086***	-0.3010***	-0.3073***
	(0.0277)	(0.0274)	(0.0275)
ln *AGE*	0.0111	0.0160	0.0161
	(0.0243)	(0.0247)	(0.0243)
LEV	0.8146***	0.8132***	0.8079***
	(0.1246)	(0.1278)	(0.1270)
SALES	-0.0001	-0.0001	-0.00004
	(0.0002)	(0.0002)	(0.0002)
CAPEX	0.2672	0.2579	0.2654
	(0.2653)	(0.2724)	(0.2679)
VOL	-0.0193**	-0.0179**	-0.0178**
	(0.0078)	(0.0078)	(0.0078)
ROA	1.3010***	1.2881***	1.2853***
	(0.3148)	(0.3133)	(0.3143)
KLCI	0.3533***	0.3442***	0.3436***
	(0.0746)	(0.0775)	(0.0732)
ln *BSIZE*	0.0432	0.0434	0.0462
	(0.0513)	(0.0512)	(0.0510)
BINDEP	-0.0797	-0.0803	-0.0790
	(0.0862)	(0.0863)	(0.0844)
DUAL	-0.0270	-0.0345	-0.0281
	(0.0457)	(0.0462)	(0.0457)
CHAIR	0.0585*	0.0625**	0.0614**
	(0.0301)	(0.0303)	(0.0301)
PCON	0.1395	0.1247	0.1878
	(0.2029)	(0.1489)	(0.2344)
PCON x *ILLIQ*	-0.1129	-0.0530	-0.2158
	(0.1195)	(0.0623)	(0.1604)
PCON x $ILLIQ^2$	0.0249	0.0045	0.0520**
	(0.0158)	(0.0062)	(0.0259)
CONSTANT	5.9229***	5.7572***	5.8876***
	(0.4368)	(0.4290)	(0.4321)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	11,794	11,794	11,794
Adj. R^2	0.3109	0.3077	0.3102

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with the Amihud (2002) illiquidity ratio (*ILLIQ*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

In summary, when liquidity is measured as the price impact of trade, hypothesis H_2 that liquidity is nonlinearly associated with firm value remains intact. However, there is no evidence to support hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger market valuation. This implies that corporate political connections only operate through transaction costs but not the price impact of trade. It is beyond the scope of this thesis to explore the exact mechanism. However, the finding is interesting for future theoretical work.

6.1.4 Robustness Check with Alternative Estimation Methods

The interaction model (3.5) is estimated using the pooled OLS with the standard errors adjusted to account for the possible existence of within-cluster correlation. Following Chapter 5, the model is re-estimated using Fama-MacBeth two-step regression and quantile regression.

Tables 6.9-6.11 present the regression results for the interaction model (3.5) using three different lists of politically connected firms assembled by Fung et al. (2015), Wong (2016) and Tee et al. (2017), respectively. Across the three lists of *PCON* firms and two alternative estimation methods, the following consistent results are obtained. First, using Fama-MacBeth two-step regression, the first-order *CPQS* is negative and highly significant at the 1% level, whereas the squared term is positively and significantly associated with Tobin's *Q*. For quantile regression, *CPQS* and $CPQS^2$ are highly significant with the expected signs across 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the firm value conditional distribution. The above results provide strong empirical support for hypothesis H_2 that the relationship between liquidity and firm value is nonlinear. Second, the dummy variable of *PCON* is positively and significantly associated with firm value. This shows that firms derive value benefits from their close ties with politicians or political parties in power. Third, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant. This provides empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

In summary, when liquidity is defined as transaction cost, the empirical results strongly support hypothesis H_3. The moderating effect of corporate political connections remains intact when the interaction model is re-estimated using Fama-MacBeth two-step regression and quantile regression. The coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant in Tables 6.9-6.11.

6.1.5 Robustness Check with Sample Period Excluding the Crisis Years

Following Chapter 5, the next robustness check determines whether the results for the interaction model is driven by the global financial crisis of 2008-2009. To address the above concern, model (3.5) is re-estimated using pooled OLS for three sub-periods: (i) 2000-2007 (before crisis); (ii) 2010-2015 (after crisis); (iii) 2000-2015 but excluding the crisis years of 2008-2009.

Table 6.12 presents the pooled OLS estimation results for the interaction model, which can be summarized as follows. First, the nonlinear relationship between liquidity and firm value remains intact when the sample period excludes the two years of 2008-2009. This implies that the nonlinear relationship is not driven by the global financial crisis. Second, the dummy variable of *PCON* is positively and significantly associated with firm value even when the crisis years of 2008-2009 are excluded (Panel C). However, the positive relationship is mainly driven by the subsample before crisis (Panel A), as *PCON* loses its explanatory power in the subsample after crisis (Panel B). Third, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant at the 1% in the whole sample period but excludes the two crisis years (Panel C).

Table 6.9: Moderating Effect of Political Connections with Alternative Estimation Methods [*PCON* Firms from Fung et al. (2015)] (2000-2015)

	Fama-MacBeth	Quantile Regression				
		10th	25th	50th	75th	90th
CPQS	-0.0739***	-0.0171***	-0.0220***	-0.0312***	-0.0565***	-0.0968***
	(0.0070)	(0.0008)	(0.0012)	(0.0016)	(0.0028)	(0.0067)
CPQS^2	0.0020***	0.0003***	0.0004***	0.0006***	0.0013***	0.0023***
	(0.0002)	(0.00002)	(0.00003)	(0.00004)	(0.0001)	(0.0002)
ln *SIZE*	-0.2149***	-0.0571***	-0.0603***	-0.0727***	-0.1267***	-0.2427***
	(0.0218)	(0.0031)	(0.0039)	(0.0059)	(0.0077)	(0.0195)
ln *AGE*	0.0143	-0.0147***	-0.0155***	-0.0230***	-0.0277**	-0.0168
	(0.0158)	(0.0039)	(0.0039)	(0.0057)	(0.0113)	(0.0220)
LEV	0.5365***	0.5750***	0.4937***	0.4254***	0.4720***	0.7926***
	(0.0774)	(0.0176)	(0.0215)	(0.0285)	(0.0444)	(0.1421)
SALES	-0.0001	0.0002***	0.0002***	0.0003***	0.0002	-0.0001
	(0.0001)	(0.00004)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5419**	0.2508***	0.2930***	0.4822***	0.7847***	0.8890***
	(0.2147)	(0.0496)	(0.0457)	(0.0587)	(0.1358)	(0.2819)
VOL	0.0150	-0.0051***	0.0019	0.0081***	0.0146***	0.0107
	(0.0109)	(0.0019)	(0.0025)	(0.0030)	(0.0051)	(0.0090)
ROA	1.4606***	0.5329***	0.6353***	0.7270***	0.8690***	1.4970***
	(0.2220)	(0.0537)	(0.0677)	(0.0663)	(0.0889)	(0.1770)
KLCI	0.6897***	0.0789***	0.1215***	0.1992***	0.4813***	0.9606***
	(0.0655)	(0.0161)	(0.0085)	(0.0179)	(0.0547)	(0.1505)
ln *BSIZE*	0.0863**	0.0412***	0.0573***	0.0480***	0.0620**	0.0753
	(0.0350)	(0.0101)	(0.0109)	(0.0134)	(0.0257)	(0.0722)
BINDEP	0.0310	-0.0402**	-0.0456*	-0.0226	-0.0348	0.0680
	(0.0350)	(0.0202)	(0.0260)	(0.0233)	(0.0620)	(0.1877)
DUAL	-0.0321	-0.0315**	-0.0234	0.0107	0.0296	0.0019
	(0.0273)	(0.0141)	(0.0156)	(0.0177)	(0.0244)	(0.0522)
CHAIR	0.0570***	0.0141***	0.0137***	0.0158**	0.0587***	0.1228***
	(0.0169)	(0.0037)	(0.0034)	(0.0065)	(0.0158)	(0.0400)
PCON	0.7011***	0.3915***	0.4378***	0.5133***	0.5327***	0.9166***
	(0.0699)	(0.0185)	(0.0262)	(0.0491)	(0.0878)	(0.1513)
PCON x *CPQS*	-0.5174***	-0.2759***	-0.3296***	-0.3886***	-0.4106***	-0.7432***
	(0.0623)	(0.0236)	(0.0257)	(0.0444)	(0.0862)	(0.1196)
PCON x *CPQS*^{2}	0.0850***	0.0412***	0.0529***	0.0649***	0.0715***	0.1235***
	(0.0117)	(0.0046)	(0.0047)	(0.0078)	(0.0143)	(0.0203)
CONSTANT	3.4350***	1.4024***	1.4447***	1.7609***	2.6077***	4.1775***
	(0.3876)	(0.0619)	(0.0924)	(0.1252)	(0.1695)	(0.4514)
Year	No	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349	12,349	12,349
R^2/Pseudo R^2	0.2909	0.1607	0.1268	0.1045	0.1238	0.1741

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces pooled OLS estimator with Fama-MacBeth two-step regression and quantile regression. For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.10: Moderating Effect of Political Connections with Alternative Estimation Methods [*PCON* Firms from Wong (2016)] (2000-2015)

	Fama-MacBeth	Quantile Regression				
		10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
CPQS	-0.0686***	-0.0141***	-0.0187***	-0.0259***	-0.0509***	-0.0952***
	(0.0076)	(0.0016)	(0.0014)	(0.0019)	(0.0029)	(0.0073)
$CPQS^2$	0.0018***	0.0003***	0.0004***	0.0005***	0.0011***	0.0022***
	(0.0002)	(0.00004)	(0.00003)	(0.00005)	(0.0001)	(0.0003)
ln *SIZE*	-0.2044***	-0.0519***	-0.0519***	-0.0628***	-0.1149***	-0.2345***
	(0.0208)	(0.0035)	(0.0040)	(0.0036)	(0.0077)	(0.0175)
ln *AGE*	0.0180	-0.0156***	-0.0175***	-0.0265***	-0.0230***	-0.0009
	(0.0153)	(0.0040)	(0.0041)	(0.0040)	(0.0064)	(0.0174)
LEV	0.5415***	0.5933***	0.5001***	0.4111***	0.4611***	0.7956***
	(0.0768)	(0.0130)	(0.0192)	(0.0236)	(0.0489)	(0.1020)
SALES	-0.0001	0.0002***	0.0002***	0.0003***	0.0002	-0.0001
	(0.0001)	(0.00004)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.4874**	0.2278***	0.2915***	0.4256***	0.7598***	0.6916
	(0.2163)	(0.0423)	(0.0695)	(0.0803)	(0.1715)	(0.4298)
VOL	0.0171	-0.0045*	0.0015	0.0080***	0.0165***	0.0161**
	(0.0103)	(0.0024)	(0.0023)	(0.0024)	(0.0047)	(0.0065)
ROA	1.4465***	0.5223***	0.5886***	0.6897***	0.8188***	1.4870***
	(0.2218)	(0.0537)	(0.0465)	(0.0555)	(0.1477)	(0.2036)
KLCI	0.7153***	0.1007***	0.1325***	0.2137***	0.4754***	0.9135***
	(0.0724)	(0.0143)	(0.0136)	(0.0195)	(0.0448)	(0.1670)
ln *BSIZE*	0.0880**	0.0597***	0.0602***	0.0435***	0.0835***	0.0951
	(0.0317)	(0.0100)	(0.0115)	(0.0129)	(0.0225)	(0.0608)
BINDEP	0.0276	-0.0280	-0.0475**	-0.0482	0.0318	0.0867
	(0.0366)	(0.0211)	(0.0240)	(0.0344)	(0.0575)	(0.1300)
DUAL	-0.0354	-0.0315***	-0.0187	0.0049	0.0090	-0.0156
	(0.0284)	(0.0119)	(0.0165)	(0.0155)	(0.0271)	(0.0612)
CHAIR	0.0628***	0.0128**	0.0141***	0.0169*	0.0644***	0.1218***
	(0.0158)	(0.0052)	(0.0053)	(0.0102)	(0.0153)	(0.0299)
PCON	0.2269***	0.0682***	0.1056***	0.1390***	0.1364***	0.2110***
	(0.0369)	(0.0105)	(0.0134)	(0.0184)	(0.0260)	(0.0721)
PCON x *CPQS*	-0.1114***	-0.0282***	-0.0433***	-0.0560***	-0.0767***	-0.1212***
	(0.0103)	(0.0044)	(0.0037)	(0.0054)	(0.0087)	(0.0199)
PCON x $CPQS^2$	0.0072***	0.0014***	0.0023***	0.0030***	0.0044***	0.0071***
	(0.0007)	(0.0003)	(0.0002)	(0.0003)	(0.0006)	(0.0013)
CONSTANT	3.2922***	1.2714***	1.3284***	1.5712***	2.3507***	4.0064***
	(0.3695)	(0.0667)	(0.0985)	(0.1054)	(0.1510)	(0.3526)
Year	No	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349	12,349	12,349
R^2/Pseudo R^2	0.2883	0.1540	0.1217	0.1010	0.1225	0.1738

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces pooled OLS estimator with Fama-MacBeth two-step regression and quantile regression. For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.11: Moderating Effect of Political Connections with Alternative Estimation Methods [*PCON* Firms from Tee et al. (2017)] (2000-2015)

	Fama-MacBeth	Quantile Regression				
		10th	25th	50th	75th	90th
CPQS	-0.0738***	-0.0171***	-0.0219***	-0.0309***	-0.0559***	-0.0989***
	(0.0070)	(0.0015)	(0.0012)	(0.0022)	(0.0030)	(0.0081)
$CPQS^2$	0.0020***	0.0003***	0.0004***	0.0006***	0.0012***	0.0024***
	(0.0002)	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0003)
ln *SIZE*	-0.2082***	-0.0571***	-0.0571***	-0.0658***	-0.1177***	-0.2377***
	(0.0216)	(0.0033)	(0.0040)	(0.0052)	(0.0074)	(0.0166)
ln *AGE*	0.0138	-0.0167***	-0.0174***	-0.0238***	-0.0237**	-0.0089
	(0.0165)	(0.0030)	(0.0035)	(0.0046)	(0.0098)	(0.0173)
LEV	0.5367***	0.5826***	0.4944***	0.4152***	0.4670***	0.7967***
	(0.0795)	(0.0175)	(0.0180)	(0.0249)	(0.0369)	(0.0693)
SALES	-0.0001	0.0002***	0.0002***	0.0003***	0.0002	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
CAPEX	0.5247**	0.2375***	0.2864***	0.4662***	0.7389***	0.9180**
	(0.2181)	(0.0344)	(0.0476)	(0.0981)	(0.2104)	(0.4049)
VOL	0.0154	-0.0055***	0.0016	0.0084***	0.0150***	0.0096*
	(0.0108)	(0.0020)	(0.0021)	(0.0027)	(0.0038)	(0.0053)
ROA	1.4626***	0.5272***	0.6296***	0.7090***	0.8413***	1.4728***
	(0.2259)	(0.0458)	(0.0414)	(0.0481)	(0.0844)	(0.1634)
KLCI	0.6980***	0.0755***	0.1103***	0.1859***	0.4584***	0.9716***
	(0.0705)	(0.0112)	(0.0104)	(0.0145)	(0.0435)	(0.0924)
ln *BSIZE*	0.0847**	0.0525***	0.0581***	0.0470***	0.0718***	0.0757*
	(0.0338)	(0.0093)	(0.0095)	(0.0158)	(0.0204)	(0.0439)
BINDEP	0.0457	-0.0288	-0.0455**	-0.0265	-0.0284	0.1124
	(0.0347)	(0.0232)	(0.0216)	(0.0312)	(0.0368)	(0.1030)
DUAL	-0.0416	-0.0306***	-0.0211	0.0041	0.0124	-0.0437
	(0.0267)	(0.0115)	(0.0196)	(0.0150)	(0.0257)	(0.0654)
CHAIR	0.0604***	0.0152***	0.0145***	0.0180**	0.0639***	0.1147***
	(0.0172)	(0.0050)	(0.0049)	(0.0070)	(0.0169)	(0.0339)
PCON	0.6189***	0.4980***	0.5181***	0.6516***	0.7110***	1.5896***
	(0.1346)	(0.0557)	(0.0508)	(0.0862)	(0.1639)	(0.2978)
PCON x *CPQS*	-0.4714**	-0.5081***	-0.5035***	-0.6394***	-0.8006***	-1.9535***
	(0.1719)	(0.0779)	(0.0655)	(0.1065)	(0.2102)	(0.3469)
PCON x $CPQS^2$	0.0884*	0.1185***	0.1189***	0.1464***	0.2012***	0.5208***
	(0.0497)	(0.0220)	(0.0185)	(0.0290)	(0.0638)	(0.0928)
CONSTANT	3.3514***	1.3824***	1.4142***	1.6142***	2.4523***	4.0452***
	(0.3807)	(0.0525)	(0.0750)	(0.0988)	(0.1007)	(0.2303)
Year	No	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,349	12,349	12,349	12,349	12,349	12,349
R^2/Pseudo R^2	0.2869	0.1566	0.1232	0.1014	0.1212	0.1741

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces pooled OLS estimator with Fama-MacBeth two-step regression and quantile regression. For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.12: Moderating Effect of Political Connections with Non-Crisis Subsamples (2000-2015)

	CPQS	***CPQS***^{2}	***PCON***	***PCON* x *CPQS***	***PCON* x *CPQS***^{2}	***N***	**Adj. *R***^{2}
			Panel A: 2000-2007 (Before Crisis)				
Fung et al. (2015)	-0.1253*** (0.0160)	0.0053*** (0.0007)	0.7990*** (0.2115)	-0.6523*** (0.1693)	0.1231*** (0.0294)	5887	0.2711
Wong (2016)	-0.1162*** (0.0175)	0.0048*** (0.0007)	0.1977** (0.0945)	-0.1296*** (0.0393)	0.0110*** (0.0029)	5887	0.2646
Tee et al. (2017)	-0.1231*** (0.0160)	0.0052*** (0.0007)	0.8819** (0.3993)	-0.7956* (0.4672)	0.1666 (0.1381)	5887	0.2671
			Panel B: 2010-2015 (After Crisis)				
Fung et al. (2015)	-0.0844*** (0.0096)	0.0020*** (0.0003)	0.5073** (0.2532)	-0.4422 (0.2959)	0.0834 (0.0660)	4704	0.2809
Wong (2016)	-0.0817*** (0.0107)	0.0019*** (0.0003)	0.1515 (0.0992)	-0.1010*** (0.0287)	0.0070*** (0.0017)	4704	0.2821
Tee et al. (2017)	-0.0849*** (0.0093)	0.0020*** (0.0003)	0.3545 (0.2938)	-0.3200 (0.3843)	0.0814 (0.1108)	4704	0.2786
			Panel C: 2000-2015 (Excludes 2008-2009)				
Fung et al. (2015)	-0.1009*** (0.0097)	0.0029*** (0.0003)	0.9312*** (0.2202)	-0.8539*** (0.1853)	0.1628*** (0.0332)	10591	0.2226
Wong (2016)	-0.0929*** (0.0107)	0.0026*** (0.0004)	0.2504*** (0.0869)	-0.1536*** (0.0301)	0.0115*** (0.0020)	10591	0.2179
Tee et al. (2017)	-0.1003*** (0.0096)	0.0029*** (0.0003)	1.1745*** (0.3164)	-1.3927*** (0.3563)	0.3797*** (0.1006)	10591	0.2191

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.5) where the dependent variable is Tobin's *Q* and the whole sample period is 2000-2015. For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The sub-samples analysis suggests that the earlier estimation results in Tables 6.1-6.3 are not driven by the global financial crisis. However, the moderating effect of corporate political connections is largely confined to the subsample of 2000-2007 (Panel A). This could be due to the efforts of stock exchange regulators in recent years to promote corporate transparency through stricter disclosure rules. Moreover, even though the Malaysian Code of Corporate Governance (MCCC) was introduced in 2000, the

Securities Commission Malaysia further reviewed the Code in 2007, 2012 and 2017.[29] In summary, the results provide empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

6.1.6 Robustness Check with Industry-Specific Regressions

The next robustness check is to determine whether the moderating effect of corporate political connections in the pooled sample is driven by certain industries. Thus, the interaction model (3.5) is re-estimated using pooled OLS for each industry in the sample. Following Chapter 5, only industries with more than 100 firm-year observations and *PCON* firms are included. Eight industries meet this criterion, namely construction, consumer products, finance, industrial products, plantations, properties, technology and trading/services.

The industry-specific regression results are presented in Table 6.13. The key findings can be summarized as follows. First, across the three lists of *PCON* firms and eight industries, the coefficients for *CPQS* and $CPQS^2$ are highly significant with the expected signs. The only exception is the financial sector, which the original sample has excluded. This suggests that the nonlinear relationship between liquidity and firm value is widespread across industries. Second, the positive relationship between *PCON* and Tobin's *Q* is driven by a small number of industries, depending on the list of *PCON* firms used. In Panel A, the dummy variable of *PCON* is positively significant in three industries, namely industrial products, properties and trading/services. An interesting result is observed in the technology sector, where *PCON* is negatively and significantly associated with Tobin's *Q*. This suggests that firms in the technology sector do not derive value

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[29] See https://www.sc.com.my/post_archive/revised-cg-code-to-further-strengthen-corporate-governance-framework/ (2007 revision); https://www.sc.com.my/malaysian-code-on-corporate-governance-2012/ (2012 revision); https://www.sc.com.my/post_archive/sc-releases-new-malaysian-code-on-corporate-governance-to-strengthen-corporate-culture/ (2017 revision). All are retrieved on 30 September 2018.

gains from establishing ties with politicians or political parties in power. In Panel B, the dummy variable of *PCON* is positively significant in four industries, namely industrial products, plantation, technology and trading/services. In Panel C, the positive relationship between *PCON* and Tobin's *Q* is reported in the industries of construction, industrial products, properties and trading/services. In summary, the value gains of political connections are very much industry-specific and depend on the types of political connections. Across the three lists of *PCON* firms, the two industries of industrial products and trading/services consistently yield a positive coefficient for the dummy variable of *PCON*.

Turning to the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$, the moderating effect of political connections is concentrated in a few industries. In Table 6.13, the nonlinear relationship between liquidity and firm value is documented in all industries except finance. However, this relationship is stronger for politically connected firms only in a few industries. Across the three lists of political connected firms, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are consistently significant with negative and positive signs, respectively, in four industries – construction, industrial products, properties and trading/services. There are a few exceptions. First, using the list provided by Fung et al. (2015), the nonlinear relationship between liquidity and firm value instead becomes weaker in the technology industry. This is consistent with the earlier interpretation of the negative coefficient for *PCON* dummy variable, in that firms in the technology sector do not derive value gains from establishing ties with politicians or political parties in power. Second, using the list provided by Wong (2016), the nonlinear relationship between liquidity and firm value becomes stronger in all industries except consumer products and finance. This is because Wong (2016) uses a broader definition for political connections. As a result, Wong (2016) has the largest number of *PCON* firms (256), compare to 122 in Fung et al. (2015) and 69 in Tee et al. (2017).

Table 6.13: Moderating Effect of Political Connections by Industry (2000-2015)

Industry	*CPQS*	*CPQS*^{2}	*PCON*	*PCON* x *CPQS*	*PCON* x *CPQS*^{2}	*N*	Adj. R^2
Panel A: *PCON* Firms from Fung et al. (2015)							
Construction	-0.0492***	0.0014***	0.3530	-0.3555**	0.0642***	730	0.3511
	(0.0168)	(0.0004)	(0.2205)	(0.1438)	(0.0227)		
Consumer Products	-0.0635***	0.0013***	1.2157	-0.8355	0.1341*	1870	0.3552
	(0.0115)	(0.0002)	(0.8052)	(0.5184)	(0.0755)		
Finance	-0.0614	0.0032	-0.1092	0.0119	0.0099	623	0.0915
	(0.0468)	(0.0027)	(0.1190)	(0.0801)	(0.0149)		
Industrial Products	-0.0566***	0.0010***	1.2849***	-0.6878*	0.0970*	3813	0.1860
	(0.0085)	(0.0002)	(0.4274)	(0.3525)	(0.0569)		
Plantation	-0.1102**	0.0073***	0.2663	-0.1326	-0.0005	632	0.2184
	(0.0485)	(0.0023)	(0.3802)	(0.4413)	(0.0808)		
Properties	-0.0175**	0.0004***	0.5388***	-0.3655***	0.0544**	1311	0.2042
	(0.0071)	(0.0001)	(0.1427)	(0.1319)	(0.0216)		
Technology	-0.1478***	0.0028***	-2.7041**	4.8686**	-1.8911**	1020	0.2411
	(0.0231)	(0.0005)	(1.2206)	(2.0017)	(0.7511)		
Trading/Services	-0.0746***	0.0016***	0.4910**	-0.6001***	0.1058***	2659	0.2065
	(0.0150)	(0.0004)	(0.2408)	(0.1865)	(0.0323)		
Panel B: *PCON* Firms from Wong (2016)							
Construction	-0.0394**	0.0012***	0.0614	-0.0797**	0.0043*	730	0.3620
	(0.0186)	(0.0004)	(0.1078)	(0.0397)	(0.0023)		
Consumer Products	-0.0589***	0.0012***	-0.0255	-0.0806	0.0044*	1870	0.3529
	(0.0131)	(0.0003)	(0.2412)	(0.0560)	(0.0026)		
Finance	-0.0503	0.0028	-0.0823	0.0198	-0.0013	623	0.0873
	(0.0506)	(0.0029)	(0.1369)	(0.0585)	(0.0039)		
Industrial Products	-0.0504***	0.0009***	0.2354**	-0.1009***	0.0054***	3813	0.1656
	(0.0093)	(0.0002)	(0.1080)	(0.0292)	(0.0015)		
Plantation	-0.0922**	0.0060***	0.8384***	-0.5506***	0.0680**	632	0.2725
	(0.0421)	(0.0019)	(0.2187)	(0.1750)	(0.0293)		
Properties	-0.0169**	0.0003**	0.0530	-0.0501**	0.0027**	1311	0.1844
	(0.0084)	(0.0002)	(0.0655)	(0.0211)	(0.0011)		
Technology	-0.1474***	0.0028***	0.5568*	-0.3456***	0.0317***	1020	0.2432
	(0.0230)	(0.0005)	(0.3041)	(0.1125)	(0.0080)		
Trading/Services	-0.0661***	0.0014***	0.3082*	-0.1045**	0.0064**	2659	0.2068
	(0.0145)	(0.0004)	(0.1662)	(0.0479)	(0.0027)		
Panel C: *PCON* Firms from Tee et al. (2017)							
Construction	-0.0473***	0.0013***	0.9337***	-1.0136***	0.2503**	730	0.3676
	(0.0169)	(0.0004)	(0.2271)	(0.3466)	(0.1065)		
Consumer Products	-0.0648***	0.0014***	1.7219	-1.2911	0.2355	1870	0.3604
	(0.0113)	(0.0002)	(1.2838)	(1.1332)	(0.2572)		
Finance	-0.0527	0.0028	-1.1712	1.6966	-0.7018	623	0.0882
	(0.0418)	(0.0025)	(0.9768)	(1.4569)	(0.5341)		
Industrial Products	-0.0559***	0.0010***	1.8409**	-1.8794**	0.4615*	3813	0.1741
	(0.0085)	(0.0002)	(0.7776)	(0.9233)	(0.2365)		
Plantation	-0.1179**	0.0076***	0.8401	-1.6234	0.4312	632	0.2331
	(0.0495)	(0.0024)	(0.7104)	(1.2216)	(0.3601)		
Properties	-0.0201***	0.0004***	0.9799***	-0.9974***	0.2342**	1311	0.2146
	(0.0077)	(0.0001)	(0.3174)	(0.3837)	(0.1027)		
Trading/Services	-0.0723***	0.0016***	0.6462*	-0.8113*	0.2170**	2659	0.2016
	(0.0146)	(0.0004)	(0.3781)	(0.4167)	(0.1070)		

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page126). This table presents the pooled OLS estimation results for the baseline interaction model (3.5) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100 and with *PCON* firms. For brevity, estimates for control variables, constant and year dummies are suppressed. Technology industry is dropped from Panel C due to the problem of multicollinearity. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

6.1.7 Robustness Check on Endogeneity

The final robustness check is to determine whether the baseline results are affected by endogeneity. Following Chapter 5, the same endogeneity tests are conducted except change-in-variable regression.[30] First, the interaction model is re-estimated using one-year lagged explanatory variables instead of taking their contemporaneous values. Second, firm fixed effects estimator is used to address the concern that some unobserved time-invariant firm characteristics simultaneously determine liquidity, political connections and firm value. Third, the interaction model is re-estimated using the two-step system GMM.

Across the three endogeneity tests and three different lists of *PCON* firms, the following consistent results from Tables 6.14-6.16 are obtained.[31] First, the coefficient of *CPQS* is negative and significant at the l% level, whereas $CPQS^2$ is positively and significantly associated with Tobin's *Q*. This suggests that the nonlinear relationship between liquidity and firm value (hypothesis H_2) not only holds in the quadratic model (Chapter 5) but also in the interaction model in this chapter. Second, the dummy variable of *PCON* is positively and significantly associated with firm value. This suggests that Malaysian firms derive value benefits from their close ties with politicians or political parties in power. Third, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are consistently significant with negative and positive signs, respectively. This provides empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. In summary, the moderating effect of political connections is not affected by

[30] In the change-in-variable regression, dummy variable is generally excluded from the model. In the interaction model, the key variable of interest for hypothesis H_3 is *PCON*, which is a dummy variable that takes a value of one if a firm is politically connected, zero otherwise.

[31] The 2-step system GMM estimator satisfies the specification tests in that there is no evidence of second-order serial correlation, and both the Sargan and Hansen tests fail to reject the null that all instruments are valid. In Table 6.14, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.1300, 0.1650 and 0.4470, respectively. In Table 6.15, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.1510, 0.2260 and 0.7330, respectively. In Table 6.16, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.2700, 0.1630 and 0.6010, respectively.

common unobservable firm factors or reverse causality.

Table 6.14: Endogeneity Tests on the Moderating Effect of Political Connections [*PCON* Firms from Fung et al. (2015)] (2000-2015)

	Lag in Variables	Firm Fixed Effects	2-Step System GMM
CPQS	-0.0545***	-0.0673***	-0.0457***
	(0.0052)	(0.0028)	(0.0137)
CPQS^2	0.0011***	0.0014***	0.0006**
	(0.0001)	(0.0001)	(0.0002)
ln *SIZE*	-0.1821***	-0.2021***	-0.6855***
	(0.0265)	(0.0069)	(0.1358)
ln *AGE*	0.0231	0.0064	-0.1713
	(0.0263)	(0.0088)	(0.1503)
LEV	0.6656***	0.7130***	2.5521***
	(0.1534)	(0.0323)	(0.4532)
SALES	-0.0004**	-0.00005	-0.0004
	(0.0002)	(0.0001)	(0.0015)
CAPEX	0.2936	0.5685***	6.8847***
	(0.2595)	(0.1269)	(2.1551)
VOL	0.0097	0.0134***	0.0383
	(0.0097)	(0.0044)	(0.0359)
ROA	1.4111***	1.4397***	1.5136
	(0.3717)	(0.0701)	(0.9443)
KLCI	0.5366***	0.5070***	0.2162
	(0.0915)	(0.0263)	(0.5198)
ln *BSIZE*	0.0214	0.0549**	0.5381
	(0.0571)	(0.0261)	(0.6391)
BINDEP	-0.0385	0.0060	-1.2432
	(0.0971)	(0.0557)	(1.1661)
DUAL	-0.0451	-0.0381	-1.3484
	(0.0491)	(0.0289)	(0.9711)
CHAIR	0.0767**	0.0715***	0.0369
	(0.0320)	(0.0130)	(0.3426)
PCON	0.7462***	0.8416***	9.1262***
	(0.2098)	(0.0629)	(2.2493)
PCON x *CPQS*	-0.5603***	-0.6808***	-3.4893***
	(0.1629)	(0.0636)	(1.3325)
PCON x *CPQS*^{2}	0.0915***	0.1141***	0.5084**
	(0.0265)	(0.0117)	(0.2314)
Q_{t-1}			-0.1337**
			(0.0547)
CONSTANT	3.2285***	3.7574***	8.4246***
	(0.3658)	(0.1146)	(1.9747)
Year	Yes	Yes	Yes
Industry	Yes	No	Yes
N	11,146	12,349	11,536
R^2	0.1852	0.2290	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). For brevity, the coefficients for year and industry dummies are not reported. Entries in parentheses are standard errors, with Column (1) the double-clustered standard errors. *N* denotes the number of observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.15: Endogeneity Tests on the Moderating Effect of Political Connections [*PCON* Firms from Wong (2016)] (2000-2015)

	Lag in Variables	Firm Fixed Effects	2-Step System GMM
CPQS	-0.0484***	-0.0611***	-0.1287***
	(0.0056)	(0.0029)	(0.0396)
$CPQS^2$	0.0009***	0.0012***	0.0021***
	(0.0001)	(0.0001)	(0.0008)
ln *SIZE*	-0.1708***	-0.1912***	-0.6183***
	(0.0248)	(0.0068)	(0.1144)
ln *AGE*	0.0260	0.0081	-0.1732
	(0.0270)	(0.0090)	(0.2191)
LEV	0.6685***	0.7161***	3.9112***
	(0.1534)	(0.0324)	(0.5767)
SALES	-0.0004**	-0.0001	0.0058***
	(0.0002)	(0.0001)	(0.0020)
CAPEX	0.2392	0.5114***	9.1299*
	(0.2704)	(0.1274)	(5.4134)
VOL	0.0107	0.0141***	0.0619
	(0.0097)	(0.0044)	(0.0704)
ROA	1.3902***	1.4281***	-0.5377
	(0.3777)	(0.0702)	(1.2436)
KLCI	0.5561***	0.5298***	1.0633
	(0.0994)	(0.0263)	(0.7703)
ln *BSIZE*	0.0281	0.0607**	2.4023**
	(0.0551)	(0.0263)	(1.0203)
BINDEP	-0.0345	0.0100	-3.5793
	(0.1002)	(0.0560)	(2.2661)
DUAL	-0.0551	-0.0440	-0.7310
	(0.0457)	(0.0290)	(1.5313)
CHAIR	0.0805**	0.0759***	0.2832
	(0.0322)	(0.0131)	(0.7325)
PCON	0.2129***	0.2266***	2.4171**
	(0.0806)	(0.0262)	(1.0187)
PCON x *CPQS*	-0.1043***	-0.1137***	-0.6555**
	(0.0226)	(0.0102)	(0.2759)
PCON x $CPQS^2$	0.0056***	0.0064***	0.0426***
	(0.0012)	(0.0006)	(0.0161)
Q_{t-1}			-0.2148***
			(0.0586)
CONSTANT	3.0543***	3.6002***	4.8985**
	(0.3442)	(0.1148)	(2.3153)
Year	Yes	Yes	Yes
Industry	Yes	No	Yes
N	11,146	12,349	11,536
R^2	0.1817	0.2246	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). For brevity, the coefficients for year and industry dummies are not reported. Entries in parentheses are standard errors, with Column (1) the double-clustered standard errors. *N* denotes the number of observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.16: Endogeneity Tests on the Moderating Effect of Political Connections [*PCON* Firms from Tee et al. (2017)] (2000-2015)

	Lag in Variables	Firm Fixed Effects	2-Step System GMM
CPQS	-0.0548***	-0.0671***	-0.0161**
	(0.0052)	(0.0027)	(0.0075)
CPQS^2	0.0011***	0.0014***	0.0003***
	(0.0001)	(0.0001)	(0.0001)
ln *SIZE*	-0.1757***	-0.1963***	-0.2140***
	(0.0264)	(0.0069)	(0.0433)
ln *AGE*	0.0250	0.0075	0.1229**
	(0.0263)	(0.0088)	(0.0520)
LEV	0.6640***	0.7131***	1.2498***
	(0.1546)	(0.0324)	(0.1619)
SALES	-0.0004***	-0.0001	0.0006
	(0.0001)	(0.0001)	(0.0006)
CAPEX	0.2913	0.5647***	1.4207*
	(0.2687)	(0.1272)	(0.8050)
VOL	0.0105	0.0138***	-0.0214
	(0.0097)	(0.0044)	(0.0162)
ROA	1.4108***	1.4459***	0.5952*
	(0.3764)	(0.0702)	(0.3466)
KLCI	0.5327***	0.5024***	0.5664***
	(0.0900)	(0.0266)	(0.1485)
ln *BSIZE*	0.0179	0.0501*	0.0262
	(0.0565)	(0.0262)	(0.2116)
BINDEP	-0.0246	0.0177	-0.0874
	(0.0960)	(0.0559)	(0.3898)
DUAL	-0.0651	-0.0560*	0.2167
	(0.0487)	(0.0290)	(0.2676)
CHAIR	0.0813**	0.0765***	-0.1891
	(0.0324)	(0.0130)	(0.1420)
PCON	0.9243***	1.0109***	4.7315***
	(0.3088)	(0.1039)	(1.3533)
PCON x *CPQS*	-0.9469***	-1.0504***	-5.2973***
	(0.3267)	(0.1490)	(1.5743)
PCON x *CPQS*^{2}	0.2235***	0.2499***	1.3654***
	(0.0827)	(0.0449)	(0.4455)
Q_{t-1}			0.4414***
			(0.0488)
CONSTANT	3.1396***	3.6803***	2.5278***
	(0.3628)	(0.1142)	(0.7711)
Year	Yes	Yes	Yes
Industry	Yes	No	Yes
N	11,146	12,349	11,536
R^2	0.1817	0.2252	

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). For brevity, the coefficients for year and industry dummies are not reported. Entries in parentheses are standard errors, with Column (1) the double-clustered standard errors. *N* denotes the number of observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

6.2 Corporate Ownership and Liquidity-Firm Value Relationship

This section explores the moderating effect of corporate ownership on the liquidity-firm value relationship. Hypothesis H_4 (H_5) states that firms with high foreign nominee (local institutional) ownership require higher level of liquidity than those with low foreign nominee (local institutional) ownership in order to reap the benefit of larger firm value. The estimation results for baseline interaction model are presented in Section 6.2.1. A series of robustness checks are then conducted in the subsequent sections.

6.2.1 Baseline Results

To test hypotheses H_4 and H_5, Chapter 3 specifies the following interaction model, with the variable of corporate ownership (*OWN*) interacts with the key variable of liquidity. The model is reproduced from equation (3.6) here as follows:

$$
\begin{aligned}
Q_{it} = {} & \delta_0 + \delta_1 CPQS_{it} + \delta_2 CPQS_{it}^2 + \delta_3 \ln SIZE_{it} + \delta_4 \ln AGE_{it} + \delta_5 LEV_{it} \\
& + \delta_6 SALES_{it} + \delta_7 CAPEX_{it} + \delta_8 VOL_{it} + \delta_9 ROA_{it} + \delta_{10} KLCI_{it} \\
& + \delta_{11} \ln BSIZE_{it} + \delta_{12} BINDEP_{it} + \delta_{13} DUAL_{it} + \delta_{14} CHAIR_{it} + \delta_{15} OWN_{it} \\
& + \delta_{16} OWN_{it} \cdot CPQS_{it} + \delta_{17} OWN_{it} \cdot CPQS_{it}^2 + \sum_{j=1}^{J} \delta_{18j} IND_j + \sum_{t=1}^{T} \delta_{19t} YR_t + \varepsilon_{it}
\end{aligned}
$$

The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). Corporate ownership (*OWN*) is computed as the total shares held by the investor group under study divided by the total shares outstanding in each firm at the end of every calendar year. The complete corporate ownership dataset for all firms listed on Bursa Malaysia over the sample period 2000-2015 is obtained from the stock exchange itself. Hypotheses H_4 and H_5 only require foreign nominee ownership and local institutional ownership. However, for comparison purpose, the analysis also considers foreign institutional ownership, foreign individual ownership, local individual ownership and local nominee ownership.

The interaction model (3.6) is estimated using pooled OLS, and the estimation results are presented in Table 6.17. Despite the inclusion of corporate ownership (*OWN*) in the model, liquidity remains a highly significant determinant of firm value across all six investor types – foreign institutions, foreign individuals, foreign nominees, local institutions, local individuals and local nominees. The coefficient of *CPQS* is negative and significant at the 1% level, whereas $CPQS^2$ is positively and significantly associated with Tobin's *Q*. This again suggests that the nonlinear relationship between liquidity and firm value is robust.

Turning to the ownership variable of *OWN*, Table 6.17 shows that both local and foreign individual ownership are negatively and significantly associated with firm value. This suggests that the participation of individual investors in general do not improve the market valuations of Malaysian firms. A recent study by Wang and Zhang (2015) finds that the trading of individual investors enhances firm value because they improve stock price informativeness. Based on this finding, the authors argue that individual investors in the U.S. market are informed traders. However, the evidence in Table 6.17 contradicts Wang and Zhang (2015). This implies that the individual investors in Bursa Malaysia cannot be regarded as informed traders, which is quite sensible for an emerging stock market. The academic literature has long regarded individual investors as noise traders who trade based on sentiment and are subject to behavioural biases (Barber & Odean, 2000; Foucault et al., 2011; Kumar, 2009; Odean, 1998).

On the other hand, Table 6.17 shows that foreign institutions and foreign nominees (in which most of the beneficiaries are foreign institutions) are positively and significantly associated with firm value. Ferreira and Matos (2008) use an extensive dataset of equity holdings from 27 countries to determine the effect of institutional ownership on firm value. The authors find that foreign and independent institutions with large stakes enhance firm value through either direct monitoring (intervention or ‘‘voice’’) or indirect monitoring (exiting or ‘‘voting with one’s feet’’). In contrast, these authors find that local institutional ownership is not significantly associated with Tobin’s *Q*. In other words, Ferreira and Matos (2008) find evidence supporting the value-enhancing role of foreign investors for firms across 27 countries. Another cross-country study by Aggarwal et al. (2011) also reports similar finding. Thus, the significant results for *FINST* and *FNOM* are consistent with Ferreira and Matos (2008) and Aggarwal et al. (2011). Following the informed trading interpretation of Wang and Zhang (2015), the results in Table 6.17 might be interpreted as an indirect evidence that the informed traders are foreign institutions. This is consistent with Lim et al. (2016) who find evidence that foreign nominees are informed traders in the Malaysian stock market.

The insignificant result for local institutions (*LINST*) is consistent with Ferreira and Matos (2008). In the Malaysian stock market, Lim et al. (2016, 2017) highlight that institutional investors are largely government-owned (such as Employees Provident Fund, the Armed Forces Fund Board, the National Equity Corporation, the Pilgrimage Fund Board and the Social Security Organization). These state-controlled institutions have socio-economic mandates that might distract them from pursuing firm value maximization. The above interpretation has its empirical support in Wei et al. (2005). These authors find that institutional ownership in China’s partially privatized former state-owned enterprises is negatively and significantly associated with Tobin's *Q*. The explanation given is that these institutions are fully or partially owned by different levels of government in China, hence they lack incentives to monitor management.

Table 6.17: Corporate Ownership and Liquidity-Firm Value Relationship (2000-2015)

	Foreign Investor			Local Investor		
	FINST	***FIND***	***FNOM***	***LINST***	***LIND***	***LNOM***
CPQS	-0.0609***	-0.0670***	-0.0559***	-0.0630***	-0.1165***	-0.0646***
	(0.0073)	(0.0078)	(0.0062)	(0.0084)	(0.0155)	(0.0084)
CPQS^2	0.0012***	0.0013***	0.0010***	0.0012***	0.0023***	0.0011***
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0004)	(0.0002)
ln *SIZE*	-0.1794***	-0.1787***	-0.2105***	-0.1793***	-0.2577***	-0.1764***
	(0.0255)	(0.0261)	(0.0260)	(0.0260)	(0.0283)	(0.0260)
ln *AGE*	0.0007	0.0141	0.0039	0.0151	0.0034	0.0138
	(0.0271)	(0.0276)	(0.0266)	(0.0272)	(0.0264)	(0.0279)
LEV	0.7589***	0.7197***	0.7466***	0.7342***	0.8368***	0.7242***
	(0.1187)	(0.1239)	(0.1132)	(0.1240)	(0.1157)	(0.1249)
SALES	-0.0001	-0.0002	-0.0001	-0.0001	-0.0002	-0.0001
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
CAPEX	0.6060**	0.5608*	0.4802*	0.5521*	0.5428*	0.5474*
	(0.2866)	(0.2910)	(0.2779)	(0.2948)	(0.2868)	(0.2940)
VOL	0.0127	0.0118	0.0079	0.0126	0.0157	0.0106
	(0.0109)	(0.0110)	(0.0108)	(0.0108)	(0.0111)	(0.0111)
ROA	1.2660***	1.3957***	1.3408***	1.3771***	1.3926***	1.3594***
	(0.3227)	(0.3583)	(0.3428)	(0.3628)	(0.3447)	(0.3583)
KLCI	0.5469***	0.5578***	0.4610***	0.5689***	0.4855***	0.5594***
	(0.0961)	(0.1012)	(0.0941)	(0.1014)	(0.0948)	(0.1016)
ln *BSIZE*	0.0498	0.0713	0.0695	0.0668	0.0440	0.0659
	(0.0560)	(0.0569)	(0.0524)	(0.0567)	(0.0557)	(0.0574)
BINDEP	0.0340	0.0192	-0.0008	0.0284	0.0494	0.0227
	(0.0931)	(0.0944)	(0.0939)	(0.0958)	(0.0948)	(0.0939)
DUAL	-0.0493	-0.0529	-0.0650	-0.0519	-0.0599	-0.0532
	(0.0492)	(0.0470)	(0.0462)	(0.0465)	(0.0471)	(0.0468)
CHAIR	0.0432	0.0667**	0.0581*	0.0677**	0.0569*	0.0658**
	(0.0285)	(0.0324)	(0.0317)	(0.0325)	(0.0318)	(0.0324)
OWN	0.0217***	-0.0075**	0.0211***	0.0014	-0.0136***	-0.0006
	(0.0046)	(0.0036)	(0.0037)	(0.0010)	(0.0015)	(0.0013)
OWN x *CPQS*	-0.0081***	-0.00004	-0.0057***	-0.0002	0.0013***	-0.0002
	(0.0015)	(0.0008)	(0.0011)	(0.0002)	(0.0002)	(0.0003)
OWN x *CPQS*^{2}	0.0005***	0.0001**	0.0003***	0.000006	-0.00003***	0.00002***
	(0.0001)	(0.00003)	(0.0001)	(0.000005)	(0.000007)	(0.000009)
CONSTANT	3.1631***	3.1074***	3.0825***	3.0698***	4.5094***	3.0907***
	(0.3499)	(0.3591)	(0.3402)	(0.3670)	(0.4046)	(0.3606)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,163	12,163	12,163	12,163	12,163	12,163
Adj. R^2	0.2216	0.1950	0.2292	0.1936	0.2442	0.1953

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

To test hypotheses H_4 and H_5, the empirical support comes from the two interaction terms of *OWN* x *CPQS* and *OWN* x *CPQS*^{2}. Hypothesis H_4 states that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. When corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x *CPQS*^{2} is positively and significantly associated with Tobin's *Q*. This provides empirical support to hypothesis H_4. The coefficients suggest that stocks with higher foreign nominee ownership must be traded at a relatively higher level of liquidity before reaping the value benefit. Lim et al. (2016) find that only foreign nominees enhance the price efficiency of Malaysian stocks. This suggests that stock price informativeness might be the channel through which liquidity improves firm value. It is worth highlighting that the significant result for *FNOM* is not due to the nominee effect per se. This is because the interaction terms with local nominees (*LNOM*) in Table 6.17 are not statistically significant.

Turning to hypothesis H_5, the interaction terms of *OWN* x *CPQS* and *OWN* x *CPQS*^{2} are not statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*). Thus, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. This is puzzling because local institutional investors have been entrusted by the Malaysian government to spearhead shareholder activism. On the other hand, there is empirical evidence that these institutions play an effective monitoring and governance role among Malaysian publicly listed firms (Abdul Wahab et al., 2007; Ameer & Abdul Rahman, 2009).

The insignificant result for *LINST* could be because the positive impact of local institutions on corporate governance has become weaker in recent years. Abdul Wahab et al. (2007) collect data for 440 Malaysian public listed companies from 1999 to 2002. Ameer and Abdul Rahman (2009) examine 224 listed firms over 2005-2008. This chapter covers more sample firms (1250) over a longer sample period (2000-2015) than Abdul Wahab et al. (2007) and Ameer and Abdul Rahman (2009). It will be interesting for future study to examine the relationship between local institutional ownership and corporate governance using more recent data, especially data after the 2008/2009 global financial crisis.

Table 6.17 sheds another two insights into the moderating effect of corporate ownership on the liquidity-firm value relationship. First, when corporate ownership (*OWN*) is proxied by local individual ownership (*LIND*), *OWN* x *CPQS* is highly significant with a positive coefficient, whereas *OWN* x $CPQS^2$ is negatively and significantly associated with Tobin's *Q*. This implies that the liquidity-firm value is weaker for firms with high local individual ownership. One possible reason is that local individual investors are noise traders whose trading reduces the stock price informativeness of Malaysian stocks.

Second, when corporate ownership (*OWN*) is proxied by foreign institutions (*FINST*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x $CPQS^2$ is positively and significantly associated with Tobin's *Q*. This implies that the liquidity-firm value is stronger for firms with high foreign institutional ownership. Lim et al. (2016) find that foreign institutional ownership is not significantly associated with stock price informativeness. This implies that stock price informativeness might not be the channel through which liquidity improves firm value. The significant result for *FINST* might be due to the corporate governance channel. Foong and Lim (2016) find that foreign institutional ownership is negatively and significantly associated with cost of equity for Malaysian stocks. Their interaction analysis suggests it operates through the corporate governance channel. Tee et al. (2017) show that institutional ownership is positively and significantly associated with audit fees for Malaysian publicly listed firms. Their disaggregate analysis reveals that the significant result is driven only by foreign institutional investors, whereas the coefficient for local institutions is statistically insignificant. Their results suggest that foreign institutions play an effective monitoring role by demanding greater audit efforts and thus higher audit fees.

In summary, the baseline results in the interaction model (3.6) consistently support hypothesis H_2 that the relationship between liquidity and firm value is nonlinear. The evidence also strongly supports Hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. The moderating effect of foreign nominee ownership might operate through the stock price informativeness channel. However, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. This challenges the corporate governance channel that motivates hypothesis H_5. However, the significant result for foreign institutions (*FINST*) suggests that the corporate governance channel cannot be ruled out. It is possible that foreign institutions play a more effective monitoring role for Malaysian publicly listed firms than local state-backed institutions.

6.2.2 Interpreting the Moderating Effect

The baseline results in Table 6.17 show evidence to support the moderating effect of foreign nominees and foreign institutional ownership on the liquidity-firm value relationship. In both cases of *FNOM* and *FINST*, the coefficients for *OWN* x *CPQS* and

OWN x $CPQS^2$ are highly significant. This section further explains how the results from the interaction terms are interpreted in the context of hypotheses H_4 and H_5.

To understand the moderating effect, equation (3.6) is reproduced as follows:

$$E(Q_{it}) = \delta_0 + \delta_1 CPQS + \delta_2 CPQS^2 + ... + \delta_{15} OWN + \delta_{16} OWN.CPQS \\ + \delta_{17} OWN.CPQS^2 + ...$$

which can be rewritten as:

$$E(Q_{it}) = \delta_0 + \delta_{15} OWN + (\delta_1 + \delta_{16} OWN).CPQS + (\delta_2 + \delta_{17} OWN).CPQS^2 + ...$$

The turning point is given by:

$$CPQS = -(\delta_1 + \delta_{16} OWN) / 2(\delta_2 + \delta_{17} OWN)$$

For hypotheses H_4 and H_5 to be true, the turning point must be smaller (i.e. occurring at higher liquidity) when the level of ownership is higher. The condition is therefore $\delta(CPQS)/\delta(OWN) < 0$ or $\delta_2 \delta_{16} > \delta_1 \delta_{17}$.

In Table 6.17, the results show that the estimates for δ_1, δ_2, δ_{16} and δ_{17} are all statistically significant for foreign nominees (*FNOM*) and foreign institutional ownership (*FINST*). Taken together, the above condition is met for these two foreign ownership categories only. This indicates that the turning point for the U-shape liquidity-firm value curve occurs at a higher liquidity level for higher ownership of these two categories. This supports hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. However, for the local institutional ownership (*LINST*), as the estimates for δ_{16} and δ_{17} are not significant, the condition is not statistically meaningful even if met, and hence no evidence to support hypothesis H_5. However, the corporate governance channel underlies hypothesis H_5 cannot be completely ruled out since the monitoring role might be more effectively assumed by foreign institutions (*FINST*).

Table 6.18: Corporate Ownership and Liquidity-Firm Value Relationship (Subsamples of Bottom 25% *OWN* and Top 25% *OWN*) (2000-2015)

	Panel A Bottom 25% *OWN*		Panel B Top 25% *OWN*	
	FINST	***FNOM***	***FINST***	***FNOM***
CPQS	-0.0530***	-0.0424***	-0.0600***	-0.0656***
	(0.0074)	(0.0069)	(0.0103)	(0.0138)
$CPQS^2$	0.0010***	0.0008***	0.0013***	0.0017***
	(0.0002)	(0.0001)	(0.0003)	(0.0005)
ln *SIZE*	-0.1927***	-0.2289***	-0.1172***	-0.1366***
	(0.0246)	(0.0410)	(0.0310)	(0.0256)
ln *AGE*	-0.0606**	0.0044	-0.0061	-0.0493*
	(0.0237)	(0.0343)	(0.0336)	(0.0255)
LEV	0.6840***	0.5801***	0.6671***	0.6186***
	(0.1378)	(0.1052)	(0.1473)	(0.1410)
SALES	0.0002	0.0004	-0.0001	-0.00003
	(0.0002)	(0.0002)	(0.0003)	(0.0002)
CAPEX	0.5145*	0.2564	0.8269	0.8833***
	(0.2880)	(0.2419)	(0.5664)	(0.2997)
VOL	0.0072	-0.0022	0.0291*	0.0274
	(0.0098)	(0.0084)	(0.0153)	(0.0195)
ROA	0.5389**	0.3044	1.6831***	0.8740***
	(0.2181)	(0.3679)	(0.6525)	(0.2730)
KLCI	0.8320***	0.4121	0.4876***	0.4215***
	(0.2197)	(0.4818)	(0.1005)	(0.1198)
ln *BSIZE*	0.0299	-0.0678	-0.0275	0.0482
	(0.0677)	(0.0678)	(0.0731)	(0.0607)
BINDEP	-0.0696	-0.0953	0.0842	0.0131
	(0.1166)	(0.1124)	(0.1859)	(0.1349)
DUAL	-0.0110	-0.1300**	0.0423	-0.0485
	(0.0607)	(0.0635)	(0.0888)	(0.0696)
CHAIR	0.0478	0.0270	-0.0449	-0.0566
	(0.0344)	(0.0380)	(0.0465)	(0.0391)
CONSTANT	3.4581***	4.6100***	2.4201***	2.9106***
	(0.3899)	(0.5789)	(0.4390)	(0.4471)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	4,878	2,989	3,116	3,055
Adj. R^2	0.2159	0.2105	0.2342	0.2098

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the quadratic model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015. Panel A (Panel B) includes only firms with ownership at the bottom 25 percentiles (top 25 percentiles). For the variable of *OWN*, only foreign institutional ownership (*FINST*) and foreign nominee ownership (*FNOM*) are considered. For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

To further illustrate the moderating role of corporate ownership, the quadratic model (3.6) is re-estimated for *OWN* at different quintiles. The estimation is performed for the bottom 25% ownership and top 25% ownership for foreign institutional ownership (*FINST*) and foreign nominee ownership (*FNOM*). The nonlinear relationship remains intact, as the coefficients for *CPQS* and $CPQS^2$ remain highly significant with the expected signs across all four columns of Table 6.18. Table 6.19 then computes the threshold point based on the coefficient estimates of *CPQS* and $CPQS^2$ for the two subsamples of bottom 25% *OWN* and top 25% *OWN*. Since *CPQS* is an inverse measure of liquidity, the computed threshold points indicate that firms with high foreign ownership require higher liquidity level to reap the benefits of larger firm value. These sub-samples results in Tables 6.18–6.19 are consistent with the interpretation of the interaction terms (OWN^*CPQS and OWN^*CPQS^2) in Table 6.17.

Table 6.19: Threshold Liquidity Levels for Bottom 25% *OWN* and Top 25% *OWN* (2000-2015)

	FINST	***FNOM***
Bottom 25% *OWN*		
CPQS	-0.0530	-0.0424
$CPQS^2$	0.0010	0.0008
Threshold Liquidity Level	26.5000	26.5000
Top 25% *OWN*		
CPQS	-0.0600	-0.0656
$CPQS^2$	0.0013	0.0017
Threshold Liquidity Level	23.0769	19.2941

Notes: For the variable of *OWN*, only foreign institutional ownership (*FINST*) and foreign nominee ownership (*FNOM*) are considered. The coefficient estimates for *CPQS* (δ_1) and $CPQS^2$ (δ_2) are taken from Table 6.18. The threshold liquidity level is computed by using the coefficient estimates i.e. $-\delta_1/(2\delta_2)$.

6.2.3 Robustness Check with Alternative Liquidity Measures

To determine the robustness of the baseline results, this section re-estimates the interaction model (3.6) using the *CPQS* Impact (*CPQSIM*) and Amihud (2002) illiquidity ratio (*ILLIQ*). Both liquidity proxies are designed to measure the price impact of trade.

Table 6.20 presents the pooled OLS estimation results for the interaction model (3.6) but replaces *CPQS* with *CPQSIM* as the liquidity proxy. The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, the nonlinear relationship between liquidity and firm value still holds. The coefficient of *CPQSIM* is negative and significant at the 1% level, whereas $CPQSIM^2$ is positively and significantly associated with Tobin's *Q*. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), *OWN* x *CPQSIM* is highly significant with a negative coefficient, whereas *OWN* x $CPQSIM^2$ is positively and significantly associated with Tobin's *Q*. This provides empirical support to hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. Third, the interaction terms of *OWN* x *CPQSIM* and *OWN* x $CPQSIM^2$ are not statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*). Thus, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. This challenges the corporate governance channel that motivates hypothesis H_5. However, when corporate ownership (*OWN*) is proxied by foreign institutions (*FINST*), *OWN* x *CPQSIM* is highly significant with a negative coefficient, whereas *OWN* x $CPQSIM^2$ is positively and significantly associated with Tobin's *Q*. This implies that the liquidity-firm value is stronger for firms with higher foreign institutional ownership. Following the interpretation in previous sections, the corporate governance channel cannot be ruled out. It is possible that foreign institutions play a more effective monitoring role for Malaysian publicly listed firms than local state-backed institutions. The recent empirical evidence provided by Foong and Lim (2016) and Tee et al. (2017) is supportive of the effective monitoring role performed by foreign institutions in the Malaysian stock market.

Table 6.20: Moderating Effect of Corporate Ownership with *CPQS* Impact (2000-2015)

	Foreign Investor			Local Investor		
	FINST	***FIND***	***FNOM***	***LINST***	***LIND***	***LNOM***
CPQSIM	-0.2768***	-0.3124***	-0.2478***	-0.3023***	-0.4955***	-0.3482***
	(0.0239)	(0.0264)	(0.0260)	(0.0345)	(0.0465)	(0.0442)
CPQSIM^2	0.0222***	0.0253***	0.0179***	0.0247***	0.0398***	0.0268***
	(0.0029)	(0.0031)	(0.0029)	(0.0039)	(0.0054)	(0.0050)
ln *SIZE*	-0.2534***	-0.2557***	-0.2692***	-0.2587***	-0.3484***	-0.2539***
	(0.0257)	(0.0268)	(0.0267)	(0.0266)	(0.0302)	(0.0267)
ln *AGE*	0.0115	0.0230	0.0147	0.0259	0.0192	0.0247
	(0.0238)	(0.0248)	(0.0245)	(0.0241)	(0.0236)	(0.0249)
LEV	0.7773***	0.7423***	0.7567***	0.7593***	0.8595***	0.7455***
	(0.1071)	(0.1140)	(0.1054)	(0.1144)	(0.1009)	(0.1130)
SALES	-0.0000	-0.0001	-0.0001	-0.0001	-0.0002	-0.0001
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
CAPEX	0.3841	0.3039	0.2833	0.2866	0.2775	0.3009
	(0.2783)	(0.2825)	(0.2729)	(0.2874)	(0.2733)	(0.2853)
VOL	-0.0142	-0.0158*	-0.0137	-0.0141	-0.0004	-0.0170*
	(0.0087)	(0.0089)	(0.0087)	(0.0089)	(0.0084)	(0.0090)
ROA	1.3034***	1.4350***	1.4383***	1.4152***	1.4543***	1.4019***
	(0.2782)	(0.3146)	(0.3111)	(0.3183)	(0.3058)	(0.3111)
KLCI	0.4198***	0.4239***	0.3712***	0.4379***	0.2967***	0.4287***
	(0.0873)	(0.0943)	(0.0887)	(0.0955)	(0.0798)	(0.0950)
ln *BSIZE*	0.0438	0.0565	0.0646	0.0523	0.0309	0.0470
	(0.0540)	(0.0543)	(0.0519)	(0.0543)	(0.0502)	(0.0553)
BINDEP	-0.0800	-0.1010	-0.1049	-0.0791	-0.0611	-0.0954
	(0.0894)	(0.0903)	(0.0913)	(0.0905)	(0.0880)	(0.0912)
DUAL	-0.0455	-0.0448	-0.0550	-0.0461	-0.0595	-0.0396
	(0.0503)	(0.0459)	(0.0451)	(0.0451)	(0.0454)	(0.0464)
CHAIR	0.0324	0.0621**	0.0522*	0.0615**	0.0513*	0.0573*
	(0.0260)	(0.0302)	(0.0299)	(0.0304)	(0.0289)	(0.0299)
OWN	0.0272***	-0.0156***	0.0145***	0.0022	-0.0227***	-0.0045*
	(0.0064)	(0.0057)	(0.0042)	(0.0018)	(0.0023)	(0.0025)
OWN x *CPQSIM*	-0.0127***	0.0042	-0.0062***	-0.0003	0.0070***	0.0012
	(0.0035)	(0.0026)	(0.0023)	(0.0009)	(0.0010)	(0.0013)
OWN x *CPQSIM*^{2}	0.0014***	-0.0002	0.0009***	0.00002	-0.0007***	-0.000009
	(0.0005)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)
CONSTANT	4.0956***	4.1167***	3.8355***	4.0638***	5.8311***	4.1303***
	(0.3491)	(0.3612)	(0.3335)	(0.3737)	(0.4356)	(0.3636)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	11,472	11,472	11,472	11,472	11,472	11,472
Adj. R^2	0.2975	0.2680	0.2851	0.2685	0.3303	0.2706

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with the price impact version of *CPQS* (*CPQSIM*). The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.21:
Moderating Effect of Corporate Ownership with Amihud (2002) Illiquidity Ratio (2000-2015)

	Foreign Investor			**Local Investor**		
	FINST	***FIND***	***FNOM***	***LINST***	***LIND***	***LNOM***
ILLIQ	-0.3643***	-0.3907***	-0.3327***	-0.3945***	-0.4890***	-0.4173***
	(0.0295)	(0.0331)	(0.0332)	(0.0489)	(0.0491)	(0.0529)
ILLIQ^2	0.0241***	0.0257***	0.0203***	0.0262***	0.0290***	0.0256***
	(0.0027)	(0.0030)	(0.0028)	(0.0044)	(0.0045)	(0.0046)
ln *SIZE*	-0.2898***	-0.2914***	-0.2991***	-0.2936***	-0.3673***	-0.2908***
	(0.0261)	(0.0274)	(0.0268)	(0.0269)	(0.0294)	(0.0274)
ln *AGE*	0.0148	0.0270	0.0178	0.0285	0.0181	0.0281
	(0.0236)	(0.0247)	(0.0245)	(0.0241)	(0.0237)	(0.0249)
LEV	0.8424***	0.8092***	0.8192***	0.8266***	0.9124***	0.8104***
	(0.1243)	(0.1317)	(0.1248)	(0.1318)	(0.1187)	(0.1318)
SALES	-0.0001	-0.0002	-0.0002	-0.0002	-0.0002	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
CAPEX	0.2667	0.2067	0.2100	0.1893	0.1884	0.2069
	(0.2771)	(0.2777)	(0.2664)	(0.2811)	(0.2719)	(0.2797)
VOL	-0.0178**	-0.0194***	-0.0159**	-0.0183**	-0.0042	-0.0195***
	(0.0071)	(0.0075)	(0.0072)	(0.0075)	(0.0073)	(0.0075)
ROA	1.1372***	1.2506***	1.2747***	1.2323***	1.2925***	1.2218***
	(0.2828)	(0.3196)	(0.3178)	(0.3191)	(0.3103)	(0.3153)
KLCI	0.3455***	0.3531***	0.3188***	0.3639***	0.2430***	0.3577***
	(0.0738)	(0.0820)	(0.0790)	(0.0826)	(0.0672)	(0.0822)
ln *BSIZE*	0.0345	0.0461	0.0551	0.0417	0.0247	0.0395
	(0.0514)	(0.0517)	(0.0497)	(0.0514)	(0.0492)	(0.0525)
BINDEP	-0.0447	-0.0714	-0.0661	-0.0507	-0.0269	-0.0711
	(0.0837)	(0.0850)	(0.0869)	(0.0849)	(0.0856)	(0.0848)
DUAL	-0.0463	-0.0446	-0.0598	-0.0456	-0.0664	-0.0415
	(0.0479)	(0.0433)	(0.0431)	(0.0425)	(0.0424)	(0.0443)
CHAIR	0.0300	0.0576*	0.0467	0.0583*	0.0505*	0.0530*
	(0.0260)	(0.0299)	(0.0299)	(0.0302)	(0.0290)	(0.0298)
OWN	0.0340***	-0.0147*	0.0135**	0.0012	-0.0259***	-0.0051
	(0.0079)	(0.0083)	(0.0056)	(0.0027)	(0.0033)	(0.0039)
OWN x *ILLIQ*	-0.0104***	0.0030	-0.0043*	0.0002	0.0059***	0.0007
	(0.0034)	(0.0027)	(0.0024)	(0.0010)	(0.0011)	(0.0015)
OWN x *ILLIQ*^{2}	0.0008*	-0.0002	0.0006**	-0.00003	-0.0004***	0.0001
	(0.0004)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)
CONSTANT	5.5914***	5.6700***	5.4369***	5.6431***	7.1883***	5.7769***
	(0.4316)	(0.4567)	(0.4261)	(0.4714)	(0.5273)	(0.4879)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	11,621	11,621	11,621	11,621	11,621	11,621
Adj. R^2	0.3315	0.3034	0.3157	0.3044	0.3549	0.3070

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces *CPQS* with the Amihud (2002) illiquidity ratio (*ILLIQ*). The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.21 presents the pooled OLS estimation results for the interaction model (3.6) but replaces *CPQS* with *ILLIQ* as the liquidity proxy. Again, the key results are consistent for hypotheses H_2, H_4 and H_5. First, the nonlinear relationship between liquidity and firm value still holds. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), the two significant interaction terms support hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. Third, when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), the interaction terms of *OWN* x *ILLIQ* and *OWN* x $ILLIQ^2$ are not statistically significant. Thus, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger market valuation. However, the corporate governance channel cannot be ruled out. The two significant interaction terms involving foreign institutions (*FINST*) suggest that foreign institutions might play a more effective monitoring role for Malaysian publicly listed firms than local state-backed institutions.

6.2.4 Robustness Check with Alternative Estimation Methods

The baseline interaction model is estimated using the pooled OLS with the standard errors adjusted to account for the possible existence of within-cluster correlation. Following Chapter 5, this interaction model (3.6) is re-estimated using the Fama-MacBeth two-step regression and quantile regression.

Table 6.22 presents the estimation results for the interaction model (3.6) using Fama-MacBeth two-step regression. The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, the nonlinear relationship between liquidity and firm value still holds. The coefficient of *CPQS* is negative and significant at the l% level, whereas $CPQS^2$ is positively and significantly associated with Tobin's Q. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x $CPQS^2$ is positively and significantly associated with Tobin's Q. This provides empirical support to hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. Third, the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ become statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*). However, the signs of the coefficients suggest that the liquidity-firm value relationship is weaker for firms with high local institutional ownership. This contradicts hypothesis H_5 and challenges the underlying corporate governance channel. The results can be rationalized with the empirical findings of Wei et al. (2005). These authors find that institutional ownership in China's partially privatized former state-owned enterprises is negatively and significantly associated with Tobin's Q. The explanation given is that these institutions are fully or partially owned by different levels of government in China. Thus, they lack incentives to monitor management. In the Malaysian stock market, the large state-back institutions have been entrusted by the Malaysian government to spearhead shareholder activism. However, they might be constrained by their socio-economic mandates. On the other hand, when corporate ownership (*OWN*) is proxied by foreign institutions (*FINST*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x $CPQS^2$ is positively and significantly associated with Tobin's Q. This implies that the liquidity-firm value is stronger for firms with high foreign institutional ownership. Following earlier interpretation, it is possible that foreign institutions play a more effective monitoring role for Malaysian public listed firms than local state-backed institutions.

Table 6.22:
Moderating Effect of Corporate Ownership with Fama-MacBeth Regression (2000-2015)

	Foreign Investor			Local Investor		
	FINST	***FIND***	***FNOM***	***LINST***	***LIND***	***LNOM***
CPQS	-0.0735***	-0.0796***	-0.0644***	-0.0918***	-0.1438***	-0.0861***
	(0.0101)	(0.0100)	(0.0085)	(0.0135)	(0.0165)	(0.0144)
$CPQS^2$	0.0023***	0.0022***	0.0017***	0.0031***	0.0039***	0.0028**
	(0.0005)	(0.0004)	(0.0004)	(0.0007)	(0.0007)	(0.0011)
ln *SIZE*	-0.1930***	-0.1923***	-0.2151***	-0.1910***	-0.2690***	-0.1912***
	(0.0204)	(0.0203)	(0.0186)	(0.0208)	(0.0206)	(0.0214)
ln *AGE*	0.0085	0.0211	0.0111	0.0191	0.0115	0.0191
	(0.0167)	(0.0153)	(0.0145)	(0.0148)	(0.0144)	(0.0157)
LEV	0.5681***	0.5248***	0.5568***	0.5343***	0.6520***	0.5298***
	(0.0756)	(0.0837)	(0.0713)	(0.0853)	(0.0725)	(0.0852)
SALES	-0.0001	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
CAPEX	0.5534**	0.5130**	0.4670*	0.5095**	0.5120**	0.5013**
	(0.2131)	(0.2180)	(0.2213)	(0.2200)	(0.2162)	(0.2164)
VOL	0.0148	0.0126	0.0107	0.0120	0.0240**	0.0119
	(0.0098)	(0.0105)	(0.0105)	(0.0103)	(0.0085)	(0.0105)
ROA	1.2716***	1.3913***	1.3376***	1.3793***	1.3924***	1.3966***
	(0.2107)	(0.2270)	(0.2229)	(0.2279)	(0.2334)	(0.2247)
KLCI	0.7475***	0.7509***	0.6583***	0.7577***	0.6710***	0.7538***
	(0.0753)	(0.0735)	(0.0691)	(0.0726)	(0.0737)	(0.0740)
ln *BSIZE*	0.0743**	0.0948**	0.0822**	0.0907**	0.0652*	0.0931**
	(0.0331)	(0.0338)	(0.0301)	(0.0350)	(0.0316)	(0.0357)
BINDEP	0.0705*	0.0572	0.0338	0.0667	0.0918**	0.0517
	(0.0375)	(0.0393)	(0.0425)	(0.0394)	(0.0404)	(0.0372)
DUAL	-0.0284	-0.0393	-0.0434	-0.0378	-0.0486	-0.0350
	(0.0284)	(0.0279)	(0.0291)	(0.0280)	(0.0279)	(0.0276)
CHAIR	0.0399**	0.0611***	0.0553***	0.0584***	0.0486**	0.0569***
	(0.0147)	(0.0170)	(0.0147)	(0.0172)	(0.0175)	(0.0168)
OWN	0.0201***	-0.0085***	0.0176***	-0.0004	-0.0142***	-0.0005
	(0.0017)	(0.0023)	(0.0016)	(0.0006)	(0.0009)	(0.0006)
OWN x *CPQS*	-0.0078***	-0.0004	-0.0049***	0.0005**	0.0015***	0.00003
	(0.0009)	(0.0009)	(0.0007)	(0.0002)	(0.0003)	(0.0002)
OWN x $CPQS^2$	0.0005***	0.0002	0.0003***	-0.00003**	-0.00003	0.000006
	(0.0001)	(0.0001)	(0.00005)	(0.00001)	(0.00002)	(0.00002)
CONSTANT	3.2771***	3.2206***	3.3707***	3.2153***	4.6317***	3.2188***
	(0.3396)	(0.3568)	(0.3373)	(0.3758)	(0.3829)	(0.3826)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	12,163	12,163	12,163	12,163	12,163	12,163
Adj. R^2	0.3045	0.2818	0.3043	0.2809	0.3275	0.2821

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces the pooled OLS estimator with Fama-MacBeth two-step regression. The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.23:
Moderating Effect of Corporate Ownership with Quantile Regression (2000-2015)

	Quantile				
	10th	**25th**	**50th**	**75th**	**90th**
			Panel A: *FINST*		
CPQS	-0.0163***	-0.0206***	-0.0289***	-0.0514***	-0.0885***
	(0.0011)	(0.0015)	(0.0017)	(0.0015)	(0.0050)
CPQS^2	0.0003***	0.0004***	0.0006***	0.0011***	0.0021***
	(0.00002)	(0.00004)	(0.00004)	(0.0001)	(0.0002)
OWN	0.0024***	0.0044***	0.0081***	0.0213***	0.0460***
	(0.0004)	(0.0006)	(0.0011)	(0.0025)	(0.0053)
OWN x *CPQS*	-0.0008***	-0.0014***	-0.0027***	-0.0066***	-0.0148***
	(0.0002)	(0.0003)	(0.0004)	(0.0008)	(0.0016)
OWN x *CPQS*^{2}	0.0001***	0.0001***	0.0002***	0.0004***	0.0009***
	(0.00001)	(0.00002)	(0.00003)	(0.0001)	(0.0001)
			Panel B: *FIND*		
CPQS	-0.0176***	-0.0218***	-0.0308***	-0.0554***	-0.1010***
	(0.0009)	(0.0012)	(0.0015)	(0.0017)	(0.0071)
CPQS^2	0.0003***	0.0004***	0.0006***	0.0012***	0.0024***
	(0.00002)	(0.00004)	(0.00004)	(0.0001)	(0.0003)
OWN	-0.0019***	-0.0020*	-0.0021**	-0.0057***	-0.0112***
	(0.0006)	(0.0011)	(0.0010)	(0.0017)	(0.0032)
OWN x *CPQS*	0.0003	0.0002	-0.0001	-0.0003	-0.0013
	(0.0003)	(0.0003)	(0.0002)	(0.0006)	(0.0010)
OWN x *CPQS*^{2}	0.000002	0.00001	0.00003*	0.0001*	0.0002***
	(0.00001)	(0.00001)	(0.00002)	(0.00003)	(0.0001)
			Panel C: *FNOM*		
CPQS	-0.0145***	-0.0186***	-0.0279***	-0.0457***	-0.0769***
	(0.0011)	(0.0012)	(0.0015)	(0.0029)	(0.0055)
CPQS^2	0.0003***	0.0003***	0.0005***	0.0008***	0.0015***
	(0.00002)	(0.00003)	(0.00004)	(0.0001)	(0.0002)
OWN	0.0046***	0.0060***	0.0110***	0.0216***	0.0482***
	(0.0005)	(0.0005)	(0.0006)	(0.0015)	(0.0043)
OWN x *CPQS*	-0.0014***	-0.0017***	-0.0031***	-0.0062***	-0.0124***
	(0.0002)	(0.0002)	(0.0002)	(0.0005)	(0.0015)
OWN x *CPQS*^{2}	0.0001***	0.0001***	0.0002***	0.0004***	0.0007***
	(0.00001)	(0.00002)	(0.00001)	(0.00004)	(0.0001)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces the pooled OLS estimator with quantile regression. The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.23:
Moderating Effect of Corporate Ownership with Quantile Regression (Continued) (2000-2015)

	Quantile				
	10th	**25th**	**50th**	**75th**	**90th**
			Panel D: *LINST*		
CPQS	-0.0110***	-0.0147***	-0.0229***	-0.0446***	-0.0910***
	(0.0015)	(0.0014)	(0.0018)	(0.0039)	(0.0099)
$CPQS^2$	0.0002***	0.0003***	0.0004***	0.0010***	0.0022***
	(0.00003)	(0.00004)	(0.00005)	(0.0001)	(0.0004)
OWN	0.0013***	0.0015***	0.0019***	0.0026***	0.0027***
	(0.0002)	(0.0002)	(0.0003)	(0.0004)	(0.0009)
OWN x *CPQS*	-0.0002***	-0.0003***	-0.0003***	-0.0004***	-0.0002
	(0.00003)	(0.00003)	(0.00004)	(0.0001)	(0.0002)
OWN x $CPQS^2$	0.000005***	0.000007***	0.000009***	0.00001**	0.000004
	(0.000001)	(0.000001)	(0.000002)	(0.000004)	(0.000008)
			Panel E: *LIND*		
CPQS	-0.0295***	-0.0400***	-0.0556***	-0.0880***	-0.1526***
	(0.0018)	(0.0021)	(0.0026)	(0.0041)	(0.0102)
$CPQS^2$	0.0006***	0.0008***	0.0011***	0.0018***	0.0034***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0003)
OWN	-0.0029***	-0.0043***	-0.0062***	-0.0097***	-0.0168***
	(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0007)
OWN x *CPQS*	0.0003***	0.0005***	0.0006***	0.0008***	0.0014***
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0002)
OWN x $CPQS^2$	-0.000005***	-0.00001***	-0.00001***	-0.00002***	-0.00003***
	(0.000001)	(0.000002)	(0.000002)	(0.000003)	(0.000007)
			Panel F: *LNOM*		
CPQS	-0.0151***	-0.0201***	-0.0318***	-0.0546***	-0.0963***
	(0.0015)	(0.0012)	(0.0023)	(0.0039)	(0.0093)
$CPQS^2$	0.0002***	0.0004***	0.0006***	0.0010***	0.0019***
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0003)
OWN	0.00004	0.0003	-0.00004	-0.0003	-0.0021**
	(0.0002)	(0.0002)	(0.0003)	(0.0005)	(0.0009)
OWN x *CPQS*	-0.0001**	-0.0001	-0.0000	-0.0002	-0.0003
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0003)
OWN x $CPQS^2$	0.000007***	0.000007**	0.000008**	0.00002***	0.00004***
	(0.000001)	(0.000003)	(0.000003)	(0.000006)	(0.00001)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, but replaces the pooled OLS estimator with quantile regression. The variable of ownership (*OWN*) is proxied by foreign institutional ownership (*FINST*), foreign individual ownership (*FIND*), foreign nominee ownership (*FNOM*), local institutional ownership (*LINST*), local individual ownership (*LIND*) and local nominee ownership (*LNOM*). For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.23 presents the quantile regression estimates at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the firm value conditional distribution. The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, across the five representative quantiles, the first-order *CPQS* is negative and highly significant, whereas its squared term is positively and significantly associated with Tobin's *Q*. This suggests the widespread influence of liquidity on all firms. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x $CPQS^2$ is positively and significantly associated with Tobin's *Q*. The significant results across all five quantiles provide empirical support to hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. Third, the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ become statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*) at the 0.10^{th}, 0.25^{th}, 0.50^{th} and 0.75^{th} quantiles. This implies that the moderating effect of local institutional ownership is only significant at certain quantiles of the Tobin's *Q* distribution. In contrast, the significant results for *FINST* across all five quantiles suggest that foreign institutions might play an effective monitoring role for Malaysian publicly listed firms.

6.2.5 Robustness Check with Sample Period Excluding the Crisis Years

The next robustness check determines whether the results for the interaction model (3.6) is driven by the global financial crisis of 2008-2009. To address the above concern, this interaction model is re-estimated using pooled OLS for three sub-periods: (i) 2000-2007 (before crisis); (ii) 2010-2015 (after crisis); (iii) 2000-2015 but excluding the crisis years of 2008-2009.

Table 6.24 presents the pooled OLS estimation results for the interaction model (3.6). The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, the nonlinear relationship between liquidity and firm value still holds across the three sub-periods. This suggests that the baseline results are not driven by the global financial crisis. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), *OWN* x *CPQS* is highly significant with a negative coefficient, whereas *OWN* x $CPQS^2$ is positively and significantly associated with Tobin's *Q*. Thus, hypothesis H_4 is supported across all three sub-periods, and not driven by the global financial crisis. Third, when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are not statistically significant across all three sub-periods. Thus, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. However, the corporate governance channel cannot be ruled out. The two significant interaction terms involving foreign institutions (*FINST*) across all three sub-periods suggest that foreign institutions might play a more effective monitoring role for Malaysian public listed firms than local state-backed institutions.

6.2.6 Robustness Check with Industry-Specific Regressions

This section further determines whether the moderating effect of corporate ownership in the pooled sample is driven by certain industries. Thus, the baseline interaction model (3.6) is re-estimated using pooled OLS for each industry in the sample. Following Chapter 5, only industries with more than 100 firm-year observations are included. There are nine industries that meet this criterion, namely construction, consumer products, finance, industrial products, plantations, properties, real estate investment trusts, technology and trading/services.

Table 6.24:
Moderating Effect of Corporate Ownership with Non-Crisis Subsamples (2000-2015)

	CPQS	*CPQS*^{2}	*OWN*	*OWN* x *CPQS*	*OWN* x *CPQS*^{2}	*N*	Adj. R^2
			Panel A: 2000-2007 (Before Crisis)				
FINST	-0.1109***	0.0048***	0.0193***	-0.0091***	0.0009***	5723	0.2650
	(0.0165)	(0.0007)	(0.0054)	(0.0026)	(0.0003)		
FIND	-0.1162***	0.0049***	-0.0011	-0.0026	0.0003**	5723	0.2551
	(0.0174)	(0.0007)	(0.0047)	(0.0020)	(0.0002)		
FNOM	-0.0956***	0.0040***	0.0190***	-0.0054***	0.0004***	5723	0.2773
	(0.0158)	(0.0007)	(0.0042)	(0.0016)	(0.0001)		
LINST	-0.1336***	0.0055***	-0.0001	0.0005	-0.000009	5723	0.2566
	(0.0223)	(0.0011)	(0.0015)	(0.0006)	(0.00003)		
LIND	-0.1969***	0.0085***	-0.0144***	0.0023***	-0.0001***	5723	0.2970
	(0.0250)	(0.0012)	(0.0021)	(0.0004)	(0.00002)		
LNOM	-0.1308***	0.0054***	-0.0031*	0.0005	-0.000003	5723	0.2563
	(0.0209)	(0.0008)	(0.0017)	(0.0006)	(0.00003)		
			Panel B: 2010-2015 (After Crisis)				
FINST	-0.0808***	0.0018***	0.0210***	-0.0086***	0.0005***	4687	0.3099
	(0.0089)	(0.0003)	(0.0055)	(0.0020)	(0.0001)		
FIND	-0.0892***	0.0020***	-0.0128***	0.0003	0.0001**	4687	0.2849
	(0.0090)	(0.0003)	(0.0044)	(0.0010)	(0.0001)		
FNOM	-0.0737***	0.0015***	0.0213***	-0.0067***	0.0004***	4687	0.3175
	(0.0071)	(0.0002)	(0.0046)	(0.0016)	(0.0001)		
LINST	-0.0762***	0.0018***	0.0014	-0.0003	0.000006	4687	0.2800
	(0.0108)	(0.0003)	(0.0012)	(0.0002)	(0.000007)		
LIND	-0.1483***	0.0032***	-0.0146***	0.0016***	-0.00003***	4687	0.3339
	(0.0202)	(0.0006)	(0.0020)	(0.0004)	(0.00001)		
LNOM	-0.0820***	0.0016***	0.0019	-0.0003	0.00003***	4687	0.2832
	(0.0097)	(0.0003)	(0.0015)	(0.0003)	(0.00001)		
			Panel C: 2000-2015 (Excludes 2008-2009)				
FINST	-0.0918***	0.0026***	0.0244***	-0.0113***	0.0009***	10410	0.2301
	(0.0102)	(0.0003)	(0.0055)	(0.0024)	(0.0002)		
FIND	-0.1006***	0.0028***	-0.0091*	-0.000009	0.0002**	10410	0.2065
	(0.0105)	(0.0003)	(0.0048)	(0.0015)	(0.0001)		
FNOM	-0.0790***	0.0020***	0.0233***	-0.0075***	0.0005***	10410	0.2412
	(0.0091)	(0.0003)	(0.0041)	(0.0015)	(0.0001)		
LINST	-0.0919***	0.0025***	0.0018	-0.0004	0.00002	10410	0.2047
	(0.0124)	(0.0004)	(0.0012)	(0.0003)	(0.00001)		
LIND	-0.1639***	0.0045***	-0.0147***	0.0019***	-0.0001***	10410	0.2545
	(0.0193)	(0.0007)	(0.0017)	(0.0003)	(0.00002)		
LNOM	-0.0982***	0.0024***	-0.0011	-0.0002	0.00004**	10410	0.2064
	(0.0118)	(0.0004)	(0.0014)	(0.0003)	(0.00002)		

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* and the whole sample period is 2000-2015. For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

The industry-specific regression results are presented in Table 6.25. The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, the nonlinear relationship between liquidity and firm value is widespread across industries. For each investor group, there are on average seven industries in which the coefficients for *CPQS* and $CPQS^2$ are statistically significant. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are statistically significant in all industries except finance and real estate investment trusts. This suggests that the evidence for hypothesis H_4 in the baseline Section 6.2.1 is not driven by only a few industries. Third, when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are not statistically significant across all industries except finance. For financial sector, the significant coefficients suggest that the liquidity-firm value is weaker for firms with high local institutional ownership. Thus, there is no statistical evidence from these industry-specific regressions to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. However, the corporate governance channel cannot be ruled out. The two significant interaction terms involving foreign institutions (*FINST*) are statistically significant in four industries – consumer products, industrial products, technology and trading/services. This supports earlier conjecture that foreign institutions might play a more effective monitoring role for Malaysian publicly listed firms than local state-backed institutions.

Table 6.25: Moderating Effect of Corporate Ownership by Industry (2000-2015)

Industry	*CPQS*	*CPQS*^{2}	*OWN*	*OWN* x *CPQS*	*OWN* x *CPQS*^{2}
			Panel A: *FINST*		
Construction	-0.0452***	0.0014***	0.0537	0.0023	-0.0003
	(0.0164)	(0.0004)	(0.0351)	(0.0075)	(0.0003)
Consumer Products	-0.0585***	0.0012***	0.0272***	-0.0099***	0.0006***
	(0.0120)	(0.0003)	(0.0070)	(0.0022)	(0.0002)
Finance	-0.0323	0.0020	0.0052	-0.0037	0.0002
	(0.0482)	(0.0026)	(0.0073)	(0.0031)	(0.0003)
Industrial Products	-0.0506***	0.0009***	0.0119**	-0.0050***	0.0003***
	(0.0085)	(0.0002)	(0.0050)	(0.0017)	(0.0001)
Plantation	-0.1167**	0.0075***	0.0081	-0.0045	0.0005
	(0.0483)	(0.0022)	(0.0071)	(0.0031)	(0.0004)
Properties	-0.0256***	0.0006***	-0.0058**	0.0008	0.00003
	(0.0079)	(0.0002)	(0.0026)	(0.0013)	(0.0001)
Real Estate Investment Trusts	-0.0822***	0.0097**	-0.0153***	0.0148*	-0.0004
	(0.0297)	(0.0043)	(0.0053)	(0.0075)	(0.0017)
Technology	-0.1330***	0.0024***	0.0148	-0.0066*	0.0005**
	(0.0220)	(0.0004)	(0.0122)	(0.0038)	(0.0002)
Trading/Services	-0.0698***	0.0014***	0.0284**	-0.0108***	0.0007***
	(0.0139)	(0.0003)	(0.0111)	(0.0036)	(0.0002)
			Panel B: *FIND*		
Construction	-0.0336**	0.0006**	-0.1000***	-0.0034	0.0008**
	(0.0136)	(0.0002)	(0.0226)	(0.0059)	(0.0003)
Consumer Products	-0.0677***	0.0014***	-0.0113*	0.0014	0.000004
	(0.0125)	(0.0003)	(0.0062)	(0.0014)	(0.0001)
Finance	0.0096	-0.0030	0.0251	-0.0692**	0.0082***
	(0.0492)	(0.0030)	(0.0484)	(0.0308)	(0.0027)
Industrial Products	-0.0536***	0.0009***	-0.0014	-0.0017*	0.0001***
	(0.0089)	(0.0002)	(0.0034)	(0.0009)	(0.00004)
Plantation	-0.1842***	0.0109***	-0.1037*	0.0489*	-0.0022
	(0.0608)	(0.0031)	(0.0565)	(0.0288)	(0.0016)
Properties	-0.0276***	0.0007***	-0.0278**	0.0048*	-0.0002*
	(0.0084)	(0.0002)	(0.0140)	(0.0026)	(0.0001)
Real Estate Investment Trusts	-0.0032	-0.0001	0.0407***	-0.0324***	0.0054*
	(0.0618)	(0.0094)	(0.0132)	(0.0121)	(0.0027)
Technology	-0.1352***	0.0025***	0.0056	-0.0030	0.0002
	(0.0234)	(0.0004)	(0.0140)	(0.0031)	(0.0002)
Trading/Services	-0.0785***	0.0017***	-0.0162	0.0057	-0.0001
	(0.0139)	(0.0003)	(0.0242)	(0.0045)	(0.0002)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, estimates for control variables, constant and year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.25: Moderating Effect of Corporate Ownership by Industry (Continued) (2000-2015)

Industry	*CPQS*	*CPQS²*	*OWN*	*OWN* x *CPQS*	*OWN* x *CPQS²*
			Panel C: *FNOM*		
Construction	-0.0464***	0.0009***	0.0220***	-0.0088***	0.0006***
	(0.0161)	(0.0003)	(0.0061)	(0.0026)	(0.0002)
Consumer Products	-0.0491***	0.0008***	0.0228**	-0.0072**	0.0004**
	(0.0114)	(0.0003)	(0.0096)	(0.0030)	(0.0002)
Finance	-0.0291	0.0017	0.0065	-0.0032	0.0002
	(0.0501)	(0.0025)	(0.0063)	(0.0029)	(0.0003)
Industrial Products	-0.0443***	0.0007***	0.0213***	-0.0064***	0.0003***
	(0.0067)	(0.0001)	(0.0055)	(0.0015)	(0.0001)
Plantation	-0.0944*	0.0063***	0.0154**	-0.0045**	0.0002*
	(0.0486)	(0.0020)	(0.0071)	(0.0022)	(0.0001)
Properties	-0.0121	0.0002	0.0086**	-0.0023**	0.0001*
	(0.0094)	(0.0002)	(0.0034)	(0.0011)	(0.00005)
Real Estate Investment Trusts	-0.0602	0.0092	-0.0017	0.0025	-0.0005
	(0.0407)	(0.0063)	(0.0041)	(0.0038)	(0.0005)
Technology	-0.1268***	0.0023***	0.0314***	-0.0064***	0.0003***
	(0.0202)	(0.0004)	(0.0099)	(0.0020)	(0.0001)
Trading/Services	-0.0640***	0.0013***	0.0165***	-0.0029*	0.0002*
	(0.0138)	(0.0003)	(0.0052)	(0.0016)	(0.0001)
			Panel D: *LINST*		
Construction	-0.0312	0.0009	0.0050**	-0.0008	0.00002
	(0.0262)	(0.0008)	(0.0021)	(0.0007)	(0.00003)
Consumer Products	-0.0689***	0.0014***	-0.0051*	0.0002	0.000001
	(0.0157)	(0.0003)	(0.0029)	(0.0004)	(0.00001)
Finance	-0.2333**	0.0189**	-0.0030	0.0035**	-0.0003**
	(0.0978)	(0.0082)	(0.0032)	(0.0017)	(0.0001)
Industrial Products	-0.0502***	0.0009***	0.0028*	-0.0002	0.000004
	(0.0118)	(0.0003)	(0.0016)	(0.0004)	(0.000009)
Plantation	-0.0562	0.0065*	0.0062*	-0.0021	0.0001
	(0.0701)	(0.0039)	(0.0036)	(0.0016)	(0.0001)
Properties	-0.0260***	0.0005***	0.0019	-0.0001	0.000004
	(0.0077)	(0.0002)	(0.0012)	(0.0002)	(0.000006)
Real Estate Investment Trusts	-0.1412***	0.0166***	-0.0011	0.0014	-0.0002
	(0.0311)	(0.0039)	(0.0012)	(0.0009)	(0.0001)
Technology	-0.1066***	0.0019***	0.0138*	-0.0016	0.00004*
	(0.0257)	(0.0005)	(0.0077)	(0.0011)	(0.00003)
Trading/Services	-0.0677***	0.0014***	0.0011	-0.0002	0.000009
	(0.0186)	(0.0004)	(0.0019)	(0.0003)	(0.000009)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, estimates for control variables, constant and year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.25: Moderating Effect of Corporate Ownership by Industry (Continued) (2000-2015)

Industry	***CPQS***	***CPQS²***	***OWN***	***OWN* x *CPQS***	***OWN* x *CPQS²***
			Panel E: *LIND*		
Construction	-0.1096***	0.0024***	-0.0110***	0.0015***	-0.00003
	(0.0266)	(0.0007)	(0.0032)	(0.0005)	(0.00002)
Consumer Products	-0.1211***	0.0028***	-0.0117***	0.0015***	-0.00004***
	(0.0251)	(0.0006)	(0.0030)	(0.0005)	(0.00001)
Finance	-0.0119	-0.0028	-0.0046	-0.0020	0.0002*
	(0.0662)	(0.0040)	(0.0047)	(0.0018)	(0.0001)
Industrial Products	-0.0982***	0.0018***	-0.0120***	0.0010***	-0.00002***
	(0.0170)	(0.0004)	(0.0021)	(0.0003)	(0.000007)
Plantation	-0.2787***	0.0174***	-0.0176***	0.0054***	-0.0003**
	(0.0871)	(0.0061)	(0.0055)	(0.0021)	(0.0001)
Properties	-0.0384***	0.0009**	-0.0041***	0.0004	-0.00001
	(0.0141)	(0.0004)	(0.0016)	(0.0003)	(0.00001)
Real Estate Investment Trusts	0.0635	-0.0108	0.0034	-0.0040*	0.0006**
	(0.0766)	(0.0111)	(0.0038)	(0.0022)	(0.0003)
Technology	-0.1718***	0.0025***	-0.0148***	0.0007	0.000002
	(0.0443)	(0.0007)	(0.0044)	(0.0005)	(0.000008)
Trading/Services	-0.1373***	0.0028***	-0.0170***	0.0018***	-0.00004***
	(0.0269)	(0.0006)	(0.0033)	(0.0004)	(0.00001)
			Panel F: *LNOM*		
Construction	-0.0661***	0.0011**	-0.0022	0.00003	0.00004**
	(0.0239)	(0.0005)	(0.0026)	(0.0008)	(0.00002)
Consumer Products	-0.0812***	0.0016***	-0.0058**	0.0008	-0.00001
	(0.0154)	(0.0004)	(0.0027)	(0.0005)	(0.00001)
Finance	-0.0488	0.0026	-0.0031	-0.00002	0.000004
	(0.0653)	(0.0032)	(0.0022)	(0.0017)	(0.0001)
Industrial Products	-0.0422***	0.0006***	0.0039	-0.0008**	0.00003***
	(0.0104)	(0.0002)	(0.0024)	(0.0004)	(0.00001)
Plantation	-0.1546**	0.0090**	-0.0054	0.0017	-0.0001
	(0.0715)	(0.0039)	(0.0038)	(0.0021)	(0.0001)
Properties	-0.0228***	0.0004**	-0.0008	-0.0001	0.000007
	(0.0080)	(0.0002)	(0.0010)	(0.0002)	(0.000008)
Real Estate Investment Trusts	-0.0299	0.0048	0.0019	-0.0019	0.0002
	(0.0448)	(0.0078)	(0.0020)	(0.0014)	(0.0002)
Technology	-0.1366***	0.0025***	-0.0013	0.0001	0.000005
	(0.0277)	(0.0006)	(0.0061)	(0.0010)	(0.00003)
Trading/Services	-0.0570***	0.0010***	0.0025	-0.0008*	0.00004**
	(0.0156)	(0.0004)	(0.0029)	(0.0005)	(0.00001)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). This table presents the pooled OLS estimation results for the interaction model (3.6) where the dependent variable is Tobin's *Q* over the sample period 2000-2015, for industries with firm-year observations greater than 100. For brevity, estimates for control variables, constant and year dummies are suppressed. Double-clustered standard errors are reported in the parentheses. *N* denotes the number of firm-year observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

6.2.7 Robustness Check on Endogeneity

The final robustness check is to determine whether the baseline results are affected by endogeneity. Following Chapter 5, the same endogeneity tests are conducted, namely lag in variables regression, change-in-variable regression, firm fixed effects estimator and two-step system GMM.

Table 6.26 presents the estimation results for the interaction model (3.6) using four different endogeneity tests. The key results for hypotheses H_2, H_4 and H_5 can be summarized as follows. First, across the six investor groups and four different tests, the nonlinear relationship between liquidity and firm value remains intact, thus provides strong support for hypothesis H_2. Second, when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), the coefficients for *OWN* x *CPQS* and *OWN* x $CPQS^2$ are statistically significant in all panels except the change-in-variable regression, with the latter more likely to reflect longer term effects. Nevertheless, the results from the 2-step system GMM suggest the baseline finding is not likely to be driven by reverse causality. Moreover, the firm fixed effects results suggest that the moderating effect of *FNOM* is not affected by common unobservable firm factors. Third, when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are not statistically significant across all panels except change-in-variable regression. Even for change-in-variable regression, the significant coefficients suggest that the liquidity-firm value is weaker for firms with high local institutional ownership. Thus, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. However, the corporate governance channel cannot be ruled out. The two significant interaction terms involving foreign institutions (*FINST*) across all panels, with the exception of change-in-variable regression, suggest that foreign institutions might play a more effective monitoring role for Malaysian publicly listed firms than local state-backed institutions.

Table 6.26: Endogeneity Tests on the Moderating Effect of Corporate Ownership (2000-2015)

	CPQS	*CPQS*^{2}	*OWN*	*OWN* x *CPQS*	*OWN* x *CPQS*^{2}
			Panel A: Lag in Variables		
FINST	-0.0493***	0.0009***	0.0195***	-0.0070***	0.0004***
	(0.0051)	(0.0001)	(0.0047)	(0.0015)	(0.0001)
FIND	-0.0562***	0.0011***	-0.0108***	0.0010	0.00004*
	(0.0055)	(0.0001)	(0.0033)	(0.0006)	(0.00002)
FNOM	-0.0456***	0.0008***	0.0174***	-0.0043***	0.0002***
	(0.0052)	(0.0001)	(0.0038)	(0.0011)	(0.0001)
LINST	-0.0501***	0.0010***	0.0012	-0.0002	0.000005
	(0.0064)	(0.0002)	(0.0011)	(0.0002)	(0.000006)
LIND	-0.1013***	0.0020***	-0.0122***	0.0012***	-0.00002***
	(0.0117)	(0.0003)	(0.0014)	(0.0002)	(0.000006)
LNOM	-0.0552***	0.0010***	-0.0010	-0.00003	0.00001
	(0.0076)	(0.0002)	(0.0013)	(0.0003)	(0.000008)
			Panel B: Changes in Variables		
FINST	-0.1805***	0.0234***	-0.0030***	0.0048***	-0.0016***
	(0.0319)	(0.0054)	(0.0011)	(0.0016)	(0.0006)
FIND	-0.1634***	0.0204***	0.0108	-0.0187	0.0015
	(0.0282)	(0.0048)	(0.0084)	(0.0120)	(0.0021)
FNOM	-0.1732***	0.0230***	0.0065***	-0.0017	-0.0019**
	(0.0283)	(0.0053)	(0.0013)	(0.0025)	(0.0010)
LINST	-0.1941***	0.0256***	-0.1485***	0.0089***	-0.0034***
	(0.0287)	(0.0050)	(0.0196)	(0.0032)	(0.0012)
LIND	-0.1849***	0.0211***	-0.1501***	-0.0005	0.0006
	(0.0408)	(0.0052)	(0.0279)	(0.0238)	(0.0049)
LNOM	-0.1238***	0.0147***	0.0702***	-0.0547***	0.0069**
	(0.0267)	(0.0050)	(0.0146)	(0.0105)	(0.0029)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). Panel A and Panel B present the pooled OLS regression results for the interaction model (3.6) but specify the independent variables in one-year lagged (*t*-1) and annual changes (Δ), respectively. Panel C estimates the interaction model with a firm fixed effects estimator, while Panel D specifies the model as a dynamic panel and estimates with two-step system GMM. For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Entries in parentheses are standard errors, with Panel A and Panel B the double-clustered standard errors. *N* denotes the number of observations.

***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6.26:
Endogeneity Tests on the Moderating Effect of Corporate Ownership (Continued) (2000-2015)

	CPQS	*CPQS*^{2}	*OWN*	*OWN* x *CPQS*	*OWN* x *CPQS*^{2}
			Panel C: Firm Fixed Effects		
FINST	-0.0604***	0.0012***	0.0217***	-0.0082***	0.0005***
	(0.0027)	(0.0001)	(0.0010)	(0.0005)	(0.00003)
FIND	-0.0666***	0.0013***	-0.0079***	-0.0001	0.0001***
	(0.0028)	(0.0001)	(0.0022)	(0.0006)	(0.00003)
FNOM	-0.0553***	0.0010***	0.0210***	-0.0057***	0.0003***
	(0.0028)	(0.0001)	(0.0009)	(0.0004)	(0.00002)
LINST	-0.0623***	0.0012***	0.0013***	-0.0002	0.000006*
	(0.0036)	(0.0001)	(0.0004)	(0.0001)	(0.000003)
LIND	-0.1168***	0.0023***	-0.0137***	0.0013***	-0.00003***
	(0.0046)	(0.0001)	(0.0005)	(0.0001)	(0.000003)
LNOM	-0.0636***	0.0011***	-0.0004	-0.0003*	0.00002***
	(0.0036)	(0.0001)	(0.0005)	(0.0001)	(0.000005)
			Panel D: 2-Step System GMM[32]		
FINST	-0.0481***	0.0007***	0.0889***	-0.0319***	0.0018***
	(0.0141)	(0.0002)	(0.0290)	(0.0094)	(0.0006)
FIND	-0.0246***	0.0004***	-0.0132	0.0008	0.0001
	(0.0064)	(0.0001)	(0.0138)	(0.0023)	(0.0001)
FNOM	-0.0690***	0.0010**	0.1328***	-0.0188***	0.0007**
	(0.0225)	(0.0005)	(0.0218)	(0.0063)	(0.0003)
LINST	-0.1016*	0.0028*	0.0214	-0.0017	-0.000003
	(0.0584)	(0.0016)	(0.0162)	(0.0022)	(0.0001)
LIND	-0.0675***	0.0013***	-0.0164***	0.0010***	-0.00002***
	(0.0136)	(0.0003)	(0.0034)	(0.0003)	(0.000007)
LNOM	-0.2077***	0.0039**	-0.0181	0.0032	-0.0001
	(0.0714)	(0.0017)	(0.0223)	(0.0032)	(0.0001)

Notes: The definitions for all the variables are provided in Table 3 of Chapter 3 (page 126). Panel A and Panel B present the pooled OLS regression results for the interaction model (3.6) but specify the independent variables in one-year lagged (*t*-1) and annual changes (Δ), respectively. Panel C estimates the interaction model with a firm fixed effects estimator, while Panel D specifies the model as a dynamic panel and estimates with two-step system GMM. For brevity, estimates for control variables, constant, year and industry dummies are suppressed. Entries in parentheses are standard errors, with Panel A and Panel B the double-clustered standard errors. *N* denotes the number of observations.
***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively

[32] The 2-step system GMM estimator satisfies the specification tests in that there is no evidence of second-order serial correlation, and both the Sargan and Hansen tests fail to reject the null that all instruments are valid. For *FINST*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0130, 0.1250, 0.1910 and 0.5300, respectively. For *FIND*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.000, 0.4250, 0.1170 and 0.5820, respectively. For *FNOM*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0080, 0.1300, 0.4450 and 0.4530, respectively. For *LINST*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.6620, 0.2460 and 0.6190, respectively. For *LIND*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.4110, 0.1710 and 0.5200, respectively. For *LNOM*, the *p*-values for *AR*(1), *AR*(2), Sargan and Hansen tests are 0.0000, 0.6670, 0.8820 and 0.4880, respectively.

6.3 Summary of Empirical Results

The previous Chapter 5 documents strong empirical support for hypothesis H_2 that the relationship between liquidity and firm value is nonlinear, using data for all non-financial firms that have been listed on Bursa Malaysia over the sample period of 2000-2015. This chapter further explores the potential factors that might moderate the reported nonlinear relationship between liquidity and firm value. Based on the unique institutional setting in the Malaysia stock market, this chapter focuses on two moderating variables, namely corporate political connections and corporate ownership. The quadratic model (3.4) is augmented with interaction terms, and estimated using pooled OLS. Subsequently, a series of robustness are conducted. This section summarizes the key findings for hypotheses H_2, H_3, H_4 and H_5.

6.3.1 The Nonlinear Relationship between Liquidity and Firm Value

Using a quadratic model, Chapter 5 documents strong empirical support for hypothesis H_2 that the relationship between liquidity and firm value is nonlinear. To test the moderating effects of corporate political connections and corporate ownership, the quadratic model (3.4) is augmented with interaction terms. Section 6.1 includes two interaction terms of *PCON* x *CPQS* and *PCON* x $CPQS^2$ in the quadratic model. Section 6.2 includes *OWN* x *CPQS* and *OWN* x $CPQS^2$ in the quadratic model. The extensive analyses in these two sections (Tables 6.1-6.26) consistently show that both the coefficients of *CPQS* and $CPQS^2$ are statistically significant. The only exceptions are Table 6.13 and Table 6.25 where the relationship does not hold in a few industries especially the financial sector. This again suggests that the nonlinear relationship between liquidity and firm value is robust even in the interaction models.

6.3.2 The Moderating Effect of Corporate Political Connections

Hypothesis H_3 states that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. This thesis uses three separate lists of patronized Malaysian corporations constructed by Fung et al. (2015), Wong (2016) and Tee et al. (2017). The baseline results in Tables 6.1-6.3 show that the coefficients for *PCON* x *CPQS* and *PCON* x *CPQS*^{2} are highly significant across all three different lists of *PCON* firms and all four adjustments of standard errors. This provides empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

The moderating effect of corporate political connections passes a series of robustness checks. First, the subsamples analyses in Tables 6.4-6.6 establish the threshold liquidity levels for *PCON* and non-*PCON* firms and confirm that politically connected firms require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. Second, the coefficients for *PCON* x *CPQS* and *PCON* x *CPQS*^{2} are highly significant in Tables 6.9-6.11, suggesting that Hypothesis H_3 is robust when using Fama-MacBeth two-step regression and quantile regression. Third, Table 6.12 shows that the moderating effect of corporate political connections is not driven by the global financial crisis. The coefficients for *PCON* x *CPQS* and *PCON* x *CPQS*^{2} are highly significant at the 1% level in the sample period excluding the crisis years of 2008-2009. However, the moderating effect is largely confined to the subsample of 2000-2007 (before global crisis). Fourth, the interaction model (3.5) is re-estimated using one-year lagged explanatory variables, firm fixed effects estimator and two-step system GMM. Across the three endogeneity tests and three different lists of *PCON* firms, Tables 6.14-6.16 show that the moderating effect of political connections is not affected by common unobservable firm factors or reverse causality.

The above robustness checks provide empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. However, there are two exceptions. First, when liquidity is measured as the price impact of trade using *CPQS* Impact and Amihud (2002) illiquidity ratio, Tables 6.7-6.8 show that there is no evidence to support hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. This implies that corporate political connections only operate through transaction costs but not the price impact of trade. Second, Table 6.13 shows that the moderating effect of political connections is concentrated in a few industries. Across the three lists of political connected firms, the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are consistently significant with negative and positive signs, respectively, in four industries – construction, industrial products, properties and trading/services.

6.3.3 The Moderating Effect of Corporate Ownership

Hypothesis H_4 (H_5) states that firms with high foreign nominee ownership (local institutional ownership) require higher level of liquidity than those with low foreign nominee ownership (local institutional ownership) in order to reap the benefit of larger firm value. The baseline results in Table 6.17 provide empirical support to hypothesis H_4, and suggest stock price informativeness might be the channel through which liquidity improves firm value. The coefficients for *OWN* x *CPQS* and *OWN* x $CPQS^2$ are highly significant when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*). However, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. The interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are not statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*). The insignificant result for *LINST* could be because the positive impact of local institutions on corporate governance has become weaker in recent years. This challenges the corporate governance channel that motivates hypothesis H_5. However, the significant result for foreign institutions (*FINST*) suggests that the corporate governance channel cannot be ruled out completely. It is possible that foreign institutions play a more effective monitoring role for Malaysian public listed firms than local state-backed institutions.

The conclusions for hypotheses H_4 and H_5 remain intact in a series of robustness checks, namely: (1) establishing the threshold liquidity levels for the subsamples of bottom 25% ownership and top 25% ownership, proxied by foreign institutional ownership and foreign nominee ownership (Tables 6.18-6.19); (2) alternative liquidity measures of *CPQS* Impact and Amihud (2002) illiquidity ratio (Tables 6.20-6.21); (3) alternative estimation methods of Fama-MacBeth two-step regression and quantile regression at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the firm value conditional distribution (Tables 6.22-6.23); (4) alternative sub-periods of 2000-2007 (before crisis), 2010-2015 (after crisis) and 2000-2015 excluding the crisis years of 2008-2009 (Table 6.24); (5) industry-specific regressions for all industries including finance sector which has been excluded from the original sample (Table 6.25); (6) endogeneity tests using lag in variables regression, firm fixed effects estimator and two-step system GMM (Table 6.26).

The above robustness checks provide empirical support to hypothesis H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value. There is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. However, there are two exceptions. First, the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ become statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*) at the 0.10th, 0.25th, 0.50th and 0.75th quantiles. This implies that the moderating effect of local institutional ownership is only significant at certain quantiles of the Tobin's *Q* distribution. Second, in the four endogeneity tests, the change-in-variable regression provides contrasting results. When corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), the coefficients for *OWN* x *CPQS* and *OWN* x $CPQS^2$ are statistically significant in all endogeneity tests except the change-in-variable regression. The same applies when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are statistically significant only in the change-in-variable regression, but the coefficients suggest that the liquidity-firm value is weaker for firms with high local institutional ownership. However, the contrasting results from change-in-variable regression should not be a concern because it reflects short-term movements after removal of any longer-term effects. The firm fixed effects estimator and two-step system GMM are adequate to address endogeneity problem arises from common unobservable firm factors and reverse causality, respectively.

CHAPTER 7

SUMMARY AND CONCLUSION

This thesis is motivated by the limited research on the liquidity of Malaysian public listed firms, the institutional feature that liquidity-enhancing policies are spearheaded mainly by stock exchange regulators in emerging markets, the growing number of liquidity horseraces that prescribe the best liquidity measure for each stock exchange, and the recent data commercialization by Bursa Malaysia. The last two developments guide this thesis to construct "Closing Percent Quoted Spreads" (*CPQS*) for Malaysian stocks and assemble detailed shareholdings information that covers 1250 public listed non-financial firms over 2000–2015. This enables the thesis to conduct an in-depth analysis of the determinants of firm liquidity and the effect of higher liquidity on the valuation of Malaysian public listed firms.

This thesis addresses four research questions and formulates five hypotheses related to the liquidity of Malaysian public listed firms, as summarized in Table 7. The four research questions are addressed in Chapter 4, Chapter 5 and Chapter 6 of this thesis, respectively. Section 7.1 of this concluding chapter provides a summary of the key empirical findings for each research question. Section 7.2 discusses the implications of the findings. Recommendations to stock exchange regulators and corporate managers of public listed firms in Malaysia are also provided. The final section 7.3 then offers some concluding remarks for future studies.

Table 7: Summary of Research Questions, Hypotheses and Findings

Research Question	Hypothesis (in alternative form)	Research Findings
Q_1: Is there a threshold level in the number of shareholders for Malaysian public listed firms to reap the benefit of higher liquidity?	H_1: There is a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms.	The statistically significant coefficient with opposite signs for ln *NSH* and ln NSH^2 imply a nonlinear relationship between the number of shareholders and liquidity, thus, support hypothesis H_1.
Q_2: Is there a threshold level in liquidity for Malaysian public listed firms to reap the benefit of higher firm value?	H_2: There is a nonlinear relationship between liquidity and firm value for Malaysian public listed firms.	The statistically significant coefficient with opposite signs for *CPQS* and $CPQS^2$ imply a nonlinear relationship between liquidity and firm value, thus, support hypothesis H_2.
Q_3: Do political connections moderate the relationship between liquidity and firm value of Malaysian public listed firms?	H_3: Malaysian public listed firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.	The coefficient for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant across all three different lists of *PCON* firms, thus, support H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value.

Q_4: Does corporate ownership moderates the relationship between liquidity and firm value of Malaysian public listed firm?	H_4: Malaysian public listed firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value.	The coefficient for *OWN* x *CPQS* and *OWN* x *CPQS*^{2} are highly significant when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*), thus, support H_4 that firms with high foreign nominee ownership require higher level of liquidity than those with low foreign nominee ownership in order to reap the benefit of larger firm value.
	H_5: Malaysian public listed firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value.	The coefficient for *OWN* x *CPQS* and *OWN* x *CPQS*^{2} are not statistically significant when corporate ownership (*OWN*) is proxied by local institutional ownership (*LINST*), thus, do not support H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value.

7.1 Summary of the Key Findings

This section provides a summary of the key empirical findings for the four research questions outlined in Chapter 1 and reproduced in Table 7.

7.1.1 Number of Shareholders and Stock Liquidity

Chapter 4 examines the relationship between the number of shareholders and liquidity using data for all non-financial firms listed on Bursa Malaysia over the sample period of 2000-2015. Corporate managers and stock exchange regulators generally hold the view that more shareholders are associated with higher liquidity for the traded stocks. This view is supported by the limited empirical studies from the U.S. stock markets (Benston & Hagerman, 1974; Demsetz, 1968; Jacoby & Zheng, 2010). The preliminary analysis in Chapter 4 first estimates a linear model and finds consistent result of a positive linear relationship between the number of shareholders and liquidity. This linear relationship is robust to different liquidity proxies, namely Closing Percent Quoted Spread (*CPQS*, Table 4.3), the impact version of Closing Percent Quoted Spread (*CPQSIM*, Table 4.6) and Amihud illiquidity ratio (*ILLIQ*, Table 4.6).

However, assuming a linear relationship implicitly ignores the possibility of a negative liquidity effect that is predicted to kick in when the number of shareholders becomes too large. Motivated by this theoretical prediction, this thesis hypothesizes a nonlinear relationship between the number of shareholders and liquidity for Malaysian public listed firms. Thus, the liquidity model is augmented with the addition of the squared term for the number of shareholders. This baseline quadratic model is estimated using pooled OLS, with the standard errors adjusted for the possible existence of within-cluster correlation. The baseline results Table 4.4 show that the first-order ln *NSH* is negative and highly significant at the 1% level. The squared term, on the other hand, is positively and significantly associated with *CPQS*. The statistically significant coefficients with opposite signs for ln *NSH* and ln NSH^2 imply a nonlinear relationship between the number of shareholders and liquidity. It is important to highlight that this nonlinear relationship is robust across all adjustments of standard errors.

Further robustness checks strongly support hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. These robustness checks include alternative shareholder base measure (Table 4.5), alternative estimation methods of Fama-MacBeth two-step regression and quantile regression at the 0.10th, 0.25th, 0.50th, 0.75th and 0.90th quantiles of the liquidity conditional distribution (Table 4.7), formal statistical test for U-shape (Table 4.8), excluding the crisis years of 2008-2009 (Table 4.9), industry-specific regressions for all industries (Table 4.10), seven different investor types (Table 4.11) and endogeneity tests using lagged explanatory variables, firm fixed effect and two-step system GMM (Table 4.12). It is important to note that the inclusion of three ownership variables (*LIND*, *LINST* and *BLOCK*) in the liquidity model does not subsume the explanatory power of shareholder base in all analyses. This suggests that the number of shareholders represents distinct dimension of shareholdings that should not be ignored in future specification of liquidity model.

Despite the strong support for hypothesis H_1, there are two exceptions. First, when liquidity is measured as the price impact of trade using *CPQS* Impact and Amihud illiquidity ratio, Table 4.6 shows that there is no evidence to support hypothesis H_1 that the relationship between the number of shareholders and liquidity is nonlinear. Instead, their relationship is at best linear. Putting the results into perspective, when liquidity is proxied by *CPQS*, bid-ask spread becomes broader when the number of shareholders exceeds the threshold level as reported in Table 4.4. However, Table 4.6 shows that there is no such upper limit imposed when liquidity is proxied by both price impact measures. Instead, a larger number of shareholders is associated monotonically with lower price impact. This implies that shareholder-boosting strategies do not pose greater adverse selection risks to liquidity providers. Thus, corporate managers and stock exchange regulators can pay exclusive attention to the negative effect of a very large shareholder base on the trading costs incurred by liquidity demanders. Second, in the four endogeneity tests, only the change-in-variable regression does not find evidence to support H_1, as Table 4.12 shows that both ln *NSH* and ln NSH^2 expressed in changes completely lose their explanatory power. This is more likely due to the nonlinear relationship between shareholder base and liquidity that exists over longer term.

The richness of the data allows this thesis to conduct further analyses to explore why liquidity declines when the number of shareholders becomes too large (Table 4.13 and Table 4.14), to assess the rationale of Malaysian stock exchange's priority in boosting retail participation (Table 4.15), and to determine the role of shareholding size in promoting liquidity (Table 4.16).

The key findings from these additional analyses can be summarized as follows. First, when ownership becomes too large, the negative effect of wider spreads begins to kick in. Using the theoretically grounded probability of information-based trading (*PIN*) Table 4.13 reveals that the liquidity decline cannot be attributed to greater adverse selection costs imposed by informed trading. Instead, Table 4.14 provides support for the alternative explanation from noise trader models that the negative liquidity effect after the threshold level is due to higher volatility induced by noise trading. Second, further analysis is conducted on the liquidity role of individual investors, proxied by the number of local individuals (in natural logarithm), percentage of local individuals per total number of shareholders, and average number of shares per local individual (in natural logarithm). The first two proxies depict a U-shaped relationship with *CPQS* in Table 4.15. This indicates that liquidity declines when the firms have too many retail investors as their noise trading induces higher volatility. However, the last proxy exhibits an inverted-U shape relationship with *CPQS*. This implies that the liquidity benefit will only kick in when the number of shares per local individual exceeds the minimum number of shares. Third, further analysis is conducted to assess the explanatory power of a new variable of shareholding size (ln *SHSIZE*). Across all three estimation methods of pooled OLS, Fama-MacBeth and quantile regressions, ln *SHSIZE* exhibits an inverted U-shaped relationship with *CPQS* in Table 4.16. This implies that the liquidity benefit will only kick in when the number of shares per account holder exceeds the threshold level. This evidence suggests the number of shares per account holder should also be taken into account when formulating liquidity-enhancing policies. Moreover, the explanatory power of shareholding size is not subsumed by percentage ownership variables.

7.1.2 Stock Liquidity and Firm Value

Chapter 5 re-examines the relationship between liquidity and firm value using data for all non-financial firms listed on Bursa Malaysia over the sample period of 2000-2015. Previous studies all find a positive relationship between liquidity and firm value, but their models are specified in the linear form including the pioneering study of Fang et al. (2009). The preliminary analysis in Chapter 5 first estimates a linear model and Table 5.3 finds consistent result of a positive relationship between liquidity and firm value. However, Fang et al. (2009) outline five positive channels and two negative channels when discussing the potential channels in which liquidity might affect firm value. Motivated by the opposing effects driving this relationship, this thesis hypothesizes in H_2 a nonlinear relationship between liquidity and firm value.

The baseline quadratic model is estimated using pooled OLS, with the standard errors adjusted for the possible existence of within-cluster correlation. The baseline results in Table 5.4 show that the first-order *CPQS* is negative and highly significant at the 1% level. The squared term, on the other hand, is positively and significantly associated with Tobin's *Q*. The statistically significant coefficients with opposite signs for *CPQS* and $CPQS^2$ imply a nonlinear relationship between liquidity and firm value. It is important to highlight that this nonlinear relationship is robust across all four adjustments of standard errors in Table 5.4 (White heteroscedastic-robust, firm-clustered, time-clustered and double-clustered). Further robustness checks strongly support hypothesis H_2 using alternative liquidity measures of price impact (*CPQS* Impact and Amihud illiquidity ratio, Tables 5.5-5.6), alternative estimation methods (Fama-MacBeth two-step regression and quantile regressions, Table 5.7), alternative checks on U-shape (graphical plots in Figure 5.2 and formal U-test in Table 5.8), excluding the crisis years of 2008-2009 (Table 5.9), industry-specific regressions (Table 5.10), endogeneity tests (lagged explanatory variables, change-in-variable regression, firm fixed effects and two-step system GMM, Table 5.11), and exogenous liquidity shock (Table 5.12). The use of exogenous liquidity shock confirms the causal relationship running from liquidity to firm value, consistent with the result of Fang et al. (2009).

The finding of a U-shape curve between *CPQS* and Tobin's *Q* suggests that liquidity and firm value are negatively related when liquidity is at lower levels. However, this relationship turns positive when liquidity increases and exceeds a certain threshold level. In other words, the evidence suggests the firm value benefit can only be attained after firms reach a high level of liquidity. This might explain why not all firms pursue liquidity-enhancing policies. This is because the potential costs of maintaining a high level of liquidity might outweigh the associated benefits.

Apart from the key finding for hypothesis H_2, the analysis also reveals firm size (ln *SIZE*), leverage (*LEV*), capital expenditures (*CAPEX*), return on assets (*ROA*), stock index membership (*KLCI*) and independent non-executive chairman (*CHAIR*) are crucial drivers for the market valuation of Malaysian stocks. This is because they are highly significant across three different estimation methods – pooled OLS, Fama-MacBeth regression and quantile analysis. Moreover, they are significant across all four adjustments of standard errors (White heteroscedastic-robust, firm-clustered, time-clustered, and double-clustered standard errors) and the entire conditional distribution of Tobin's *Q*. For corporate governance, the results show that having a larger board size, more independent non-executive directors, and separate CEO and board chairman are not sufficient to reap value gains. Instead, a more stringent corporate governance code might be needed in that the board chairman should be independent non-executive director.

7.1.3 Corporate Political Connections, Corporate Ownership and Liquidity-Firm Value Relationship

The previous Chapter 5 documents strong empirical support for hypothesis H_2 that the relationship between liquidity and firm value is nonlinear, using data for all non-financial firms that have been listed on Bursa Malaysia over the sample period of 2000-2015. Chapter 6 further explores the potential factors that might moderate the reported nonlinear relationship between liquidity and firm value. Based on the unique institutional setting in the Malaysia stock market, Chapter 6 focuses on two moderating variables, namely corporate political connections and corporate ownership.

To test the moderating effects of corporate political connections (*PCON*) and corporate ownership (*OWN*), the quadratic model in Chapter 5 is augmented with interaction terms. Section 6.1 includes two interaction terms of *PCON* x *CPQS* and *PCON* x $CPQS^2$, while Section 6.2 includes *OWN* x *CPQS* and *OWN* x $CPQS^2$ in the original quadratic model. The extensive analyses in these two sections (Tables 6.1-6.26) consistently show that both the coefficients of *CPQS* and $CPQS^2$ are statistically significant. The exceptions are Table 6.13 and Table 6.25 where the nonlinear relationship does not hold in a few industries. This again suggests that the nonlinear relationship between liquidity and firm value is robust even in the interaction models.

Hypothesis H_3 states that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. This thesis uses three separate lists of patronized Malaysian corporations constructed by Fung et al. (2015), Wong (2016) and Tee et al. (2017). The baseline results in Tables 6.1-6.3 show that the coefficients for *PCON* x *CPQS* and *PCON* x $CPQS^2$ are highly significant across all three different lists of *PCON* firms and all four adjustments of standard errors. This provides empirical support to hypothesis H_3 that firms with political connections require higher level of liquidity than non-politically connected firms in order to reap the benefit of larger firm value. The moderating effect of corporate political connections passes a series of robustness checks: (1) subsamples analyses for *PCON* and non-*PCON* firms (Tables 6.4-6.6); (2) alternative estimation methods of Fama-MacBeth two-step regression and quantile regression (Tables 6.9-6.11); (3) sub-samples excluding the 2008-2009 global financial crisis (Table 6.12); (4) endogeneity tests using one-year lagged explanatory variables, firm fixed effects estimator and two-step system GMM (Tables 6.14-6.16). However, there are two exceptions in which hypothesis H_3 does not hold, that is when liquidity is measured as the price impact of trade using *CPQS* Impact and Amihud illiquidity ratio (Tables 6.7-6.8), and that the moderating effect of political connections is concentrated in a few industries (Table 6.13).

Hypothesis H_4 (H_5) states that firms with high foreign nominee ownership (local institutional ownership) require higher level of liquidity than those with low foreign nominee ownership (local institutional ownership) in order to reap the benefit of larger firm value. The baseline results in Table 6.17 show that the coefficients for *OWN* x *CPQS* and *OWN* x $CPQS^2$ are highly significant when corporate ownership (*OWN*) is proxied by foreign nominee (*FNOM*). This provides empirical support to hypothesis H_4, and suggest stock price informativeness might be the channel through which liquidity improves firm value. However, there is no statistical evidence to support hypothesis H_5 that firms with high local institutional ownership require higher level of liquidity than those with low local institutional ownership in order to reap the benefit of larger firm value. This is because the interaction terms of *OWN* x *CPQS* and *OWN* x $CPQS^2$ are not statistically significant when corporate ownership is proxied by local institutional ownership (*LINST*). This challenges the corporate governance channel that motivates hypothesis H_5. However, the significant result for foreign institutions (*FINST*) suggests that the corporate governance channel cannot be ruled out completely. It is possible that foreign institutions play a more effective monitoring role for Malaysian public listed firms than local state-backed institutions.

The conclusions for hypotheses H_4 and H_5 remain intact in a series of robustness checks, namely: (1) establishing the threshold liquidity levels for the subsamples of bottom 25% ownership and top 25% ownership, proxied by foreign institutional ownership and foreign nominee ownership (Tables 6.18-6.19); (2) alternative liquidity measures of *CPQS* Impact and Amihud illiquidity ratio (Tables 6.20-6.21); (3) alternative estimation methods of Fama-MacBeth two-step regression and quantile regression at the 0.10^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th} and 0.90^{th} quantiles of the firm value conditional distribution (Tables 6.22-6.23); (4) alternative sub-periods of 2000-2007 (before crisis), 2010-2015 (after crisis) and 2000-2015 excluding the crisis years of 2008-2009 (Table 6.24); (5) industry-specific regressions for all industries that have at least 100 firm-year observations (Table 6.25); (6) endogeneity tests using lag in variables regression, firm fixed effects estimator and two-step system GMM (Table 6.26).

7.2 Implications of the Findings

The findings from the first empirical Chapter 4 have implications for the Malaysian stock exchange regulator and operator, given their continuous efforts to expand investor participation in the local bourse. The evidence commends those measures aimed at attracting investors because larger number is associated with higher liquidity. However, the U-shaped relationship between the number of shareholders and Closing Percent Quoted Spread suggests the existence of a threshold maximum level. When the number of shareholders become too large, liquidity will decline because the costs outweigh the benefits. This caution against the popular view that "more is better" in shareholding-boosting strategies. On the other hand, the Malaysian data reveal that less than 5% of firm-year observations exceed the threshold maximum level. This suggests either the existing policies are not adequate or there is a limit to what stock exchange can achieve. It thus calls for the active cooperation of Malaysian public listed firms to boost their shareholder base. Unlike most emerging markets, the literature suggests that public listed firms in developed stock markets actively pursue a wide range of shareholding-boosting strategies, such as the reduction in lot size, stock splits, noncash shareholder perks, cross-listing on overseas major stock exchanges, strategic corporate disclosures, effective investor relations programs, increases in company name fluency, addition to stock indices and higher levels of advertising expenditures. Some of these effective strategies from developed markets are worth considering for corporate managers of Malaysian public listed firms.

Chapter 5 establishes the ground as to why corporate managers of Malaysian public listed firms should actively manage their shareholder base to increase liquidity. The finding of a U-shape curve between *CPQS* and Tobin's *Q* suggests that Malaysian public listed firms should play a more active role in boosting their own stock liquidity. This is because the tangible benefit of higher market valuation can only be attained when liquidity is at higher levels, especially for firms with political connections and higher foreign ownership. This is in line with the repeated calls by Amihud and Mendelson (1988, 1991, 2000, 2008) to actively pursue liquidity-enhancing policies. The Malaysian stock market will benefit greatly if regulators and listed firms cooperate and make concerted efforts to improve liquidity.

Apart from the above policy and practical implications, the key findings of this thesis are also of relevance to future theoretical work. This thesis shows the importance of functional form when modelling the shareholder base-liquidity and liquidity-firm value relationships. The existence of threshold calls for more advanced econometrics modelling, such as the threshold models of Hansen (1999, 2000), Caner and Hansen (2004) and Seo and Shin (2016). On the other hand, the significance of the moderating effects should be formally modelled as this is not captured in existing theoretical models.

7.3 Conclusion

This thesis contributes to the literature through extensive analyses on the determinants and effect of liquidity on the Malaysian public listed firms. This has direct implications to stock exchange regulators, corporate managers and future theoretical work. It is possible the policy lessons are applicable to other emerging markets with similar institutional and market features. For instance, those emerging markets with huge presence of political connected firms and foreign investors. However, the possibility of generalization is left for verification by future studies.

The assembled dataset can be expanded to shed more insights into various liquidity issues explored in other developed stock markets, but have not been addressed in the Malaysian context due to data constraint. On the other hand, the Malaysian authorities have embarked on a series of measures and initiatives to improve the liquidity of the local stock market since its incorporation in 1976. However, the effectiveness of these public measures in enhancing the liquidity of Malaysian stocks has not been examined. It is the hope that this thesis will stimulate more research on the liquidity of Malaysian public listed firms.

As highlighted earlier, the focus of a single country is a limitation of this thesis. For instance, this thesis advocates the inclusion of shareholder base in liquidity model but the evidence is drawn from a single country. Future studies should assess the explanatory power of shareholder base when cross-country data are available in commercial databases. For instance, with the availability of shareholder information in Thomson Datastream, the literature witnesses the emergence of cross-country liquidity studies using number of free-float shares (Ding et al., 2016) and foreign blockholdings (Lee & Chung, 2018; Ng et al., 2016), but none on shareholder base.

REFERENCES

Abdul Wahab, E. A., How, J. C. Y., & Verhoeven, P. (2007). The impact of the Malaysian Code on Corporate Governance: Compliance, institutional investors and stock performance. *Journal of Contemporary Accounting & Economics*, *3*(2), 106–129.

Abdul Wahab, Effiezal Aswadi, Mat Zain, M. M., James, K., & Haron, H. (2009). Institutional investors, political connection and audit quality in Malaysia. *Accounting Research Journal*, *22*(2), 167–195.

Acharya, V. V., & Pedersen, L. H. (2005). Asset pricing with liquidity risk. *Journal of Financial Economics, 77*(2), 375–410.

Adhikari, A., Derashid, C., & Zhang, H. (2006). Public policy, political connections, and effective tax rates: Longitudinal evidence from Malaysia. *Journal of Accounting and Public Policy, 25*(5), 574–595.

Agarwal, P. (2007). Institutional ownership and stock liquidity. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.1029395.

Aggarwal, R., Erel, I., Ferreira, M., & Matos, P. (2011). Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics, 100*(1), 154–181.

Agudelo, D. A. (2010). Friend or foe? Foreign investors and the liquidity of six Asian markets. *Asia-Pacific Journal of Financial Studies*, *39*(3), 261–300.

Ahn, H. J., Cai, J., Hamao, Y., & Melvin, M. (2014). Little guys, liquidity, and the informational efficiency of price: Evidence from the Tokyo Stock Exchange on the effects of small investor participation. *Pacific-Basin Finance Journal, 29*, 163–181.

Aitken, M., & Comerton-Forde, C. (2003). How should liquidity be measured? *Pacific-Basin Finance Journal*, *11*(1), 45–59.

Akins, B. K., Ng, J., & Verdi, R. S. (2012). Investor competition over information and the pricing of information asymmetry. *Accounting Review*, *87*(1), 35–58.

Al-Jaifi, H. A., Hussein Al-rassas, A., & Ali AL-Qadasi, A. (2017). Corporate governance strength and stock market liquidity in Malaysia. *International Journal of Managerial Finance, 13*(5), 592–610.

Alonso-Borrego, C., & Arellano, M. (1999). Symmetrically normalized instrumental-variable estimation using panel data. *Journal of Business and Economic Statistics*, *17*(1), 36–49.

Ameer, R., & Abdul Rahman, R. (2009). The impact of minority shareholder watchdog group activism on the performance of targeted firms in Malaysia. *Asian Academy of Management Journal of Accounting and Finance*, *5*(1), 67–92.

Amihud, Y., & Mendelson, H. (2008). Liquidity, the value of the firm, and corporate finance. *Journal of Applied Corporate Finance*, *20*(2), 32–45.

Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31–56.

Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, *17*(2), 223–249.

Amihud, Y., & Mendelson, H. (1988). Liquidity and asset prices: Financial management implications. *Financial Management*, *17*(1), 5–15.

Amihud, Y., & Mendelson, H. (1989). The effects of beta, bid-ask spread, residual risk, and size on stock returns. *Journal of Finance*, *44*(2), 479–486.

Amihud, Y., & Mendelson, H. (1991). Liquidity, asset prices and financial policy. *Financial Analysts Journal*, *47*(6), 56–66.

Amihud, Y., & Mendelson, H. (1996). A new approach to the regulation of trading across securities markets. *New York University Law Review*, *71*(6), 1411–1466.

Amihud, Y., & Mendelson, H. (2000). The liquidity route to a lower cost of capital. *Journal of Applied Corporate Finance*, *12*(4), 8–26.

Amihud, Y., & Mendelson, H. (2012). Liquidity, the value of the firm and corporate finance. *Journal of Applied Corporate Finance*, *24*(1), 17–32.

Amihud, Y., Mendelson, H., & Lauterbach, B. (1997). Market microstructure and securities values: Evidence from the Tel Aviv stock exchange. *Journal of Financial Economics*, *45*(3), 365–390.

Amihud, Y., Mendelson, H., & Pedersen, L. H. (2006). Liquidity and asset prices. *Foundations and Trends® in Finance, 1*, 269–364.

Amihud, Y., Mendelson, H., & Uno, J. (1999). Number of shareholders and stock prices: Evidence from Japan. *Journal of Finance, 54*(3), 1169–1184.

An, H., & Zhang, T. (2013). Stock price synchronicity, crash risk, and institutional investors. *Journal of Corporate Finance, 21*, 1–15.

Anchev, S. (2017). Investor base and stock return anomalies. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.3048508.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29–51.

Armstrong, C. S., Core, J. E., Taylor, D. J., & Verrecchia, R. E. (2011). When does information asymmetry affect the cost of capital? *Journal of Accounting Research*, *49*(1), 1–40.

Aslan, H., Easley, D., Hvidkjaer, S., & O'Hara, M. (2011). The characteristics of informed trading: Implications for asset pricing. *Journal of Empirical Finance*, *18*(5), 782–801.

Attig, N., Fong, W. M., Gadhoum, Y., & Lang, L. H. P. (2006). Effects of large shareholding on information asymmetry and stock liquidity. *Journal of Banking and Finance*, *30*(10), 2875–2892.

Azevedo, A., Karim, M., Gregoriou, A., & Rhodes, M. (2014). Stock price and volume effects associated with changes in the composition of the FTSE Bursa Malaysian KLCI. *Journal of International Financial Markets, Institutions and Money*, *28*, 20–35.

Back, K., Li, T., & Ljungqvist, A. (2015). Liquidity and governance. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.2350362.

Baker, M., & Stein, J. C. (2004). Market liquidity as a sentiment indicator. *Journal of Financial Markets*, *7*(3), 271–299.

Balachandran, B., & Faff, R. (2015). Corporate governance, firm value and risk: Past, present, and future. *Pacific-Basin Finance Journal*, *35*, 1–12.

Balakrishnan, K., Billings, M. B., Kelly, B., & Ljungqvist, A. (2014). Shaping liquidity: On the causal effects of voluntary disclosure. *Journal of Finance, 69*(5), 2237–2278.

Barber, B. M., & Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *Journal of Finance*, *55*(2), 773–806.

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, *49*(3), 307–343.

Barinov, A. (2014). Turnover: Liquidity or uncertainty? *Management Science*, *60*(10), 2478–2495.

Batten, J., & Vo, X. V. (2019). Liquidity and firm value in an emerging market. *Singapore Economic Review, 64*(2), 365–376.

Bekaert, G., Harvey, C. R., & Lumsdaine, R. L. (2002). Dating the integration of world equity markets. *Journal of Financial Economics*, *65*(2), 203–247.

Bekaert, G., Harvey, C. R., & Lundblad, C. (2007). Liquidity and expected returns: Lessons from emerging markets. *Review of Financial Studies*, *20*(6), 1783–1831.

Bellemare, M. F., Masaki, T., & Pepinsky, T. B. (2017). Lagged explanatory variables and the estimation of causal effects. *Journal of Politics*, *79*(3), 949–963.

Benson, K., Faff, R., & Smith, T. (2015). Injecting liquidity into liquidity research. *Pacific-Basin Finance Journal*, *35*, 533–540.

Benston, G. J., & Hagerman, R. L. (1974). Determinants of bid-asked spreads in the over-the-counter market. *Journal of Financial Economics*, *1*(4), 353–364.

Beyer, A., Larcker, D. F., & Tayan, B. (2014). Does the composition of a company's shareholder base really matter? *SSRN Working Paper*, available at https://ssrn.com/abstract=2474792.

Bharath, S. T., Jayaraman, S., & Nagar, V. (2013). Exit as governance: An empirical analysis. *Journal of Finance*, *68*(6), 2515–2547.

Bharath, S. T., & Shumway, T. (2008). Forecasting default with the Merton distance to default model. *Review of Financial Studies*, *21*(3), 1339–1369.

Bhide, A. (1993). The hidden costs of stock market liquidity. *Journal of Financial Economics*, *34*(1), 31–51.

Black, F. (1986). Noise. *Journal of Finance*, *41*(3), 528–543.

Blau, B. M., Brough, T. J., & Thomas, D. W. (2013). Corporate lobbying, political connections, and the bailout of banks. *Journal of Banking and Finance*, *37*(8), 3007–3017.

Bliss, M. A., & Gul, F. A. (2012a). Political connection and cost of debt: Some Malaysian evidence. *Journal of Banking and Finance*, *36*(5), 1520–1527.

Bliss, M. A., & Gul, F. A. (2012b). Political connection and leverage: Some Malaysian evidence. *Journal of Banking and Finance*, *36*(8), 2344–2350.

Bliss, M. A., Gul, F. A., & Majid, A. (2011). Do political connections affect the role of independent audit committees and CEO duality? Some evidence from Malaysian audit pricing. *Journal of Contemporary Accounting and Economics*, *7*(2), 82–98.

Blume, M. E., & Keim, D. B. (2012). Institutional investors and stock market liquidity: Trends and relationships. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.2147757.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143.

Bodnaruk, A., & Östberg, P. (2009). Does investor recognition predict returns? *Journal of Financial Economics*, *91*(2), 208–226.

Bodnaruk, A., & Östberg, P. (2013). The shareholder base and payout policy. *Journal of Financial and Quantitative Analysis*, *48*(3), 729–760.

Bond, P., Edmans, A., & Goldstein, I. (2012). The real effects of financial markets. *Annual Review of Financial Economics*, *4*, 339–360.

Borisova, G., & Yadav, P. K. (2015). Government ownership, informed trading, and private information. *Journal of Corporate Finance*, *33*, 196–211.

Boubakri, N., Guedhami, O., Mishra, D., & Saffar, W. (2012). Political connections and the cost of equity capital. *Journal of Corporate Finance*, *18*(3), 541–559.

Braam, G., Nandy, M., Weitzel, U., & Lodh, S. (2015). Accrual-based and real earnings management and political connections. *International Journal of Accounting*, *50*(2), 111–141.

Brennan, M. J., Huh, S.-W., & Subrahmanyam, A. (2016). Asymmetric effects of informed trading on the cost of equity capital. *Management Science*, *62*(9), 2460–2480.

Brennan, M. J., & Subrahmanyam, A. (1995). Investment analysis and price formation in securities markets. *Journal of Financial Economics*, *38*(3), 361–381.

Brockman, P., Chung, D. Y., & Yan, S.X. (2009). Block ownership, trading activity, and market liquidity. *Journal of Financial and Quantitative Analysis*, *44*(6), 1403–1426.

Brockman, P., & Yan, S.X. (2009). Block ownership and firm-specific information. *Journal of Banking and Finance*, *33*(2), 308–316.

Brogaard, J., Li, D., & Xia, Y. (2017). Stock liquidity and default risk. *Journal of Financial Economics*, *124*(3), 486–502.

Brown, G. W. (1999). Volatility, sentiment, and noise traders. *Financial Analysts Journal*, *55*(2), 82–90.

Brown, S., & Hillegeist, S. A. (2007). How disclosure quality affects the level of information asymmetry. *Review of Accounting Studies*, *12*(2–3), 443–477.

Brunnermeier, M. K., & Pedersen, L. H. (2009). Market liquidity and funding liquidity. *Review of Financial Studies*, *22*(6), 2201–2238.

Bushee, B. (2004). Identifying and attracting the “right” investors: Evidence on the behavior of institutional investors. *Journal of Applied Corporate Finance*, *16*(4), 28–35.

Bushee, B. J., & Miller, G. S. (2012). Investor relations, firm visibility, and investor following. *Accounting Review*, *87*(3), 867–897.

Bushee, B. J., & Noe, C. F. (2000). Corporate disclosure practices, institutional investors, and stock return volatility. *Journal of Accounting Research*, *38*, 171–202.

Byun, H. Y., Hwang, L. S., & Lee, W. J. (2011). How does ownership concentration exacerbate information asymmetry among equity investors? *Pacific Basin Finance Journal*, *19*(5), 511–534.

Caner, M., & Hansen, B. E. (2004). Instrumental variable estimation of a threshold model. *Econometric Theory*, *20*(5), 813–843.

Carney, R. W., & Child, T. B. (2013). Changes to the ownership and control of East Asian corporations between 1996 and 2008: The primacy of politics. *Journal of Financial Economics*, *107*(2), 494–513.

Chan, H. W., & Faff, R. W. (2003). An investigation into the role of liquidity in asset pricing: Australian evidence. *Pacific-Basin Finance Journal*, *11*(5), 555–572.

Chang, E. C., Guo, C., & Ren, J. (2013). Retail investor recognition and the cross-section of stock returns. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.1998697.

Chang, X., Chen, Y., & Zolotoy, L. (2017). Stock liquidity and stock price crash risk. *Journal of Financial and Quantitative Analysis*, *52*(4), 1605–1637.

Charumilind, C., Kali, R., & Wiwattanakantang, Y. (2006). Connected lending: Thailand before the financial crisis. *Journal of Business*, *79*(1), 181–218.

Chen, C. R., Li, Y., Luo, D., & Zhang, T. (2017). Helping hands or grabbing hands? An analysis of political connections and firm value. *Journal of Banking and Finance*, *80*, 71–89.

Chen, H. L., Chow, E. H., & Shiu, C. Y. (2015). The informational role of individual investors in stock pricing: Evidence from large individual and small retail investors. *Pacific-Basin Finance Journal*, *31*, 36–56.

Chen, H., Noronha, G., & Singal, V. (2004). The price response to S&P 500 index additions and deletions: Evidence of asymmetry and a new explanation. *Journal of Finance*, *59*(4), 1901–1930.

Chen, S. S., Ho, K. W., Lee, C. F., & Shrestha, K. (2004). Nonlinear models in corporate finance research: Review, critique, and extensions. *Review of Quantitative Finance and Accounting*, *22*(2), 141–169.

Chen, S., Sun, Z., Tang, S., & Wu, D. (2011). Government intervention and investment efficiency: Evidence from China. *Journal of Corporate Finance*, *17*(2), 259–271.

Cheung, W. M., Chung, R., & Fung, S. (2015). The effects of stock liquidity on firm value and corporate governance: Endogeneity and the REIT experiment. *Journal of Corporate Finance*, *35*, 211–231.

Cheung, Y. L., Rau, P. R., & Stouraitis, A. (2010). Helping hand or grabbing hand? Central vs. local government shareholders in Chinese listed firms. *Review of Finance*, *14*(4), 669–694.

Chiang, R., & Venkatesh, P. C. (1988). Insider holdings and perceptions of information asymmetry: A note. *Journal of Finance*, *43*(4), 1041–1048.

Chiang, T. C., & Zheng, D. (2015). Liquidity and stock returns: Evidence from international markets. *Global Finance Journal*, *27*, 73–97.

Chichernea, D. C., Ferguson, M. F., & Kassa, H. (2015). Idiosyncratic risk, investor base and returns. *Financial Management*, *44*(2), 267–293.

Choi, J. J., Jin, L., & Yan, H. (2013). What does stock ownership breadth measure? *Review of Finance*, *17*(4), 1239–1278.

Chordia, T., Roll, R., & Subrahmanyam, A. (2008). Liquidity and market efficiency. *Journal of Financial Economics*, *87*(2), 249–268.

Chung, D., & Hrazdil, K. (2010a). Liquidity and market efficiency: A large sample study. *Journal of Banking and Finance*, *34*(10), 2346–2357.

Chung, D. Y., & Hrazdil, K. (2010b). Liquidity and market efficiency: Analysis of NASDAQ firms. *Global Finance Journal*, *21*(3), 262–274.

Chung, K H, McInish, T. H., Wood, R. A., & Wyhowski, D. J. (1995). Production of information, information asymmetry, and the bid-ask spread: Empirical evidence from analysts' forecasts. *Journal of Banking and Finance*, *19*(6), 1025–1046.

Chung, Kee H., & Chuwonganant, C. (2014). Uncertainty, market structure, and liquidity. *Journal of Financial Economics*, *113*(3), 476–499.

Chung, Kee H., Elder, J., & Kim, J. C. (2010). Corporate governance and liquidity. *Journal of Financial and Quantitative Analysis*, *45*(2), 265–291.

Chung, Kee H., & Li, M. (2003). Adverse-selection costs and the probability of information-based trading. *Financial Review*, *38*(2), 257–272.

Chung, Kee H., & Zhang, H. (2014). A simple approximation of intraday spreads using daily data. *Journal of Financial Markets*, *17*(1), 94–120.

Claessens, S., Djankov, S., & Lang, L. H. (2000). The separation of ownership and control in East Asian Corporations. *Journal of Financial Economics*, *58*(1-2), 81–112.

Claessens, S., & Yurtoglu, B. B. (2013). Corporate governance in emerging markets: A survey. *Emerging Markets Review*, *15*, 1–33.

Coffee, J. C. (1991). Liquidity versus control: The institutional investor as corporate monitor. *Columbia Law Review*, *91*(6), 1277–1368.

Corwin, S. A., & Schultz, P. (2012). A simple way to estimate bid-ask spreads from daily high and low prices. *Journal of Finance*, *67*(2), 719–760.

Cumming, D., Johan, S., & Li, D. (2011). Exchange trading rules and stock market liquidity. *Journal of Financial Economics*, *99*(3), 651–671.

Dang, T. L., Nguyen, T. H., Tran, N. T. A., & Vo, T. T. A. (2018). Institutional ownership and stock liquidity: International evidence. *Asia-Pacific Journal of Financial Studies*, *47*(1), 21–53.

Dass, N., Nanda, V., & Xiao, S. C. (2013). Innovative firms and the endogenous choice of stock liquidity. *Working Paper, Georgia Institute of Technology and Rutgers*.

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. *Journal of Political Economy*, *98*(4), 703–738.

Demsetz, H. (1968). The cost of transacting. *Quarterly Journal of Economics*, *82*(1), 33–53.

Dey, M. K. (2005). Turnover and return in global stock markets. *Emerging Markets Review*, *6*(1), 45–67.

Ding, M., Nilsson, B., & Suardi, S. (2017). Foreign institutional investment, ownership, and liquidity: Real and informational frictions. *Financial Review*, *52*(1), 101–144.

Ding, X. S., Ni, Y., & Zhong, L. (2016). Free float and market liquidity around the world. *Journal of Empirical Finance*, *38*, 236–257.

Dou, Y., Hope, O.-K., Thomas, W. B., & Zou, Y. (2018). Blockholder exit threats and financial reporting quality. *Contemporary Accounting Research*, *35*(2), 1004–1028.

Duarte, J., & Young, L. (2009). Why is PIN priced? *Journal of Financial Economics*, *91*(2), 119–138.

Duchin, R., & Sosyura, D. (2012). The politics of government investment. *Journal of Financial Economics*, *106*(1), 24–48.

Easley, D, & O'hara, M. (1987). Price, trade size, and information in securities markets. *Journal of Financial Economics*, *19*(1), 69–90.

Easley, David, Kiefer, N. M., O'Hara, M., & Paperman, J. B. (1996). Liquidity, information, and infrequently traded stocks. *Journal of Finance*, *51*(4), 1405–1436.

Easley, David, & O'hara, M. (2004). Information and the cost of capital. *Journal of Finance*, *59*(4), 1553–1583.

Easley, David, O'Hara, M., & Paperman, J. (1998). Financial analysts and information-based trade. *Journal of Financial Markets*, *1*(2), 175–201.

Edmans, A. (2009). Blockholder trading, market efficiency, and managerial myopia. *Journal of Finance*, *64*(6), 2481–2513.

Edmans, A. (2014). Blockholders and corporate governance. *Annual Review of Financial Economics*, *6*, 23–50.

Edmans, A., Fang, V. W., & Zur, E. (2013). The effect of liquidity on governance. *Review of Financial Studies*, *26*(6), 1443–1482.

Edmans, A., & Holderness, C. G. (2017). Blockholders: A survey of theory and evidence. *Handbook of the Economics of Corporate Governance*, *1*, 541-636.

Edmans, A., & Manso, G. (2011). Governance through trading and intervention: A theory of multiple blockholders. *Review of Financial Studies*, *24*(7), 2395–2428.

El-Nader, G. (2018). Stock liquidity and free float: Evidence from the UK. *Managerial Finance*, *44*(10), 1227–1236.

Faccio, M. (2006). Politically connected firms. *American Economic Review*, *96*(1), 369–386.

Faccio, M., Masulis, R. W., & Mcconnell, J. J. (2006). Political connections and corporate bailouts. *Journal of Finance*, *61*(6), 2597–2635.

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *Journal of Finance*, *47*(2), 427–465.

Fama, E. F., & Macbeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy*, *81*(3), 607–636.

Fang, V. W., Noe, T. H., & Tice, S. (2009). Stock market liquidity and firm value. *Journal of Financial Economics*, *94*(1), 150–169.

Fang, V. W., Tian, X., & Tice, S. (2014). Does stock liquidity enhance or impede firm innovation? *Journal of Finance*, *69*(5), 2085–2125.

Fauver, L., Hung, M., Li, X., & Taboada, A. G. (2017). Board reforms and firm value: Worldwide evidence. *Journal of Financial Economics*, *125*(1), 120–142.

Ferreira, M. A., & Matos, P. (2008). The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics*, *88*(3), 499–533.

Fieller, E. C. (1954). Some problems in interval estimation. *Journal of the Royal Statistical Society. Series B (Methodological)*, *16*(2), 175–185.

Fong, K. Y. L., Holden, C. W., & Trzcinka, C. (2017). What are the best liquidity proxies for global research? *Review of Finance*, *21*(4), 1355–1401.

Foo, Y. B., & Mat Zain, M. (2010). Board independence, board diligence and liquidity in Malaysia: A research note. *Journal of Contemporary Accounting and Economics*, *6*(2), 92–100.

Foong, S. S., & Lim, K. P. (2016). Stock market liberalisation and cost of equity: Firm-level evidence from Malaysia. *Asian Academy of Management Journal of Accounting and Finance*, *12*(1), 19–42.

Foster, F. D., & Viswanathan, S. (1994). Strategic trading with asymmetrically informed traders and long-lived information. *Journal of Financial and Quantitative Analysis*, *29*(4), 499–518.

Foucault, T., Sraer, D., & Thesmar, D. J. (2011). Individual investors and volatility. *Journal of Finance*, *66*(4), 1369–1406.

Fraser, D. R., Zhang, H., & Derashid, C. (2006). Capital structure and political patronage: The case of Malaysia. *Journal of Banking and Finance*, *30*(4), 1291–1308.

Frieder, L., & Martell, R. (2006). On capital structure and the liquidity of a firm's stock. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.880421.

Frino, A., Mollica, V., Monaco, E., & Palumbo, R. (2017). The effect of algorithmic trading on market liquidity: Evidence around earnings announcements on Borsa Italiana. *Pacific-Basin Finance Journal*, *45*, 82–90.

Fung, S. Y. K., Gul, F. A., & Radhakrishnan, S. (2015). Corporate political connections and the 2008 Malaysian election. *Accounting, Organizations and Society*, *43*, 67–86.

Garleanu, N., & Pedersen, L. H. (2007). Liquidity and risk management. *American Economic Review*, *97*(2), 193–197.

Glosten, L. R., & Milgrom, P. R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, *14*(1), 71–100.

Goldman, E., Rocholl, J., & So, J. (2009). Do politically connected boards affect firm value? *Review of Financial Studies*, *22*(6), 2331–2360.

Goldman, E., Rocholl, J., & So, J. (2013). Politically connected boards of directors and the allocation of procurement contracts. *Review of Finance*, *17*(5), 1617–1648.

Goldstein, I., & Guembel, A. (2008). Manipulation and the allocational role of prices. *Review of Economic Studies*, *75*(1), 133–164.

Gomez, E. T. (2004). *The State of Malaysia: Ethnicity, Equity and Reform*. London: RoutledgeCurzon.

Gomez, E. T., & Jomo, K. S. (1997). *Malaysia's Political Economy: Politics, Patronage and Profits*. Cambridge: Cambridge University Press.

Gomez, E. T., Padmanabhan, T., Kamaruddin, N., Bhalla, S., & Fisal, F. (2018). *Minister of Finance Incorporated: Ownership and Control of Corporate Malaysia*. Singapore: Palgrave Macmillan.

Gomez, E. T., & Saravanamuttu, J. (2013). *The New Economic Policy in Malaysia: Affirmative Action, Ethnic Inequalities and Social Justice*. Singapore: National University of Singapore Press.

Gormley, T. A., & Matsa, D. A. (2014). Common errors: How to (and Not to) control for unobserved heterogeneity. *Review of Financial Studies*, *27*(2), 617–661.

Gow, I. D., Ormazabal, G., & Taylor, D. J. (2010). Correcting for cross-sectional and time-series dependence in accounting research. *Accounting Review*, *85*(2), 483–512.

Goyenko, R. Y., Holden, C. W., & Trzcinka, C. A. (2009). Do liquidity measures measure liquidity? *Journal of Financial Economics*, *92*(2), 153–181.

Green, T. C., & Jame, R. (2013). Company name fluency, investor recognition, and firm value. *Journal of Financial Economics*, *109*(3), 813–834.

Griffin, J. M., Kelly, P. J., & Nardari, F. (2010). Do market efficiency measures yield correct inferences? A comparison of developed and emerging markets. *Review of Financial Studies*, *23*(8), 3225–3277.

Grossman, S. J., & Hart, O. D. (1980). Takeover bids, the free-rider problem, and the theory of the corporation. *The Bell Journal of Economics*, *11*(1), 42–64.

Grullon, G., Kanatas, G., & Weston, J. P. (2004). Advertising, breadth of ownership, and liquidity. *Review of Financial Studies*, *17*(2), 439–461.

Gul, F. A. (2006). Auditors' response to political connections and cronyism in Malaysia. *Journal of Accounting Research*, *44*(5), 931–963.

Gul, F. A., Munir, S., & Zhang, L. (2016). Ethnicity, politics and firm performance: Evidence from Malaysia. *Pacific-Basin Finance Journal*, *40*, 115–129.

Gunasekarage, A., Hess, K., & Hu, A. (Jie). (2007). The influence of the degree of state ownership and the ownership concentration on the performance of listed Chinese companies. *Research in International Business and Finance*, *21*(3), 379–395.

Habib, A., Muhammadi, A. H., & Jiang, H. (2017). Political connections, related party transactions, and auditor choice: Evidence from Indonesia. *Journal of Contemporary Accounting and Economics*, *13*(1), 1–19.

Hameed, A., & Ting, S. (2000). Trading volume and short-horizon contrarian profits: Evidence from the Malaysian market. *Pacific-Basin Finance Journal*, *8*(1), 67–84.

Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, *93*, 345–368.

Hansen, B. E. (2000). Sample splitting and threshold estimation. *Econometrica*, *68*(3), 575–603.

Hasbrouck, J. (2004). Liquidity in the futures pits: Inferring market dynamics from incomplete data. *Journal of Financial and Quantitative Analysis*, *39*(2), 305–326.

Hasbrouck, J. (2009). Trading costs and returns for U.S. equities: Estimating effective costs from daily data. *Journal of Finance*, *64*(3), 1445–1477.

He, W., Li, D., Shen, J., & Zhang, B. (2013). Large foreign ownership and stock price informativeness around the world. *Journal of International Money and Finance*, *36*, 211–230.

Heflin, F. L., Shaw, K. W., & Wild, J. J. (2005). Disclosure policy and market liquidity: Impact of depth quotes and order sizes. *Contemporary Accounting Research*, *22*(4), 829–865.

Heflin, F., & Shaw, K. W. (2000). Blockholder ownership and market liquidity. *Journal of Financial and Quantitative Analysis*, *35*(4), 621–633.

Hendershott, T., Jones, C. M., & Menkveld, A. J. (2011). Does algorithmic trading improve Liquidity? *Journal of Finance*, *66*(1), 1–33.

Holden, C W, & Subrahmanyam, A. (1992). Long-lived private information and imperfect competition. *Journal of Finance*, *47*(1), 247–270.

Holden, Craig W. (2009). New low-frequency spread measures. *Journal of Financial Markets*, *12*(4), 778–813.

Holden, Craig W, Jacobsen, S., & Subrahmanyam, A. (2014). The empirical analysis of liquidity. *Foundations and Trends® in Finance*, *8*(4), 263–365.

Holmström, B., & Tirole, J. (1993). Market liquidity and performance monitoring. *Journal of Political Economy*, *101*(4), 678–709.

Holmström, B., & Tirole, J. (2001). LAPM: A liquidity-based asset pricing model. *Journal of Finance*, *56*(5), 1837–1867.

Hooy, C. W., & Hooy, G. K. (2017). The impact of corporate governance reform on firms' control mechanisms and performance : Evidences from Malaysia. *International Journal of Economics and Management*, *11*(1), 205–224.

Houston, J. F., Jiang, L., Lin, C., & Ma, Y. (2014). Political connections and the cost of bank loans. *Journal of Accounting Research*, *52*(1), 193–243.

Huang, K., Lao, B., & McPhee, G. (2017). Does stock liquidity affect accrual-based earnings management? *Journal of Business Finance and Accounting*, *44*(3–4), 417–447.

Huang, T., Wu, F., Yu, J., & Zhang, B. (2014). Investor protection and value impact of stock liquidity. *SSRN Working Paper,* available at https://doi.org/10.2139/ssrn.2395636.

Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, *94*(1), 67–86.

Ibrahimy, A. I., & Ahmad, R. (2016). An empirical investigation of executive stock option granting in Malaysia. *International Journal of Business Excellence*, *10*(4), 433–448.

Irvine, P. J. (2003). The incremental impact of analyst initiation of coverage. *Journal of Corporate Finance*, *9*(4), 431–451.

Isakov, D., & Weisskopf, J. P. (2014). Are founding families special blockholders? An investigation of controlling shareholder influence on firm performance. *Journal of Banking and Finance*, *41*, 1–16.

Ismail, Z. (2014). Essays on executive stock options in Malaysia. PhD Thesis, University of Portsmouth.

Jacoby, G., & Zheng, S. X. (2010). Ownership dispersion and market liquidity. *International Review of Financial Analysis*, *19*(2), 81–88.

Jain, P., Jiang, C., & Mekhaimer, M. (2016). Executives' horizon, internal governance and stock market liquidity. *Journal of Corporate Finance*, *40*, 1–23.

Jankensgård, H., & Vilhelmsson, A. (2018). The shareholder base hypothesis of stock return volatility: Empirical evidence. *Financial Management*, *47*(1), 55–79.

Jawed, M. S., & Kotha, K. K. (2018). Stock liquidity and firm value: Evidence from a policy experiment in India. *International Review of Finance*. https://doi.org/10.1111/irfi.12200.

Jayaraman, S., & Milbourn, T. T. (2012). The role of stock liquidity in executive compensation. *Accounting Review*, *87*(2), 537–563.

Jebaraj Benjamin, S., Mat Zain, M., & Abdul Wahab, E. A. (2016). Political connections and dividend payouts in Malaysia: The influence of institutional investors. *Pacific Accounting Review*, *28*(2), 153–179.

Jennings, W. W., Schnatterly, K., & Seguin, P. J. (2002). Institutional ownership, information and liquidity. *Innovations in Investments and Corporate Finance (Advances in Financial Economics)*, *7*, 44–71.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, *76*(2), 323–329.

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, *48*(3), 831–880.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Jiang, C. X., Kim, J. C., & Zhou, D. (2011). Liquidity, analysts, and institutional ownership. *International Review of Financial Analysis*, *20*(5), 335–344.

Jiao, Y. (2016). Investor competition over information and stock returns. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.2448536.

Johnson, S. A., Wang, Q., & Zhang, J. (2013). Does algorithmic trading increase firm value? *SSRN Working Paper*.

Johnson, S., & Mitton, T. (2003). Cronyism and capital controls: Evidence from Malaysia. *Journal of Financial Economics*, *67*(2), 351–382.

Kadlec, G. B., & McConnell, J. J. (1994). The effect of market segmentation and illiquidity on asset prices: Evidence from exchange listings. *Journal of Finance*, *49*(2), 611–636.

Kale, J. R., & Loon, Y. C. (2011). Product market power and stock market liquidity. J*ournal of Financial Markets*, *14*(2), 376–410.

Karolyi, G. A., & Liao, R. C. (2017). The economic consequences of investor relations: A global perspective. *SSRN Working Paper*, available at https://ssrn.com/abstract=2591079.

Karpoff, J. M., Schonlau, R., & Suzuki, K. (2018). Shareholder perks, ownership structure, and firm value. *SSRN Working Paper*, available at http://ssrn.com/abstract=2615777.

Kelly, B., & Ljungqvist, A. (2012). Testing asymmetric-information asset pricing models. *Review of Financial Studies*, *25*(5), 1366–1413.

Khawaja, A. I., & Mian, A. (2005). Do lenders favor politically connected firms? Rent provision in an emerging financial market. *Quarterly Journal of Economics*, *120*(4), 1371–1411.

King, M. R., & Segal, D. (2009). The long-term effects of cross-listing, investor recognition, and ownership structure on valuation. *Review of Financial Studies*, *22*(6), 2393–2421.

Kini, O., & Mian, S. (1995). Bid-ask spread and ownership structure. *Journal of Financial Research*, *18*(4), 401–414.

Kirk, M. (2011). Research for sale: Determinants and consequences of paid-for analyst research. *Journal of Financial Economics*, *100*(1), 182–200.

Koenker, R., & Hallock, K. F. (2001). Quantile Regression. *Journal of Economic Perspectives*, *15*(4), 143–156.

Koenker, R. W., & Bassett, G. (1978). Regression Quantiles. *Econometrica*, *46*(1), 33–50.

Kumar, A. (2009). Who gambles in the stock market? *Journal of Finance*, *64*(4), 1889–1933.

Kyle, A. S. (1985). Continuous auctions and insider trading. *Econometrica*, *53*(6), 1315–1335.

Kyle, A. S., & Vila, J.-L. (1991). Noise trading and takeovers. *RAND Journal of Economics*, *22*(1), 54–71.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics*, *58*(1–2), 3–27.

Lai, S., Ng, L., & Zhang, B. (2014). Does PIN affect equity prices around the world? *Journal of Financial Economics*, *114*(1), 178–195.

Lang, L. H. P., & Stulz, R. M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy*, *102*(6), 1248–1280.

Lean, H. H., Ting, I. W. K., & Kweh, Q. L. (2015). Ownership concentration, family ownership and leverage: Evidence from Malaysia. *Malaysian Journal of Economic Studies*, *52*(2), 117–133.

Leaño, M., & Pedraza, A. (2018). Ownership concentration and market liquidity: Evidence from a natural experiment. *Economics Letters*, *167*, 56–59.

Lee, J., & Chung, K. H. (2018). Foreign ownership and stock market liquidity. *International Review of Economics and Finance*, *54*, 311–325.

Lehavy, R., & Sloan, R. G. (2008). Investor recognition and stock returns. *Review of Accounting Studies*, *13*(2–3), 327–361.

Lesmond, D. A. (2005). Liquidity of emerging markets. *Journal of Financial Economics*, *77*(2), 411–452.

Lesmond, D. A., Ogden, J. P., & Trzcinka, C. A. (1999). A new estimate of transaction costs. *Review of Financial Studies*, *12*(5), 1113–1141.

Levine, R., & Schmukler, S. L. (2003). Migration, spillovers, and trade diversion: The impact of internationalization on stock market liquidity. *NBER Working Paper*, available at https://www.nber.org/papers/w9614.

Levine, R., & Schmukler, S. L. (2006). Internationalization and stock market liquidity. *Review of Finance*, *10*(1), 153–187.

Levine, R., & Schmukler, S. L. (2007). Migration, spillovers, and trade diversion: The impact of internationalization on domestic stock market activity. *Journal of Banking and Finance, 31*(6), 1595–1612.

Levine, R., & Zervos, S. (1998). Capital control liberalization and stock market development. *World Development*, *26*(7), 1169–1183.

Li, F., Liu, M. H., & Shi, Y. (Eric). (2017). Institutional ownership around stock splits. *Pacific-Basin Finance Journal*, *46*, 14–40.

Li, W. X., Chen, C. C. S., & French, J. J. (2012). The relationship between liquidity, corporate governance, and firm valuation: Evidence from Russia. *Emerging Markets Review*, *13*(4), 465–477.

Li, X., Geng, Z., Subrahmanyam, A., & Yu, H. (2017). Do wealthy investors have an informational advantage? Evidence based on account classifications of individual investors. *Journal of Empirical Finance*, *44*, 1–18.

Liew, P. X. (2016). An empirical analysis of the liquidity of the Malaysian stock market. Master Thesis, University of Malaya.

Liew, P. X., Lim, K. P., & Goh, K. L. (2016). Aggregate liquidity for Malaysian stock market: New indicators and time series properties. *International Journal of Economcics and Management*, *10*(2), 297–319.

Liew, P. X., Lim, K. P., & Goh, K. L. (2018). Foreign equity flows: Boon or bane to the liquidity of Malaysian stock market? *North American Journal of Economics and Finance*, *45*, 161–181.

Lim, K. P., & Brooks, R. D. (2010). Why do emerging stock markets experience more persistent price deviations from a random walk over time? A country-level analysis. *Macroeconomic Dynamics*, *14*, 3–41.

Lim, K. P., Hooy, C. W., Chang, K. B., & Brooks, R. (2016). Foreign investors and stock price efficiency: Thresholds, underlying channels and investor heterogeneity. *North American Journal of Economics and Finance*, *36*, 1–28.

Lim, K. P., Thian, T. C., & Hooy, C. W. (2017). Investor heterogeneity, trading account types and competing liquidity channels for Malaysian stocks. *Research in International Business and Finance*, *41*, 220–234.

Lim, M., How, J., & Verhoeven, P. (2014). Corporate ownership, corporate governance reform and timeliness of earnings: Malaysian evidence. *Journal of Contemporary Accounting and Economics*, *10*(1), 32–45.

Lind, J. T., & Mehlum, H. (2010). With or without u? The appropriate test for a U-shaped relationship. *Oxford Bulletin of Economics and Statistics*, *72*(1), 109–118.

Lipson, M. L., & Mortal, S. (2007). Liquidity and firm characteristics: Evidence from mergers and acquisitions. *Journal of Financial Markets, 10*(4), 342–361.

Lou, X., & Shu, T. (2017). Price impact or trading volume : Why is the Amihud (2002) measure priced? *Review of Financial Studies*, *30*(12), 4481–4520.

Love, I. (2011). Corporate governance and performance around the world: What we know and what we don't. *World Bank Research Observer*, *26*(1), 42–70.

Ma, L., Ma, S., & Tian, G. (2013). Political connections, founder-managers, and their impact on tunneling in China's listed firms. *Pacific-Basin Finance Journal*, *24*, 312–339.

Mak, Y. T., & 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.

Malaysian Code of Corporate Governance. (2017). Retrieved from https://www.sc.com.my/wp-content/uploads/eng/html/cg/mccg2017.pdf

Marshall, B. R., Nguyen, N. H., & Visaltanachoti, N. (2013). Liquidity measurement in frontier markets. *Journal of International Financial Markets, Institutions and Money, 27*, 1–12.

Maug, E. (1998). Large shareholders as monitors: Is there a trade-off between liquidity and control? *Journal of Finance*, *53*(1), 65–98.

Merton, R. (1974). On the pricing of corporate debt: The risk structure of interest rates. *Journal of Finance, 29*(2), 449–470.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *Journal of Finance*, *42*(3), 483–510.

Mestel, R., Murg, M., & Theissen, E. (2018). Algorithmic trading and liquidity: Long term evidence from Austria. *Finance Research Letters*, *26*, 198–203.

Mishra, A. V. (2014). Foreign ownership and firm value: Evidence from Australian firms. *Asia-Pacific Financial Markets, 21*(1), 67–96.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital. *American Economic Review*, *53*(3), 433–443.

Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation. An empirical analysis. *Journal of Financial Economics*, *20*, 293–315.

Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics, 58*(1–2), 215–260.

Mukherji, S., Kim, Y. H., & Walker, M. C. (1997). The effect of stock splits on the ownership structure of firms. *Journal of Corporate Finance, 3*(2), 167–188.

Ng, A., Yuce, A., & Chen, E. (2009). Determinants of state equity ownership, and its effect on value/performance: China's privatized firms. *Pacific-Basin Finance Journal*, *17*(4), 413–443.

Ng, L., Wu, F., Yu, J., & Zhang, B. (2016). Foreign investor heterogeneity and stock liquidity around the world. *Review of Finance*, *20*(5), 1867–1910.

Nguyen, T., Duong, H. N., & Singh, H. (2016). Stock market liquidity and firm value: An empirical examination of the Australian Market. *International Review of Finance*, *16*(4), 639–646.

Norli, Ø., Ostergaard, C., & Schindele, I. (2015). Liquidity and shareholder activism. *Review of Financial Studies*, *28*(2), 486–520.

O'Connor, T. (2012). Investability, corporate governance and firm value. *Research in International Business and Finance*, *26*(1), 120–136.

Odean, T. (1998). Are investors reluctant to realize their losses? *Journal of Finance*, *53*(5), 1775–1798.

Paramanantham, N. S., Ting, I. W. K., & Kweh, Q. L. (2018). Ownership concentration and debt structure: Evidence from Top 100 PLCs in Malaysia. *Institutions and Economies*, *10*(3), 1–13.

Parrino, R., Sias, R. W., & Starks, L. T. (2003). Voting with their feet: Institutional ownership changes around forced CEO turnover. *Journal of Financial Economics*, *68*(1), 3–46.

Pástor, L., & Stambaugh, R. (2003). Liquidity risk and expected stock returns. *Journal of Political Economy*, *111*(3), 642–685.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, *22*(1), 435–480.

Pontiff, J. (1997). Excess volatility and close-end funds. *American Economic Review*, *87*(1), 155–169.

Prommin, P., Jumreornvong, S., & Jiraporn, P. (2014). The effect of corporate governance on stock liquidity: The case of Thailand. *International Review of Economics and Finance*, *32*, 132–142.

Rahim, R. A., & Nor, A. H. S. M. (2006). A comparison between fama and french model and liquidity-based three-factor models in predicting the portfolio returns. *Asian Academy of Management Journal of Accounting and Finance*, *2*(2), 43–60.

Rajan, R. G., & Zingales, L. (1998). Which capitalism? Lessons from the East Asian crisis. *Journal of Applied Corporate Finance*, *11*(3), 40–48.

Ramanna, K., & Roychowdhury, S. (2010). Elections and discretionary accruals: Evidence from 2004. *Journal of Accounting Research*, *48*(2), 445–475.

Ramlee, R., & Ali, R. (2012). Liquidity , initial public offering (IPO) long- term return and government ownership: Evidence from Bursa Malaysia IPO stocks. *Asian Academy of Management Journal of Accounting and Finance, 8*(Supp.1), 39–66.

Rhee, S. G., & Wang, J. (2009). Foreign institutional ownership and stock market liquidity: Evidence from Indonesia. *Journal of Banking and Finance*, *33*(7), 1312–1324.

Richardson, S., Sloan, R., & You, H. (2012). What makes stock prices move? Fundamentals vs. investor recognition. *Financial Analysts Journal*, *68*(2), 30–50.

Roll, R. (1984). A simple implicit measure of the effective bid-ask spread in an efficient market. *Journal of Finance*, *39*(4), 1127–1139.

Roulstone, D. T. (2003). Analyst following and market liquidity. *Contemporary Accounting Research*, *20*(3), 552–578.

Rouwenhorst, K. G. (1999). Local return factors and turnover in emerging stock markets. *Journal of Finance, 54*(4), 1439–1464.

Rubin, A. (2007). Ownership level, ownership concentration and liquidity. *Journal of Financial Markets*, *10*(3), 219–248.

Sapian, R. Z. Z., Rahim, R. A., & Yong, O. (2013). IPO underpricing and aftermarket liquidity: Evidence from Malaysia. *International Journal of Business and Society*, *14*(2), 299–318.

Seo, M. H., & Shin, Y. (2016). Dynamic panels with threshold effect and endogeneity. *Journal of Econometrics*, *195*(2), 169–186.

Shakir, R. (2008). Board size, executive directors and property firm performance in Malaysia. *Pacific Rim Property Research Journal*, *14*(1), 66–80.

Shleifer, A., & Summers, L. H. (1988). *Breach of trust in hostile takeovers*. Corporate Takeovers: Causes and Consequences, University of Chicago Press, 33–68.

Shleifer, A., & Summers, L. H. (1990). The noise trader approach to finance. *Journal of Economic Perspectives*, *4*(2), 19–33.

Short, H., & Keasey, K. (1999). Managerial ownership and the performance of firms: Evidence from the UK. *Journal of Corporate Finance*, *5*(1), 79–101.

Sias, R. W., Starks, L. T., & Titman, S. (2001). The price impact of institutional trading. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.283779.

Spiegel, M., & Subrahmanyam, A. (1992). Informed speculation and hedging in a noncompetitive securities market. *Review of Financial Studies*, *5*(2), 307–329.

Stein, J. C. (1988). Takeover threats and managerial myopia. *Journal of Political Economy*, *96*(1), 61–80.

Stoll, H. R. (1978a). The pricing of securiry dealer services: An empirical study of Nasdaq stocks. *Journal of Finance*, *33*(4), 1153–1172.

Stoll, H. R. (1978b). The supply of dealer services in securities markets. *Journal of Finance*, *33*(4), 1133–1151.

Stoll, H. R. (1989). Inferring the components of the bid-ask spread: Theory and empirical tests. *Journal of Finance*, *44*(1), 115–134.

Stoll, H. R. (2000). Friction. *Journal of Finance*, *55*(4), 1479–1514.

Stulz, R. M. (1988). Managerial control of voting rights: Financing policies and the market for corporate control. *Journal of Financial Economics*, *20*, 25–54.

Subrahmanyam, A. (1991). Risk adversion, market liquidity, and price efficiency. *Review of Financial Studies*, *4*(3), 417–441.

Subrahmanyam, Avanidhar, & Titman, S. (2001). Feedback from stock prices to cash flows. *Journal of Finance*, *56*(6), 2389–2413.

Sulong, Z., & Mat Nor, F. (2008). Dividends, ownership structure and board governance on firm value: Empirical evidence from Malaysian listed firms. *Malaysian Accounting Review*, *7*(2), 55–94.

Summers, L. H. (2000). International financial crises: Causes, prevention, and cures. *American Economic Review*, *90*(2), 1–16.

Tang, K., & Wang, C. (2011). Corporate governance and firm liquidity: Evidence from the Chinese stock market. *Emerging Markets Finance and Trade*, *47*(Sup1), 47–60.

Tee, C. M., Gul, F. A., Foo, Y. B., & Teh, C. G. (2017). Institutional monitoring, political connections and audit fees: Evidence from Malaysian firms. *International Journal of Auditing*, *21*(2), 164–176.

Ting, I. W. K., Kweh, Q. L., Lean, H. H., & Juan, S. H. (2018). Founder management, government ownership and firm performance: Evidence from Malaysia. *Institutions and Economics*, *10*(1), 1–17.

Ting, I. W. K., Kweh, Q. L., Lean, H. H., & Ng, K. H. (2016). Ownership structure and firm performance: The role of R & D. *Institutions and Economies*, *8*(4), 1–21.

Uno, J., & Kamiyama, N. (2010). Ownership structure , liquidity , and firm value : Effects of the investment horizon. *Working Paper*, available at https://doi.org/10.2139/ssrn.1455995.

Vagias, D., & van Dijk, M. A. (2012). International capital flows and liquidity. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.1744161.

Vayanos, D., & Wang, J. (2012). Liquidity and asset returns under asymmetric information and imperfect competition. *Review of Financial Studies*, *25*(5), 1339–1365.

Vayanos, D., & Wang, J. (2013). Market liquidity-Theory and empirical evidence. *Handbook of the Economics of Finance*, *2*, 1289–1361.

Vorst, P. (2017). Equity market competition and stock price crash risk. *SSRN Working Paper*, available at https://doi.org/10.2139/ssrn.2661580.

Wang, Q., & Zhang, J. (2015). Does individual investor trading impact firm valuation? *Journal of Corporate Finance*, *35*, 120–135.

Wang, Q., & Zhang, J. (2015). Individual investor trading and stock liquidity. *Review of Quantitative Finance and Accounting*, *45*(3), 485–508.

Wei, Z., Xie, F., & Zhang, S. (2005). Ownership structure and firm value in China's privatized firms: 1991–2001. *Journal of Financial and Quantitative Analysis*, *40*(1), 87–108.

Welker, M. (1995). Disclosure policy, information asymmetry, and liquidity in equity markets. *Contemporary Accounting Research*, *11*(2), 801–827.

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, *105*(3), 581–606.

Wong, W. Y. (2016). The performance of politically connected firms in long-run and short-run: Evidence from Malaysia. Master Thesis, Universiti Sains Malaysia.

Yasser, Q. R., Mamun, A. A., & Rodrigs, M. (2017). Impact of board structure on firm performance: Evidence from an emerging economy. *Journal of Asia Business Studies*, *11*(2), 210–228.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics*, *40*(2), 185–211.

Yung, K., & Jian, Y. (2017). Effects of the shareholder base on firm behavior and firm value in China. *International Review of Economics and Finance*, *49*, 370–385.

Zhang, L., Li, Y., Huang, Z., & Chen, X. (2018). Stock liquidity and firm value : Evidence from China. *Applied Economics Letters*, *25*(1), 47–50.