

An Alternative Perspective on Multinationality: Integrating Research in International Business and Finance

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DECLARATION

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ABSTRACT

The Multinational Company (MNC) is one of the most important concepts across many business research domains. Multinational companies (MNCs) vary significantly in terms of risk exposure, operational activities and financial activities. However, there are no commonly and widely agreed definitions and measures of multinationality. Despite multinational companies' (MNCs) prevalence in International Business (IB) research, few studies consider the importance of measuring firm-level multinationality while distinguishing between MNCs and Domestic Companies (DCs) using more IB perspective measures. Unsurprisingly, empirical evidence on these studies measuring firm level multinationality remain inconclusive (Aggarwal & Kyaw, 2010; Lindner et al., 2018).

In light of this situation, this thesis applies a more IB perspective to measure multinationality on three financial subjects and then uses this perspective to investigate three areas in finance – stock liquidity, capital structure and dividend policy, in which previous studies provide conflicting empirical results and theoretical arguments.

Following Aggarwal, Berrill, Hutson, and Kearney (2011), this thesis applies a classification scheme - the ABHK model to categorise firms. While many commonly used measures such as the percentage foreign sales or assets focus on the total degree of multinationality, the ABHK model captures the breadth of multinationality. The motivation behind the use of this model is to distinguish between firms with high levels of foreign sales spread throughout the world (the ABHK model) that differ significantly from firms with high levels of foreign sales or foreign assets in a single neighbouring country.

Furthermore, the liabilities of foreignness (LOF) theory is used to provide an alternative perspective on my three chosen financial topics. Since the pioneering work of Zaheer (1995) which defines LOF as “all additional costs a firm operating in a market overseas incurs that a local firm would not incur” (Zaheer, 1995, p. 343), LOF has mainly been applied in product (non-equity) markets in International Business studies (Baik et al., 2013). This thesis is not aware of any other Financial or International Business Studies that investigate the impact of the breadth of multinationality on financial subjects while incorporating the LOF as a theoretical explanation.

This thesis first studies the impact of both the total and the breadth of multinationality on stock liquidity. Previous research almost exclusively relies on event study analysis and uses cross-listing as their measure of multinationality. While most previous studies find a positive relationship, this thesis finds that this positive relationship between stock liquidity and multinationality measured using the ABHK score does not increase gradually but presents as an inverted horizontal-S-shaped trend. This thesis finds an increase in stock liquidity at low and high levels of multinationality, while a decrease at moderate levels.

Next, this thesis considers the impact of both the total and the breadth of multinationality on capital structure. This thesis finds that the breadth of multinationality has a positive impact on short-term debt. Moreover, my sub-period analysis shows that the relationship between multinationality and firms’ long-term and total debt changed significantly since the global financial crisis (GFC) of 2008. The breadth of multinationality was positively related to both long-term and total debt before the GFC, while it becomes negatively related to the long-term and total debt after the GFC.

Finally, this thesis analyses the impact of both the total and the breadth of multinationality on dividend policy. Results suggest a negative relationship between the breadth of multinationality and dividend policy. Moreover, the results show that the negative relationship does not increase gradually. This thesis finds that firms with foreign sales only in one geographic region pay the lowest dividends, while firms that have foreign sales from two geographic regions pay the highest dividends.

Overall, this thesis provides a novel perspective on research integrating the IB and finance areas, using an alternative perspective on a core concept, the MNC. In doing so, it answers the call of Puck and Filatotchev (2018) for future research on the overlap of Finance and IB and cross-border contributions.

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ACRONYMS

ABHK (2011)	Multinationality measure provided by Aggarwal, Berrill, Hutson, and Kearney
ADR	American Depository Receipts
CPQS	Closing Percent Quoted Spread
Div	Dividend
DC	Domestic Company
DCs	Domestic Companies
EBIT	Earnings Before Income Tax
EPS	Earnings per Share
FA	Foreign Assets
FS	Foreign Sales
FCF	Free Cash Flow
GFC	Global Financial Crisis
GDR	Global Depository Receipts
GICS	Global Industry Classification Standard
GDP	Gross Domestic Product
HHI	Herfindahl–Hirschman concentration index
IB	International Business
IJFE	International Journal of Finance and Economics
LOF	Liabilities of Foreignness
LTD	Long-Term Debt
MNC	Multinational Company
MNCs	Multinational Companies
STD	Short-Term Debt
SIC	Standard Industry Classification
TD	Total Debt
%FS	Percentage of Foreign Sales
%FA	Percentage of Foreign Assets

Chapter 1 Introduction

1.1 Introduction

The Multinational Company (MNC) is one of the core concepts across many business research domains, such as global strategy, finance, corporate finance, international business and strategic management. There is a significant difference between multinational companies (MNCs) and domestic companies (DCs) in terms of risk exposure, operational activities and financial activities. Despite the multinational companies (MNCs) prevalence in International Business Research, few studies consider the importance of measuring firm-level multinationality in Finance domains when investigating the relationship between multinationality and other factors such as stock liquidity, capital structure and dividend policy while distinguishing between MNCs and DCs. Previous studies investigating the relationship between multinationality and other variables regularly produce conflicting results. One explanation for the lack of consistency within the literature may be the difficulties arising from defining and measuring multinationality. The most common approach in existing studies is to use the percentage of foreign sales and the percentage of foreign assets (Marshall et al., 2020), but again, there is no consistency within the literature.

Moreover, this study argues that the use of the percentage of foreign sales or assets in measuring multinationality has potential limitations. Firms with high levels of foreign sales or foreign assets to a single neighbouring country differ significantly from firms with high levels of foreign sales spread throughout the world. In order to address this issue, this thesis applies a classification scheme by Aggarwal, Berrill, Hutson, and Kearney (2011), the ABHK model, to capture the breadth of multinationality. By considering both the total and the breadth of multinationality, this thesis analyses the

relationship between multinationality and three financial aspects of firms - stock liquidity, capital structure and dividend policy. Previous studies on each of these topics produce conflicting results and remain open questions. This thesis provides a new perspective to shed light on these subjects.

The thesis examines the impact of the breadth of multinationality on stock liquidity, capital structure (leverage) and dividend policy. Improving stock liquidity is one of the major motivations for companies to internationalize (Chipunza & McCullough, 2018a). Higher stock liquidity could help to increase firms' performance and value (Fang et al., 2009), and decrease firms' default risk (Brogaard et al., 2017). Stock liquidity becomes especially important, particularly given the current Covid-19 pandemic as it has become more relevant to both firms and investors. Whether expanding sales geographically could help to achieve this goal is examined in Chapter 2. Moreover, starting with the modern theories presented by Modigliani and Miller (1958), the study of capital structure has received considerable attention in the academic literature. It is strongly related to firm risks (Myers, 1984), financial policy (Custódio et al., 2013) and agency conflicts (Aggarwal & Kyaw, 2010). The question of whether and how internationalization affects capital structure has been of interest to international business (IB) scholars (Bowe et al., 2010), while the empirical evidence on this relationship remains inconclusive (Lindner et al., 2018). Therefore, Chapter 3 explicitly examines the impact of the breadth of multinationality on capital structure. Finally, since the pioneering work of Miller and Modigliani (1961), the study of dividend policy has a long history. However, few studies investigating dividend policy distinguish between multinational corporations (MNCs) and domestic corporations (DCs) (Bahreini & Adaoglu, 2018; Dewasiri et al., 2019). Typically, according to Akhtar (2018a), MNCs are exposed to more risk, such as political, foreign exchange, different tax laws and

legal requirements, all of which could affect dividend payments. In turn, Chapter 4 investigates whether and how the breadth of multinationality could impact dividend policy. These three topics are particularly relevant within the finance domain as both theoretical arguments and empirical results provide widely differing results and conclusions.

The remainder of this chapter is structured as follows. Section 1.2 outlines the motivations of the thesis. Section 1.3 presents a brief overview of the studies, research questions and managerial contribution. Finally, section 1.4 concludes.

1.2 Motivations of the thesis

Existing studies analysing the impact of multinationality on finance subjects, such as stock liquidity, capital structure and dividend policy, usually provide conflicting results. One explanation within the literature may be because of the lack of consistency in defining and measuring multinationality. For example, Atanasova and Li (2018) analyse the relationship between multinationality and stock liquidity. They classify firms as multinational by identifying the event date when they either cross-list, cross-trade, or issue American Depositary Receipts or Global Depositary Receipts. As another example, Aggarwal and Kyaw (2010) analyse the relationship between multinationality and capital structure. They identify a firm as multinational if its percentage of foreign sales is greater than 20 percent. Most studies consider multinationality as a dichotomous variable and categorise firms as multinationality or domestic.

There are many ways that a firm can enter a foreign market and become multinational. Correspondingly, there are numerous methods within the existing literature used to measure multinationality such as the percentage of foreign assets (Marshall et al., 2020), foreign direct investments (Iamsiraroj, 2016), the number of foreign to total employees

and the number of foreign subsidiaries to total subsidiaries (Contractor et al., 2003). Aggarwal, Berrill, Hutson, and Kearney (2011) propose a classification scheme, the ABHK model, to categorise firm-level multinationality. They measure multinationality based on the firm's breadth of multinationality and consider multinationality as an ordinal variable occurring along a spectrum. According to Aggarwal et al. (2011), the ABHK model classifies the breadth of multinationality of a firm based on the breadth of its operations across six geographical regions: Africa, Asia, Europe, North America, Oceania, and South America. A firm is categorised as domestic if it has sales only in its home country (the US in this study); a regional firm has sales in one region (North America in the current study); a trans-regional firm has sales in two or more regions while a global firm has sales in all six regions. This results in seven degrees of multinationality, ranging from purely domestic firms (a score of 0) to fully global firms (a score of 6). It is important to distinguish between the total and the breadth of multinationality measures as a high breadth of multinationality may not necessarily have a high level of foreign composition. For example, in 2018, Astec Industries had an ABHK score of 6 (meaning it had sales in all 6 geographical regions of the world) while only having 21.8 percent foreign sales. Similarly, ANI Pharmaceuticals had 100 percent foreign sales but an ABHK score of just 1 (sales in only one of the six geographical regions of the world).

As an alternative explanation, existing studies usually do not incorporate the liabilities of foreignness (LOF) theory in their analysis. Since the pioneering work of Zaheer (1995) which defines LOF as “all additional costs a firm operating in a market overseas incurs that a local firm would not incur”, LOF has mainly been applied in product (non-equity) markets in International Business studies (Baik et al., 2013). LOF is associated with additional transportation and coordination costs, costs arising because of the

unfamiliarity with foreign markets, costs resulting from cultural and legitimacy differences and costs due to restrictions on the foreign market (Bell et al., 2012). These additional costs, however, could impact firms' stock liquidity, capital structure and dividend policy in several ways. Therefore, LOF offers alternative perspectives that have the potential to enrich the theoretical understanding of relevant phenomena in both the International Business and Finance domains.

This thesis contributes to the literature on the relationship between multinationality and financial subjects in several ways. First, this thesis uses an alternative measure of multinationality with a stronger IB focus – the ABHK model, which focuses on the breadth of firms' international operations. This study argues that it provides a more robust view on the relationships whereas existing studies rely heavily on equity-based multinationality measures, particularly when investigating the multinationality – stock liquidity and multinationality – dividends relationships. Second, this thesis incorporates the theory of liabilities of foreignness and provides a more robust analysis of the relationship between multinationality and other financial subjects from a novel theoretical and empirical perspective. Third, this thesis contributes to a stronger integration of research on International Business and Finance. It answers the call of Puck and Filatotchev (2018) for future research on the overlap of finance and IB and cross-border contributions.

1.3 Overview of the studies

1.3.1 Stock liquidity and the breadth of multinationality

Although managers may be motivated by such considerations as enhanced consumer trust and foreign market reputation (Pagano et al., 2002a), surveys of managers typically find that the primary motivation for pursuing internationalization is an

increase in stock liquidity (Mittoo, 1992; Bancel & Mittoo, 2001; Chipunza & McCullough, 2018). Stock liquidity may impact MNCs on the costs of raising external funds (Silva & Chávez, 2008), their performance and value (Fang et al., 2009), and default risk (Brogaard et al., 2017). Thus, it is important to understand the impact of multinationality on stock liquidity. However, theories on this relationship provide alternative results. On the one hand, the additional order flows (Berkman & Nguyen, 2010), inter-market competition (Eun & Sabherwal, 2018) and the bonding hypothesis (Y. Huang et al., 2013) propose that there is an improvement in stock liquidity after cross-listing. In contrast, the Migration and Spillover hypothesis (Levine & Schmukler, 2006a) proposes reduced stock liquidity after cross-listing. The empirical results of this relationship are also contradictory and far from conclusive (Hales & Mollick, 2014; Levine & Schmukler, 2007). The relationship between multinationality and stock liquidity remains an open question.

Existing studies on this relationship mainly take the perspective of non-US firms and the benefits they achieve from cross-listing into the US market and produce mixed results. This indicates a gap in the literature on how US firms' stock liquidity changes when they use international sales as their measure of multinationality. Chapter 2 of this thesis, therefore, takes an alternative approach using the ABHK model (sale-based multinationality measures) and focusing on the multinationality of US firms. First, evidence from US markets is important because the US market differs significantly from other markets as it is a quote-driven market. Second, firms selling abroad face additional costs driven by the liabilities of foreignness. The main research question addressed is: Does the breadth of multinationality improve stock liquidity? The impact of the breadth of multinationality on stock liquidity is evaluated after controlling for firm-specific characteristics, such as firm size, leverage, analyst coverage, share

turnover, firm's growth opportunity and return volatility which are commonly used in the relevant literature (Atanasova & Li, 2018; Deng et al., 2018; Dang et al., 2015). Using four measures of stock liquidity, two primary measures of multinationality (plus an additional four measures as part of a robustness analysis) and the constituents of Russell 3000 for the period 1998 to 2018, this chapter provides an alternative and more in-depth investigation into the multinationality - stock liquidity relationship than exists in the literature to date.

The empirical findings of Chapter 2 suggest that there is a positive relationship between stock liquidity and both the breadth of multinationality (geographical spread of sales) and total multinationality (measured using the percentage of foreign sales). The results also show that stock liquidity is more strongly related to total multinationality (measured using the percentage of foreign sales), while the breadth of multinationality (geographical spread of sales) produces mixed results. Moreover, Chapter 2 reports that the positive relationship between stock liquidity and the breadth of multinationality (measured using the ABHK score) does not increase gradually but presents as an inverted horizontal-S-shaped trend. This finding suggests that there is an increase in stock liquidity at low and high levels of the ABHK score, while a decrease at moderate levels. Finally, it is found that the multinationality - stock liquidity relationship has changed dramatically over time from a weak and insignificant relationship to a strong positive relationship. With mixed levels of significance, results are robust to the industry analysis, size effect analysis, sub-period analysis, alternative measures of multinationality and endogeneity are robust and consistent with the main findings.

Chapter 2 contributes to managerial practice in the following ways. First, as increasing stock liquidity is a primary motivation for managers' decisions to pursue internationalization (Chipunza & McCullough, 2018a), this chapter is strongly related

to the managerial decision-making process and provides empirical evidence on corporate managers achieving this goal (increased stock liquidity) by expanding sales geographically. Moreover, when expanding business operations geographically, firms may face additional costs that arise from the liabilities of foreignness. Consequently, managers need to make more informed decisions, from entering specific countries, the sequence of market entry, and the choice of entry mode to cross-border knowledge transfer and international human resource management, to lower the additional costs and enhance stock liquidity.

1.3.2 Capital structure and the breadth of multinationality

Since the pioneering work of Modigliani and Miller (1958), the study of capital structure has received considerable attention as it is strongly related to firm risks (Myers, 1984), financial policy (Custódio et al., 2013) and agency conflicts (Aggarwal & Kyaw, 2010). In addition, given the differences between MNCs and DCs in relation to their risk exposure, how MNCs manage their capital structure has been an issue of strong interest for a long time (Akhtar, 2017; Bowe et al., 2010). However, there is an ongoing debate in the literature on whether and how multinationality affects capital structure. Based on the trade-off theory, the capital structure decisions of firms depend on the benefits and costs of using more debt; Less debt is used if the cost of bankruptcy is higher than the tax shield or other benefits of using debt (Aggarwal & Kyaw, 2010). Some studies propose MNCs have higher costs of bankruptcy compared to their domestic counterparts and accordingly often have a lower debt ratio because 1) MNCs are naturally inherent with more risks due to their foreign expansion (Lindner et al., 2018), 2) if MNCs come from more stable economies or countries that make risky international investments (downstream hypothesis proposed by Kwok and Reeb (2000)), and 3) MNCs have greater agency costs of debt (Reeb et al., 2001). Alternatively, the

classic corporate international diversification theories (Chao & Kumar, 2010; Fatemi, 1984), the agency conflicts (Aggarwal & Kyaw, 2010) the Upstream hypothesis (Kwok & Reeb, 2000) and the bonding theory (Bell et al., 2012) all argue that MNCs tend to have a higher level of indebtedness in comparison to DCs. The empirical evidence on this relationship remains inconclusive (Lindner et al., 2018). In sum, Bowe et al. (2010), Lindner et al. (2018) and Gyimah et al. (2021) acknowledge this relationship is underexplored and both theoretical and empirical debates are inconclusive.

The above inconsistent evidence is mainly based on the use of total multinationality (measured as the percentage of foreign sales or assets) and does not focus on differences with the breadth of multinationality (measured as the ABHK model). Chapter 3 of this thesis contributes to the empirical literature on this relationship by addressing the following research question: how does the breadth of multinationality impact firms' capital structure? This issue is investigated both from the point of view of using the ABHK model to measure the number of regions that a firm has sales in and also from the perspective of incorporating the liabilities of foreignness (LOF) theory to identify the additional costs when a firm expands sales into foreign regions. This Chapter also aims to identify whether product diversification is a determinant of capital structure. Using seven measures of capital structure, three measures of multinationality and the constituents of the Russell 3000 for the period 1998 to 2020, Chapter 3 provides a more comprehensive analysis of this relationship.

The findings of Chapter 3 reveal that MNCs have a higher level of indebtedness in comparison to DCs. More specifically, Chapter 3 finds that the breadth of multinationality (geographical expansion of sales) and the total multinationality (measured using the percentage of foreign sales) have a positive impact on short-term debt, while total multinationality (measured using the percentage of foreign assets) has

a positive impact on long-term and total debt. It is also found that the relationship between the breadth of multinationality (the ABHK score) and capital structure is not linear. Moreover, the findings suggest that product diversification has a strong influence on capital structure. The robustness tests are performed on this relationship to investigate if the size or industrial classification of firms impacts the results. The results of the robustness tests remain consistent with the main findings. Finally, this Chapter shows that the relationship between multinationality and firms' long-term and total debt has changed significantly since the global financial crisis (GFC) of 2008. The ABHK scores are positively related to both long-term and total debt before the GFC, while they become negatively related to the long-term and total debt after the GFC. This suggests that there is a non-linear relationship between multinationality (the ABHK score) and capital structure (long-term and total debt).

The major contributions of Chapter 3 to managerial practice are as follows: First, it adds to the empirical evidence of whether and how the breadth of multinationality affects corporate indebtedness, which is important for managers who have to design and implement internationalization strategies. Second, this study distinguishes between the breadth of multinationality (ABHK model) and total multinationality (the foreign sales ratio and foreign assets ratio) and compares the implications of these different types of multinationality in terms of capital structure. This allows managers of multinationals to understand how different choices about internationalization can affect their capital structure. Third, in line with Custódio et al. (2013) and Brockman et al. (2010), this study provides empirical evidence that US multinationals usually hold more short-term debt which may be used as a mechanism to discipline managers that reduces agency conflicts between managers and shareholders.

1.3.3 Dividend policy and the breadth of multinationality

The study of dividend policy and dividend determinates has a long history since the pioneering work of Miller and Modigliani (1961). However, given the critical differences between MNCs and DCs concerning their risk exposure (Akhtar, 2018a), little is known about whether and how their dividend policies differ (Bahreini & Adaoglu, 2018; Dewasiri et al., 2019). In addition, existing literature provides conflicting theoretical arguments on the relationship between multinationality and dividends. Some studies, such as Huang et al. (2016) and Cheng et al. (2021), propose that based on the bonding theory, MNCs tend to pay higher dividends compared to DCs when they cross-list in a more developed market as shareholders have greater rights and can demand higher dividends. Other studies based on the substitution hypothesis proposed by La Porta et al. (2000) argue that MNCs tend to pay lower dividends compared to DCs when they cross-list in a more developed market as strong legal protection for shareholders may substitute for higher dividend payments. Furthermore, existing empirical evidence on the impact of multinationality on dividends is inconclusive. Akhtar (2018b) and Aggarwal and Kyaw (2010) both report that US multinationals pay higher dividends compared to DCs. However, Lam et al. (2012), Cheng et al. (2021) and Huang et al. (2015) find that multinational firms pay significantly less dividends than domestic firms.

Once again, existing evidence is mainly focused on samples of non-US firms cross-listed in other markets (more developed ones). There remains open question such as 1) existing literature provides incomprehensive evidence on how dividend policy changes when US firms become multinational, and 2) it is also not clear for firms to understand how their dividend policy changes when they spread sales geographically. The latter is important for managers from small and medium-sized MNCs, as cross-listing requires a

significant level of managerial and financial commitments initially (Sharma & Erramilli, 2004), which is financially costly to them (Pagano et al., 2002b). Hence, this gap in the literature needs to be addressed. The main research question in Chapter 4 is: whether and how does the breadth of multinationality impact firms' dividend policy? Both the effects of the breadth of multinationality and the total level of multinationality are compared across various measures of dividend payments. The impact of the breadth of multinationality on dividend payments is evaluated with a particular focus on the liabilities of foreignness where MNCs face additional costs when they have business operations in foreign markets. Using three proxies to measure multinationality, eight measures of dividend payments and the constituents of Russell 3000 for the period 1998 to 2020, Chapter 4 provides a more in-depth investigation into this relationship.

The findings of Chapter 4 suggest that dividend payments are found to be negatively impacted by the degree of multinationality. It is found that the percentage foreign sales has the strongest effect on dividend policy compared to the ABHK score and percentage foreign assets. Chapter 4 also reports that the negative relationship between the ABHK score and dividend payments does not increase gradually. This indicates that as the breadth of geographic sales increases, firms do not necessarily reduce dividend payments. In particular, firms that have foreign sales only in one region pay the lowest dividends, while firms that have foreign sales from two regions pay the highest dividends. With mixed levels of significance, the results show that the industry analysis, size effect analysis, sub-period analysis, and alternative measures of multinationality and endogeneity are robust and consistent with the main findings.

Chapter 4 contributes to managerial practice in the following ways. First, it provides evidence on whether and how the breadth of multinationality affects dividend payments. This is important for managers of multinational firms as multinationals are usually well-

established firms with high free cash flow and limited investment opportunities, where dividends can be used to reduce the conflicts of interest between managers and stockholders (John et al., 2011). Second, it provides evidence that managers of US multinational firms are more likely to offer lower dividend payments to their shareholders. Such evidence may show strong support for the substitution hypothesis proposed by La Porta et al. (2000) which argues that the strong legal protection, given that US shareholders are highly protected from corporate expropriation, may substitute for higher dividend payments. Third, an alternative viewpoint may suggest that there is a great manager-shareholder conflict among US multinational firms where managers may involve themselves in increasing their wealth at the cost of shareholders (overinvestment problem). This may be because most large corporations, in the United States, the U.K., Canada, and Australia, have their ownership largely dispersed and are to a significant extent controlled by their managers (La Porta et al., 2000). Similar results have been found by Akhtar (2018a) for Australian multinationals. This Chapter leaves further investigation into these alternative views for future research.

1.4 Conclusion

Overall, this Chapter provides an overview of my thesis. It introduces the thesis's structure, motivation, research questions and hypothesis on a chapter-by-chapter basis. Chapter 2 has been submitted to the International Journal of Finance and Economics (IJFE) (ABS 3*). Furthermore, Chapter 3 has been submitted to the Financial Analysts Journal (ABS 3*). Chapter 4 is currently in the final stages of editing in order to submit to an ABS 3-star journal.

Chapter 2 The impact of foreign sales expansion on stock liquidity

2.1 Introduction

The study of stock liquidity constitutes an important area in the literature, particularly given the current Covid-19 pandemic and stock liquidity has become more relevant to investors. Although a large number of studies examine the impact of multinationality on stock liquidity, the effect of geographic expansion of sales or exporting on stock liquidity has received little attention. Existing studies on this relationship take an equity-based perspective, such as Atanasova and Li (2018) and Deng et al. (2018), and exclusively focus on the impact of cross-listing on stock liquidity. As an alternative method of being multinationals, firms selling their products internationally may face management and business practices issues in an international context that come from political and cultural differences. Managers need to be aware of whether and how selling abroad can impact firms' stock liquidity in order to perform in the international environment.

Existing literature finds contradictory theoretical arguments on the relationship between equity-based internationalisation and stock liquidity. For example, additional order flows (Berkman & Nguyen, 2010; Domowitz et al., 1998), a broader investor base (Berkman & Nguyen, 2010; Dodd, 2011), the bonding theory (Huang et al., 2016) and the flow-back theory (Halling et al., 2008a; Hargis & Ramanlal, 1998) all argue that multinationality may enhance stock liquidity. Alternatively, the migration and spill-over hypothesis (Levine & Schmukler, 2006b) propose a negative relationship between multinationality and liquidity. Furthermore, empirical results on the relationship between internationalisation and stock liquidity are contradictory and far from

conclusive (Hales & Mollick, 2014; Levine & Schmukler, 2007). The relationship between multinationality and stock liquidity remains an open question.

One explanation for the lack of consistency within the literature may be because existing studies, such as Huang et al. (2013) and Levine and Schmukler (2006), mainly focus on the cross-listing of shares. This study takes an alternative perspective and analyses the geographic expansion of sales, which allows us to incorporate the liabilities of foreignness (LOF) theory and therefore provide a more robust analysis of the relationship. The LOF refers to the additional costs that foreign firms incur when operating abroad that domestic firms do not face (Gu et al., 2019; Mezias, 2002). Multinationals may face LOF, such as institutional distance, information costs, unfamiliarity costs, and cultural differences (Bell et al., 2012), when they expand their sales geographically. The LOF can affect a firm's stock liquidity through agency conflicts. Based on agency theory, these additional costs may cause greater agency costs because it becomes more difficult to monitor managers in international markets (Reeb et al., 2001). For example, it is complex and costly for firms to provide multi-country financial statements and hire multi-country auditors (Reeb et al., 2001). A poor disclosure of a firm's earnings or poor earnings quality can result in differentially informed investors and thereby enhance the information asymmetry in financial markets as investors differ in their ability to process earnings-related information (Bhattacharya et al., 2013). This may widen the bid-ask spread and lower the stock liquidity (Attig et al., 2006).

Another explanation for the lack of consistency may be because of the difficulties arising from defining and measuring both stock liquidity and multinationality. Existing studies tend to either directly measure stock liquidity using the bid-ask spread or indirectly measure it as price impact (Lesmond, 2005). Most standard measures of stock

liquidity are difficult to compute as they require intraday data which is large and grows exponentially over time. Therefore, existing studies often use low-frequency liquidity proxies (Fong et al., 2017). However, there is still no agreement within the literature on which measures are best for all market conditions (Fong et al., 2017; Goyenko et al., 2009). A similar issue arises in relation to multinationality. Despite the multinational companies' (MNCs) prevalence in International Business, there is no agreed definition or approach to measurement (Aggarwal et al., 2011). The most common approach in existing studies is the percentage of foreign sales (Aggarwal & Kyaw, 2010; Ramírez & Tadesse, 2009) but again, there is no consistency within the literature.

Many existing studies on the multinationality - stock liquidity relationship rely on equity-based market entry and event study analysis (Chipunza & McCullough, 2018b; Deng et al., 2018). These studies classify firms as international by identifying the event date when they either cross-list, cross-trade, issue American Depositary Receipts or Global Depositary Receipts (Atanasova & Li, 2018). This methodology is limited in that the event date may be difficult to identify (Nelson et al., 2008) and the event study cannot determine whether the event caused the underlying situation - the rise or fall of stock liquidity (Fisch et al., 2018). Moreover, event studies tend to rely on small sample sizes. For example, Hegde et al. (2010) use a sample size of 80 firms while Bayar and Önder (2005) use a sample of 54 firms. This may explain why empirical results on this topic remain contradictory (Chipunza & McCullough, 2018b; Hales & Mollick, 2014). Furthermore, this approach studies the initial impact on stock liquidity when a firm becomes international. This study takes a much broader perspective and provides a panel-data analysis to investigate the longitudinal relationship between multinationality and stock liquidity, not at the initial stages of internationalisation, but rather over a 20-year sample period.

This study is unaware of any existing research that tests whether non-equity-based multinationality impacts stock liquidity, using the constituents of the Russell 3000 for the period 1998 to 2018. This study uses four measures of stock liquidity, two primary measures of multinationality (plus an additional four measures as part of the robustness analysis) and a regression-based analysis to provide an alternative and more in-depth investigation into the multinationality - stock liquidity relationship than exists in the literature to date. It is important to note that the two measures of multinationality use foreign sales data, while they capture different concepts of firm multinationality. This study uses the percentage of foreign sales to capture the total multinationality while using the ABHK score from Aggarwal et al. (2011) to explore the breadth of firms' multinationality. The measures are more consistent with conventional measures of multinationality within the International Business literature (Aggarwal et al., 2011a). They also allow for a longitudinal analysis of both multinationality and its relationship over time with stock liquidity. This study checks the robustness of the results using the Herfindahl–Hirschman concentration index (HHI), the Entropy measure, the percentage of foreign assets and the number of foreign segments as additional measures of multinationality.

The main findings are as follows. This study finds a positive relationship between stock liquidity and the percentage of foreign sales, while the relationship between stock liquidity and the ABHK score produces mixed results. More specifically, this study finds a negative relationship between bid-ask spreads and the ABHK score, while price impact factors and trading volume are positively related to the ABHK score. Moreover, this study finds that the positive relationship between stock liquidity and the ABHK score does not increase gradually but presents as an inverted horizontal-S-shaped trend. This study finds an increase in stock liquidity at low and high levels of ABHK score,

while a decrease at moderate levels. With mixed levels of significance, the results show that the industry analysis, size effect analysis, sub-period analysis, alternative measures of multinationality and endogeneity are robust and consistent with the main findings. Finally, this study finds that the multinationality - stock liquidity relationship has changed dramatically over time from a weak and insignificant relationship to a strong positive relationship.

This Chapter offers several contributions to international business research. First, This study extends the literature on the multinationality - stock liquidity relationship by taking a more IB perspective, most notably in my approach to measuring multinationality. Moreover, by considering the LOF in the relationship between foreign sales and stock liquidity, this study answers the call of Puck and Filatotchev (2018) for future research on the overlap of finance and IB and cross-border contributions. Second, rather than relying on an event study analysis, this study provides a panel-data analysis to investigate the longitudinal relationship using non-equity-based market entry modes. Third, This study provides a more in-depth analysis of this relationship which allows us to identify the internationalisation methods that have the greatest impact on stock liquidity. This is important because it provides a more holistic view of the mechanism of this relationship. In particular, this study finds that foreign sales improve stock liquidity through price impact factors and trading volume. This study also finds that the percentage of foreign sales leads to higher stock liquidity when compared to the ABHK score, HHI, Entropy measure, percentage of foreign assets and number of foreign segments. Finally, this research has important implications for managerial practice. When expanding business operations geographically, firms face increased information asymmetry and costs due to the differences originating in cultural and political institutions across headquarters and subsidiaries. Therefore, managerial decisions, from

entering specific countries, the sequence of market entry, and the choice of entry mode to cross-border knowledge transfer and international human resource management, are critical in order to perform well in the international environment. For example, one challenge for MNCs is how to employ and interlink their diverse knowledge located in dispersed headquarters and subsidiaries to generate creative and innovative outcomes (Tippmann et al., 2017). Such a challenge on knowledge transformation in MNCs is greatly needed given it may lower the information asymmetry and the costs associated with liabilities of foreignness by promoting information or knowledge to flow between regions, thus increasing stock liquidity.

The remainder of this Chapter is organized as follows. Section 2.3 reviews prior studies and provides a research hypothesis. Section 2.4 describes the data and research methodology. Section 2.5 details the results of the analysis. Section 2.6 presents the robustness tests. Finally, Section 2.5 concludes.

2.2 Literature review and hypothesis development

2.2.1 The relationship between multinationality and stock liquidity

Existing literature provides conflicting theoretical arguments on the relationship between multinationality and stock liquidity. Berkman and Nguyen (2010) argue that when companies cross-list, additional order flows that come from a broader shareholder base and access to foreign equity markets may enhance their stock liquidity. Moreover, according to Eun and Sabherwal (2018), when firms cross-listed, the increased inter-market competition between the host and home markets improves stock liquidity. By analysing Canadian stocks that cross-listed on the US markets, they find that these stocks have increased trading and narrower bid-ask spreads because of the greater competition and price adjustments from the US markets. (Foerster & Karolyi, 1998)

According to the bonding hypothesis, stock liquidity improves for firms that cross-list in a market with a better investment environment and a system of stronger shareholder protections (Y. Huang et al., 2013). Berkman and Nguyen (2010) report that by bonding themselves to an increased level of disclosure and scrutiny market, firms' stock liquidity improves as a result of a better information environment. For instance, Baker et al. (2002) find that firms' analyst forecasts become more accurate after cross-listing in NYSE as the analyst and media coverage increased. Moreover, a good investor protection system may lower the costs of information asymmetry, therefore liquidity providers may incur relatively lower costs and offer narrower bid–ask spreads (H. Chung, 2006). However, evidence on the bonding hypothesis is limited to emerging markets (Y. Huang et al., 2013), whereas the empirical evidence is mixed for firms from developed markets that cross-list (Bessler et al., 2012).

Alternatively, other research questions the positive effects of internationalization on cross-listing. Levine and Schmukler (2006) argue that cross-listing can reduce firms' stock liquidity in the domestic market through the mechanism of Migration and Spillover. They propose that cross-listing may shift the trading of international firms out of their domestic market and migrate into foreign markets. For example, foreign investors in different time zones who used to trade in the home market may shift to foreign markets for convenience (Halling et al., 2008b). Spillover means that the liquidity of individual equities co-moves with market liquidity and the inefficiencies of the domestic market may harm the liquidity of domestic firms (Levine & Schmukler, 2006a). Therefore, combined, migration and spillover reduce the liquidity of domestic firms that cross-listed in foreign markets, especially if their domestic equity market is illiquid.

As mentioned above, theoretical arguments for this relationship mainly focus on cross-listings and provide conflicting predictions. However, there are many other ways for firms to go internationally, such as selling abroad. Compared to cross-listing which demands a significant level of managerial and financial commitments initially (Sharma & Erramilli, 2004), selling abroad requires fewer upfront resources and provides greater operational flexibility (Hollender et al., 2017). Moreover, selling abroad may help firms to benefit from international opportunities and new information (Sui & Baum, 2014), build consumer trust and foreign market reputation (Pagano et al., 2002a) and provide firms with a wider investor base (De Villa et al., 2015). These indicate an increase in stock liquidity through the channel of narrower bid-ask spreads and an increased trading volume. On the other hand, firms that sell abroad may face additional costs -liabilities of foreignness (LOF) - that comes from unfamiliarity with the local environment, institutional distance, information asymmetry and cultural differences (Bell et al., 2012). These additional costs may lead to greater agency costs (Reeb et al., 2001) and enhanced information asymmetry (Bhattacharya et al., 2013), which may widen the bid-ask spread and lower the stock liquidity (Attig et al., 2006).

2.2.2 Measuring Multinationality and stock liquidity

There are numerous methods within the existing literature used to measure multinationality, such as the percentage of foreign assets (Marshall et al., 2020), foreign direct investments (Iamsiraroj, 2016), number of foreign to total employees and number of foreign subsidiaries to total subsidiaries (Contractor et al., 2003). Aggarwal, Berrill, Hutson, and Kearney (2011) propose a classification scheme, the ABHK model, to categorise firm-level multinationality. They measure multinationality based on the firm's breadth of international operations. This study measures the total multinationality using both the percentage of foreign sales and the breadth of multinationality using the

ABHK model. It is important to distinguish between these two measures as firms with high levels of foreign sales to a single neighbouring country differ significantly from firms with high levels of foreign sales spread throughout the world. According to Marshall et al. (2020), these multinationality measures can be divided into three groups – foreign composition, international diversification and international scope. First, methods such as the percentage foreign sales ratio and the percentage foreign assets ratio examine the total multinationality of a firm and reflect the Uppsala Model (Marshall et al., 2020). They are the most commonly used measures of firm multinationality (Aggarwal et al., 2011a). Second, the international diversification measure focuses on a firm's revenue by region (Kirca et al., 2011), which can be calculated as HHI or Entropy measure (Marshall et al., 2020). Third, a number of measures focus on the breadth of international operations or the breadth of multinationality (Marshall et al., 2020). My analysis provides a measure of internationalisation under each category proposed by Marshall (2020).

Stock liquidity is also difficult to define and even more challenging to measure (Lesmond, 2005). Holden and Jacobsen (2014) find that stock liquidity can be measured using standard methods of cost dimension, quantity and time dimensions based on intraday trade and quotation data. However, most standard measures of stock liquidity are difficult to compute as they require intraday data which is very big and grows exponentially over time. Similarly, the annual growth rate of trade and quotation data (32.8 percent per year for 37 exchanges) (Fang et al., 2014) and the computer's central processing unit performance (31 percent per year) (Hennessy & Patterson, 2012) make it difficult to compute standard measures of stock liquidity from intraday data (Holden et al., 2014). Hence, recent literature proposes the use of low-frequency stock liquidity

proxies calculated using daily data in order to save computational time compared to intraday data (Fong et al., 2017).

Two types of low-frequency stock liquidity measures are found in the existing literature – transaction cost (bid-ask spreads) and cost-per-dollar-volume (price impact) (Fong et al., 2017). Measures such as closing percent quoted spread (CPQS) (Chung & Zhang, 2014), Holden's measure (Holden, 2009) and high-low measure (Corwin & Schultz, 2012) can be used as proxies for transaction costs. Moreover, Amihud's (2002) illiquidity ratio, Pastor and Stambaugh's (2003) method and Amihud, Mendelson and Lauterbach's (1997) Amivest liquidity ratio are commonly used as price-impact measures. Alternatively, a firm's trading activities, such as trading volume and turnover ratios (Atanasova & Li, 2018; Huang, Jacoby, & Jiang, 2016; Chipunza & McCullough, 2018), have also been widely used to represent stock liquidity in previous studies (Hearn et al., 2010). However, there is still no agreement within the literature on which measures are best for all market conditions (Fong et al., 2017; Goyenko et al., 2009). For instance, argue that the US is a quote-driven market where market makers stand ready to provide stock liquidity, which differs from international order-driven markets, such as the UK. Moreover, Chung and Zhang (2014) note that the best stock liquidity measures for developed markets are not necessarily accurate for emerging markets where securities are thinly traded.

2.2.3 Hypotheses development

Foreign sales provide firms with a high level of flexibility (Sousa et al., 2008); require little or no upfront investment (Suñrez-Ortega, 2003); and involve few resources and low risks (Leonidou et al., 2010). Firms' foreign sales data and the geographic distribution of sales may impact stock liquidity through different channels. Firms that have foreign sales are generally financially healthier (Berman & Héricourt, 2010;

Guariglia & Mateut, 2010), and have stable and large cash flows as they are less tied to the domestic business cycle, and less subject to those financial constraints induced by tight monetary policy and recessions at home (Chen & Guariglia, 2013). On the one hand, stock liquidity increases as greater cash flows lower the valuation uncertainty associated with assets (Gopalan et al., 2012). On the other hand, a healthier financial state and larger cash flows may imply more future investments which lead to greater uncertainty about future assets and hence lower stock liquidity (Gopalan et al., 2012).

Moreover, by selling into an institutional and culturally close foreign market (De Villa et al., 2015; Sui et al., 2012), firms learn experiential knowledge about that market by expanding into it in a sequential manner (Vahlne & Johanson, 2013). This knowledge includes factors related to culture, language, institutional environment and level of industrial development (Papadopoulos & Martín Martín, 2011; Yeoh, 2011) and may in turn help firms to reduce both the risk and the liabilities of foreignness (Johanson & Vahlne, 2009; Sui & Baum, 2014). Furthermore, many studies, such as Pangarkar (2008) and Glaum and Oesterle (2007), find that the degree of multinationality (measured using the percentage of foreign sales) has a strong influence on firms' performance; high-performance firms may further attract more investors. This study, therefore, argues that with the gradual increase in foreign sales, firms incur lower information asymmetry and a greater investor base. Hence, this study proposes the following hypotheses:

Hypotheses 2.1. There is a positive relationship between total multinationality (measured using the percentage of foreign sales) and stock liquidity.

The second measure of internationalisation, the ABHK model, measures a firm's breadth of internationalisation. This measure has been used extensively throughout the literature (Hutson & Laing, 2014; Mullen & O'Hagan Luff, 2018). A firm's breadth of

multinationality can impact its stock liquidity through several channels. First, geographical expansion helps firms to benefit from international opportunities and new information (Sui & Baum, 2014). This new information may later spill-over from product markets to capital markets (Bell et al., 2012), which may lower the information asymmetry. This may result in a narrower bid-ask spread and higher stock liquidity (Attig et al., 2006). Second, selling abroad may help firms build consumer trust and foreign market reputation (Pagano et al., 2002a). Given that investors prefer to invest in stocks with easily recognized products (Frieder & Subrahmanyam, 2005), the geographical expansion may likely provide firms with a wider investor base. Therefore, this study argues that with the geographical expansion of sales, firms incur lower information asymmetry and a greater potential investor base. This study further proposes the following hypotheses:

Hypotheses 2.2. There is a positive relationship between the breadth of multinationality (measured using the ABHK score) and stock liquidity.

2.3 Data and Methodology

Existing studies primarily take the perspective of non-US firms and the benefits they achieve from cross-listing into the US market, that is, they analyse stock liquidity in the domestic market for non-US firms that cross-list on US exchanges (Karolyi, 2006). This is because, according to the bonding theory, firms like to cross-list on a country with a better information environment in order to improve reporting behaviour in the originating country, which reduce transaction cost and improve stock liquidity in the home market (Huang et al., 2016). Firms from smaller, less liquid markets may likely benefit from cross-listing on larger, more efficient and more liquid markets such as the US (Karolyi, 2006). The US market may also provide better protection to its shareholders due to its strong governance and legal systems (Coffee, 1999, 2002; Reese

& Weisbach, 2002). Less attention has been given to US market stock liquidity and the multinationality of US firms.

This study, therefore, provides an alternative approach to analysing US firms. The stock liquidity benefits for US firms when they internationalise likely differ as the US market is already a large, well-regulated and highly liquid market (Karolyi, 2006; NASDAQ, 2018). US firms may likely expand internationally for operational reasons while other firms may be more focused on their stock liquidity. Moreover, the US is a quote-driven market where market makers stand ready to provide stock liquidity while others such as the EU are dominated by order-driven markets (Jiang et al., 2017). Furthermore, the U.S. equity markets are the largest in the world and continue to be among the deepest, most liquid and most efficient, it may provide high-quality data for this study using panel analysis on this multinationality – stock liquidity relationship. Future research could try to analyse this multinationality – stock liquidity relationship in European and other markets.

This study, therefore, uses constituents of the Russell 3000 index as the sample, which includes large-cap Russell 1000 firms and small to mid-cap Russell 2000 firms. The Russell 3000 constituent firms contain the largest 3000 US companies representing approximately 98 percent of all US-incorporated equity securities (FTSE Russell, 2019). All data are collected from Bloomberg and Thompson Reuters, and the sample period is 21 years, from 1998 to 2018. Following Hoang et al. (2020) and Wu (2019), this study uses the Global Industry Classification Standard (GICS) sectors to categorise firms into industries. The GICS code collected from Bloomberg contains eleven sectors - communication services, consumer discretionary, consumer staples, energy, financials, healthcare, industries, information technology, materials, real estate, and utilities. This study excludes financial firms as they are heavily regulated (Deng et al., 2018).

This study uses four measures of stock liquidity as follows: closing percentage quoted spread (CPQS), Amihud's illiquidity ratio, Amivest's liquidity ratio and total trading volume to capture alternative aspects of stock liquidity. These four measures represent the three dimensions of stock liquidity – bid-ask spreads (the first proxy), price impact (the second and third proxies) and trading activities (the last proxy) as proposed by Holden and Jacobsen (2014).

The stock liquidity measures are calculated as follows. The CPQS measure is calculated as the average difference in the bid-ask spreads over its mid-point which represents the firm's bid-ask spread (K. H. Chung & Zhang, 2014). Amihud's illiquidity ratio is calculated as the natural logarithm of absolute daily return divided by dollar volume which represents the firm's price impact on stock liquidity (Atanasova & Li, 2018). Amivest's liquidity ratio is calculated as the average of the natural logarithm of trading divided by absolute daily return (Goyenko et al., 2009). Total trading volume is calculated as the natural logarithm of the aggregated daily trading volume after adjusting for the total number of trading days in a year (Chipunza & McCullough, 2018).

This study measures total multinationality using the percentage of foreign sales which has been widely applied in previous studies (Ahmed & Brennan, 2019; Attig et al, 2016), while the ABHK model is used to measure the international scope. The ABHK model classifies the breadth of multinationality of a firm based on the breadth of its operations across six geographical regions: Africa, Asia, Europe, North America, Oceania, and South America. A firm is categorised as domestic if it has sales only in its home country (the US); a regional firm has sales in one region (North America in the current study); a trans-regional firm has sales in two or more regions while a global firm has sales in all six regions. This results in seven degrees of multinationality,

ranging from purely domestic firms (a score of 0) to fully global firms (a score of 6). It is important to distinguish these two sale-based multinationality measures as a high breadth of multinationality may not necessarily have a high level of foreign composition. For example, in 2018, Astec Industries had an ABHK score of 6 (meaning it had sales in all 6 geographical regions of the world) while only having 21.8 percent foreign sales. Similarly, ANI Pharmaceuticals had 100 percent foreign sales but an ABHK score of just 1 (sales in only one of the six geographical regions of the world). This study provides a panel model estimation. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions, including six control variables - firm size, leverage, analyst coverage, share turnover, firm's growth opportunity and return volatility. The use of fixed effects is confirmed by the Hausman test from Hausman (1978), which strongly suggests a fixed-effects model over the random-effects model. Results are available in Table A2-10 in the Appendix. All models include year and industry-fixed effects (Bris et al., 2012). This study states the model as follows:

$$Liquidity_{i,t} = \alpha + \beta_1 M_{i,t} + \sum \beta_2 X_{Control} + M_{i,t} \sum \beta_3 X_{Control} + \varepsilon_{i,t} \quad (2.1)$$

where stock liquidity is measured using each of the four measures detailed above, $M_{i,t}$ is multinationality as measured by its ABHK score (international scope) in model 2.1.1 or percentage foreign sales ratio (foreign composition) in model 2.1.2 for stock i in time t . $X_{Control}$ represents the six control variables¹ used in the model.

¹ This study recognises that several market events which may affect stock liquidity occurred during the sample period. For example, the decimalisation and segmentation of the stock market, and the tick size pilot program where firms are involved in widening their minimum quoting and trading increments. This study do not control for these events in the main analysis as they are beyond the scope of this Chapter. However, the preliminary results suggest that these events did not significantly effect the liquidity measures.

Firstly, this study includes return volatility (Atanasova & Li, 2018; Chipunza & McCullough, 2018), calculated as the standard deviation of daily stock returns to control for the risk of adverse price changes. Silva and Chávez (2008) find evidence that return volatility positively affects trading costs as it is more costly to hold riskier stocks and to trade with informed traders, which may lower stock liquidity. Secondly, the level of trading activity is measured using the stock's turnover ratio (Dang et al., 2015). More actively traded stocks should have lower costs of trading and may have relatively high stock liquidity (Levine & Schmukler, 2006). Thirdly, this study uses the natural logarithm of total assets as a measure of firm size (Dabhane, 2018; Chipunza & McCullough, 2018). Firm size has been shown to affect trading costs as large firms have relatively lower trading costs compared to small-sized firms (Y. Huang et al., 2016). In terms of growth opportunity and leverage, this study measures a firm's growth opportunity using its market-to-book ratio (Dabhane, 2018; Deng et al., 2018) and its' leverage using the ratio of the firm's total liabilities to its total assets at the end of the preceding year (Doodd, 2011; Chipunza & McCullough, 2018). A firm's growth signals its need to raise capital, which may increase its investor base and have more active trading (Deng et al., 2018). Moreover, highly leveraged firms tend to have more volatile stocks (Chipunza & McCullough, 2018) and investors usually avoid firms with higher leverage ratios (Vo, 2016). Finally, this study uses the total number of one-year price estimates by analysts as a proxy of analyst coverage (Chipunza & McCullough, 2018). Analyst coverage can improve stock liquidity by enhancing corporate transparency and information quality as more analysts can gather information to better assess firm value and promote information efficiency (Deng et al., 2018). This study also includes interaction terms for each of the six control variables to investigate if a firm's stock liquidity determinants vary between alternative levels and breadths of

multinationality and their domestic counterparties. Following Bris et al. (2012) and Deng et al. (2018), this study controls for industry and time effects by adding both industry and time annual dummy variables.

2.4 Results

2.4.1 Preliminary Statistics

The sample size for the ABHK analysis is 29,285 firm observations over 21 years (1998 – 2018), while the percentage of foreign sales is 27,853. Table 2-1 shows the multinationality and stock liquidity levels for each year of the sample. Using the ABHK model, the percentage of domestic firms (ABHK score 0) remained below 46 percent in all years. The number of firms categorised as regional (ABHK score 1) is low (on average 1.7 percent), remaining below 2.6 percent in all years. On average, 55.69 percentage of firms are categorised as trans-regional (ABHK score 2-5) over the sample period. The number of firms classified as global (ABHK score 6) remained below 4 percent in all years, with an average of 2.32 percent of firms classified as global over the sample period. The average ABHK score shows that from 1998 to 2018, companies' average breadth of multinationality is 1.89. The pattern of the breadth of multinationality is consistent with previous studies on US firms. For example, Berrill and Hovey (2018), Chadha and Berrill (2016) and O'Hagan-Luff and Berrill (2016) find that the number of firms with regional and global operations forms a small proportion of their samples.

Table 2-1 Sample Distribution of Multinationality and Stock Liquidity

	International Scope and Foreign Composition									Stock Liquidity			
	DCs			MNCs				Avg ABHK score	Avg %FS	CPQS	Illiquidity	Amivest	Volume
	0	1	2	3	4	5	6						
1998	39.58%	2.55%	21.06%	19.91%	10.42%	4.63%	1.85%	1.80	19.63%	0.0173	0.0014	17.1132	12.7598
1999	36.38%	1.43%	23.84%	19.18%	11.11%	5.91%	2.15%	1.94	21.89%	0.0205	0.0012	16.8675	12.8656
2000	34.57%	1.57%	25.43%	21.57%	11.14%	4.29%	1.43%	1.92	21.07%	0.0254	0.0009	16.7767	13.0262
2001	38.19%	1.88%	23.24%	20.10%	12.19%	3.14%	1.26%	1.81	20.39%	0.0385	0.0001	16.8917	12.9643
2002	39.06%	1.79%	20.42%	22.54%	11.94%	2.68%	1.56%	1.81	21.89%	0.3448	0.0008	16.8743	12.9587
2003	39.13%	1.81%	20.04%	21.00%	12.15%	4.80%	1.07%	1.84	23.27%	0.3348	0.0007	16.6999	13.0475
2004	39.56%	2.01%	18.98%	19.68%	13.86%	4.32%	1.61%	1.86	23.81%	0.2960	0.0006	17.3847	13.1302
2005	41.71%	1.76%	17.81%	18.08%	14.11%	4.94%	1.59%	1.82	23.70%	0.0682	0.0005	17.4472	13.1452
2006	40.89%	2.00%	19.01%	18.05%	13.98%	4.39%	1.68%	1.82	24.02%	0.0767	0.0004	17.5353	13.2605
2007	39.47%	1.68%	19.24%	17.94%	15.27%	4.89%	1.53%	1.89	25.45%	0.0515	0.0003	17.2924	13.4617
2008	39.35%	1.84%	18.52%	18.31%	14.02%	6.19%	1.77%	1.91	26.23%	0.0758	0.0003	16.7848	13.5494
2009	40.38%	1.86%	18.27%	16.73%	14.68%	6.28%	1.79%	1.89	25.15%	0.0442	0.0004	17.1270	13.3848
2010	39.88%	1.74%	18.56%	15.74%	15.56%	6.91%	1.62%	1.93	24.28%	0.0297	0.0004	17.3322	13.2184
2011	39.39%	1.69%	19.36%	15.41%	15.01%	7.34%	1.81%	1.94	24.94%	0.0348	0.0004	17.2229	13.1926
2012	38.77%	1.96%	19.20%	15.12%	13.54%	8.32%	3.10%	2.00	24.94%	0.0225	0.0005	17.0716	13.0570
2013	39.76%	1.78%	18.12%	14.61%	13.62%	8.22%	3.88%	2.01	24.88%	0.0081	0.0005	17.3934	13.0376
2014	42.26%	1.34%	17.51%	14.63%	12.15%	8.13%	3.97%	1.93	24.85%	0.0026	0.0004	17.4802	13.1352
2015	43.04%	1.29%	17.93%	13.87%	12.68%	7.43%	3.76%	1.89	23.48%	0.0013	0.0004	17.4159	13.2050
2016	44.43%	1.20%	16.67%	12.68%	13.78%	7.44%	3.79%	1.88	23.00%	0.0013	0.0004	17.3986	13.2299
2017	44.92%	1.12%	16.90%	12.69%	13.25%	7.36%	3.76%	1.85	22.44%	0.0014	0.0004	17.5914	13.2360
2018	45.34%	1.46%	17.02%	12.53%	12.43%	7.56%	3.66%	1.83	22.80%	0.0014	0.0004	17.3514	13.3150
Average	40.29%	1.70%	19.39%	17.16%	13.18%	5.96%	2.32%	1.89	23.81%	0.0518	0.0005	17.2576	13.1909

This table shows the percentage ABHK Score and percentage foreign sales ratio distribution over time. It also presents the mean value of four different stock liquidity measures across Time. Following Berkman and Nguyen (2010) all control variables are winsorized at 1 percent. Moreover, annual stock liquidity is the aggregated daily stock liquidity after adjusting for the total number of trading days in a year. For stock liquidity measures, CPQS and Illiquidity have a negative correlation with stock liquidity, while Amivest's liquidity and Volume have a positive correlation with stock liquidity. For example, in 2010, 39.88% of firms were categorised as domestic using the ABHK model and on average, firms had 24.28% foreign sales.

The average percentage of foreign sales (the measure of foreign composition) is 23.81 percent over the sample period. The two measures show different patterns of multinationality over time. For example, in the period 2001 to 2006, the average ABHK shows a dramatic increase in 2004 and a decrease after it, while the average percentage of foreign sales shows stable growth. Furthermore, during the period 2008 to 2013, the average percentage of foreign sales shows a steady decrease, while the average ABHK score increases dramatically. This emphasises the difference between these two multinationality measures.

Table 2-1 also shows the mean values of the four stock liquidity measures each year. In terms of the bid-ask spreads proxies, the CPQS shows a rise between 2002 to 2004, while it falls dramatically after 2012. For the two price-impact stock liquidity proxies, the illiquidity ratio falls from 1998 and reaches its lowest point in 2001, then increases again in 2002; Amivest's liquidity ratio increases from its lowest point in 2003 and falls to its lowest point again in 2008. The remaining trading-related stock liquidity measure shows a steady increase to a peak in 2008 and then remains stable. In general, the four stock liquidity proxies produce mixed annual movements during the sample period.

Table 2-2 presents the descriptive statistics for the four dependent and all independent variables. Among the four stock liquidity proxies, Amivest's liquidity ratio is the most volatile, while the illiquidity ratio is the least. In terms of independent variables, analyst coverage has the highest volatility, while turnover has the lowest. Firms, on average, have relatively low volatility (0.0255) and low growth rates (3.3). They have more debt than equity (52 percent leverage ratio) and the average number of analysts following each stock is 8.

Table 2-2 Descriptive statistics for all variables

Panel A - Descriptive statistics for all variables - ABHK model				
	Mean	Std. Dev.	Min	Max
Dependent Variables				
CPQS	0.0518	0.144	0.0001	0.9395
Illiquidity	0.0005	0.0015	0	0.0178
Amivest	17.2576	1.5932	12.9307	21.2007
Volume	13.1909	1.4699	9.0696	16.9156
Independent Variables				
ABHK	1.8935	1.8291	0	6
Volatility	0.0255	0.0119	0.0086	0.0731
Turnover	0.0108	0.0098	0.0003	0.0777
Market-to-Book	3.3162	3.7008	-14.6082	30.4507
Leverage	0.5203	0.2197	0.069	1.2495
Assets	9.1976	0.699	7.72	11.2688
Analyst	8.4828	6.5151	0	30
Panel B - Descriptive statistics for all variables - %FS model				
Dependent Variables				
CPQS	0.0496	0.1399	0.0001	0.9342
Illiquidity	0.0005	0.0015	0	0.0183
Amivest	0.0507	0.0193	0.0307	0.1494
Volume	17.2958	1.5927	12.9738	21.2572
Independent Variables				
%Foreign sales	0.2381	0.2748	0	1.9062
Volatility	0.0251	0.0116	0.0086	0.0717
Turnover	0.0108	0.0098	0.0003	0.0791
Market-to-Book	3.3245	3.7482	-15.2653	30.8615
Leverage	0.524	0.2177	0.0757	1.2525
Assets	9.2163	0.6981	7.7453	11.2901
Analyst	8.597	6.5681	0	30

This table shows the descriptive statistics for all variables. The dependent variables are as follows: ABHK and %FS. Analyst coverage is measured as the total number of EPS one-year estimates on the company. Market-to-Book (growth opportunity) is measured as the company's market-to-book ratio. The leverage ratio is measured as the ratio of the total liabilities to total assets at the end of the preceding year. The log assets is measured as the natural log of total assets. Return-Volatility is measured as the company's standard deviation of close-to-close returns. Turnover is measured as the trading volume divided by shares outstanding. Descriptive statistics for variables after winsorizing 1 percent at each end excluding ABHK score.

Table 2-3 reports the correlation coefficients between all variables and their degrees of significance. In general, variables tend not to be highly correlated. AHBK scores are positively correlated with Amivest's liquidity ratio and trading volume at the 1 percent level of significance and negatively correlated with the Illiquidity ratio at the 1 percent significance level. This may imply that a higher breadth of multinationality (ABHK scores) increases the firm's trading activity and the marginal cost of trading per dollar. Moreover, the ABHK scores are negatively correlated with leverage ratios and return volatility and positively correlated with the remaining variables at the 1 percent significance level. This implies that a more international firm tends to have more analyst coverage, larger size, higher growth opportunities (market-to-book ratio) and is less leveraged and volatile than less international firms. The percentage of foreign sales is positively correlated with trading volume, Amivest's liquidity, turnover, analyst coverage, growth, and size, while negatively correlated with CPQS, illiquidity and leverage. The results using percentage foreign sales are broadly consistent with those using ABHK scores.

Table 2-3 Correlation coefficients between variables and their degrees of significance.

	ABHK/FS	CPQS	Illiquidity	Amivest	Volume	Turn Over	Analyst	Growth	Leverage	Assets	Volatility
ABHK/FS	1	-0.0309***	-0.0544***	0.102***	0.156***	0.0314***	0.116***	0.0426***	-0.0979***	0.0853***	0.00574
CPQS	-0.0125	1	0.0446***	-0.0533***	-0.0497***	-0.0279***	-0.0805***	-0.0625***	0.0811***	0.0477***	-0.0298***
Illiquidity	-0.0328***	0.0455***	1	-0.215***	-0.298***	-0.141***	-0.191***	-0.0426***	-0.0537***	-0.164***	-0.0534***
Amivest	0.122***	-0.0491***	-0.198***	1	0.762***	0.270***	0.535***	0.104***	0.164***	0.603***	-0.267***
Volume	0.159***	-0.0488***	-0.298***	0.703***	1	0.458***	0.650***	0.115***	0.166***	0.672***	-0.0373***
Turn Over	0.0213***	-0.0320***	-0.147***	0.281***	0.497***	1	0.217***	0.0534***	-0.0133*	0.0427***	0.228***
Analyst	0.140***	-0.0803***	-0.191***	0.491***	0.647***	0.236***	1	0.152***	0.0944***	0.557***	-0.143***
Growth	0.0383***	-0.0644***	-0.0435***	0.0977***	0.116***	0.0509***	0.153***	1	0.0658***	-0.0806***	-0.0384***
Leverage	-0.0575***	0.0868***	-0.0502***	0.155***	0.168***	-0.00699	0.0980***	0.0626***	1	0.447***	-0.113***
Assets	0.137***	0.0526***	-0.161***	0.556***	0.668***	0.0624***	0.557***	-0.0847***	0.456***	1	-0.366***
Volatility	-0.0427***	-0.0239***	-0.0553***	-0.258***	-0.0538***	0.233***	-0.156***	-0.0428***	-0.133***	-0.398***	1

This table shows the correlation coefficients for all variables. The ABHK Model and %FS Models have different sample sizes. The pairwise correlation of the ABHK model is on the bottom left, while the correlation coefficients of the %FS Model are at the top right. * p<0.10, ** p<0.05, *** p<0.01

2.4.2 Regression Analysis

2.4.2.1 ABHK Model Analysis

This study estimates the model using four measures of stock liquidity. As suggested by the Hausman test, all regressions use the fixed-effects approach. Results are presented in Table 2-4. This study finds a positive relationship between the breadth of multinationality and bid-ask spreads as the direction of multinationality is significantly positive with CPQS. Next, this study finds a significant positive relationship between the breadth of multinationality and marginal cost per dollar volume (price impact). A significant negative coefficient is found for illiquidity and a significantly positive coefficient for Amivest's liquidity in explaining the international scope. Furthermore, this study finds the effect of the breadth of multinationality is significantly positive for the trading volume. Results indicate that the geographic expansion of sales increases firms' transaction costs which may lower the stock liquidity. This is in line with the hypothesis that due to the liabilities of newness, the geographic expansion of sales burdens firms with an increase in transaction and operating costs (Cieřlik et al., 2015). On the other hand, the geographic expansion of sales increases stock liquidity through the channel of the price impact factors and the trading volume. This is in line with hypothesis 2.2 that the geographic expansion of sales improves stock liquidity by reducing the information asymmetry and increasing the investor base. Overall, this study finds that there is a positive relationship between stock liquidity and international scope.

Table 2-4 The ABHK and stock liquidity determinants across four stock liquidity measurements

	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	-0.0675	-0.0007	0.2824	0.3261
2	0.0212	-0.0013***	3.1766***	1.8128***
3	-0.0044	-0.0016***	3.3393***	1.9733***
4	0.1482*	-0.0021***	3.1008***	2.4976***
5	0.2805**	-0.0017**	3.2613***	2.1403***
6	0.3916**	-0.0019*	3.5861**	2.5430***
Firm Factors				
Volatility	0.6991***	-0.0055***	-8.4504***	12.5665***
Turnover	-1.3539***	-0.0135***	29.5183***	41.1979***
Assets	0.0151**	-0.0005***	0.8311***	0.9564***
Growth	0.0006	-0.0001***	0.0104*	0.0151***
Leverage	0.0643***	0.0003***	-0.3857***	-0.4818***
Analyst	0.0005	-0.0001**	0.0153***	0.0117***
R-squared	0.4055	0.0755	0.4152	0.6974
Number of obs	25,690	25,759	25,678	26,001

This table shows the regression results of the ABHK model. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "Stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity measure. The independent variables are as follows: Breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented. All interaction terms are available in table A2-1 in the Appendix.

In terms of the control variables, all six variables are significant determinants of stock liquidity. Volatility has a significant negative relationship with the illiquidity ratio and Amivest's liquidity ratio, but a significant positive relationship with the CPQS measure and trading volume. While the results are quite mixed, this study finds that overall, volatility has a positive relationship with stock liquidity. The exception that stock return volatility is negatively correlated with Amivest liquidity and positively correlated with the CPQS measure is likely due to the calculation method. For instance, the standard deviation of stock return (return volatility) has a positive relationship with the absolute volume of stock return that acts as the denominator of Amivest's liquidity, which may explain the negative correlation between them.

The coefficients for share turnover show a strong positive relationship with the Amivest liquidity ratio and trading volume but a strong negative relationship with the CPQS measure and illiquidity ratio. This result supports the argument that as a proxy for the level of information asymmetry, a higher turnover ratio represents lower information asymmetry for the firm, therefore, better stock liquidity (Leuz & Verrecchia, 2000; Leuz, 2003). As share turnover can also be used as a proxy for a firm's trading activity (Levine & Schmukler, 2006b), this result may further imply that higher trading activity causes lower trading costs (bid-ask spreads) and marginal cost per dollar volume, and higher trading volume.

Firm size (log of total assets) is negative and statistically significant in explaining the illiquidity ratio. It also shows a significant positive relationship with the CPQS measure, Amivest's liquidity ratio and trading volume. In general, the results present a positive relationship between stock liquidity and firm size, consistent with the argument that larger firms are likely to have greater analyst coverage leading to a better information

environment and hence reduced transaction costs (Lang et al., 2003; Silva & Chávez, 2008).

A firm's growth opportunity, as measured by its market-to-book ratio, has a significantly positive relationship with Amivest's liquidity and trading volume, but a significantly negative relationship with the illiquidity ratio. This may indicate that, as a measure of the firm's future growth, the firm engaged in a fast-growing process has a higher trading volume and marginal costs per dollar volume. This result is consistent with Pagano et al. (2002) and Dodd (2011), who find a positive relationship between stock liquidity and companies' market-to-book ratio and sales growth, respectively.

The leverage ratio has a significant negative relationship with trading volume and Amivest's liquidity ratio and a significantly positive relationship with the CPQS measure and illiquidity ratio. This may indicate that when a firm is highly leveraged, it significantly reduces its trading volume and trading activity and increases its trading cost through a wider bid-ask spread and marginal cost per dollar volume. In general, firms that use more debt tend to have lower stock liquidity.

Finally, an increase in analyst coverage has a significant positive effect on Amivest's liquidity ratio and trading volume, but a negative impact on the illiquidity ratio. These results indicate that stock liquidity is affected by the number of analysts following the stock. This suggests that greater analyst coverage increases a firm's stock liquidity by increasing its trading volume and trading activity and reducing its marginal cost per dollar volume. This result is consistent with Silva and Chávez (2008), Domowitz, Glen, and Madhavan (1998), Lang, Lins and Miller (2003) and Karolyi (2006). They argue that firms list in a better information environment as a result of greater analyst coverage, and hence have higher stock liquidity than firms with lower analyst coverage.

2.4.2.2 *Foreign Sales Analysis*

This study re-runs the model using the percentage of foreign sales as the measure of foreign composition. Results show a positive relationship between stock liquidity and foreign composition. More specifically, in terms of price impact, the significant negative illiquidity and significant positive Amivest's liquidity suggest that a firm's stock liquidity levels rise as total multinationality increases. Furthermore, results indicate that as total multinationality increases, trading activity increases and as a result, stock liquidity also increases. In general, volatility, share turnover, firm size, growth, leverage and analyst coverage are significant determinants of stock liquidity, consistent with the results using the ABHK model. With the exception of the CPQS measure, this study finds that total multinationality has a significant effect on the remaining three stock liquidity measures. Results show that stock liquidity increases as total multinationality increases.

Table 2-4 presents results using an ordinal measure (the ABHK model), while Table 2-5 presents a continuous measure (measured using the percentage of foreign sales). While the percentage foreign sales model shows that firms' stock liquidity increases as their total multinationality increases, the ABHK model provides further information on stock liquidity among firms with different international scopes. For example, the stock liquidity of regional firms (ABHK score = 1) is not significantly different to their domestic counterparts. The stock liquidity of trans-regional firms (ABHK score between 2 to 5) and global firms (ABHK score = 6) show significant increases compared to domestic firms. However, the stock liquidity increased not in a gradual pattern, but in an inverted horizontal-S-shaped.

Table 2-5 Percentage of Foreign Sales and stock liquidity determinants across four stock liquidity measurements

	CPQS	Illiquidity	Amivest	Volume
FS	0.1006	-0.0046***	4.1360***	4.0901***
Volatility	-0.4657***	-0.0054***	-11.9508***	12.3483***
Turnover	-0.9470***	-0.0131***	22.0051***	32.2474***
Assets	0.0177***	-0.0005***	0.6931***	0.9072***
Growth	0.0003	-0.0001***	0.0153***	0.0124***
Leverage	0.0780***	0.0004***	-0.3688***	-0.4039***
Analyst	-0.0006*	-0.0001***	0.0271***	0.0130***
R-squared	0.4172	0.0756	0.4685	0.6843
Number of obs	24,637	24,691	24,531	24,910

This table shows the regression results of the %FS model. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented. All interaction terms are available in Table A2-2 in the Appendix.

More specifically, for Illiquidity and Trading volume, stock liquidity increases when firms expand their geographic sales and reach the first peak when firms spread their foreign sales to four regions (ABHK score 4). Stock liquidity falls after that but increases to the highest point when firms become fully global (ABHK score 6). Amivest's liquidity shows a similar pattern in that the stock liquidity falls after it reaches the first peak where the firm's ABHK score is 2 and increases again to its highest value when the ABHK score is 6. Overall, This study finds an inverted horizontal-S-shaped relationship between stock liquidity and the breadth of multinationality. Firms that expand their geographic sales experience an increase in their stock liquidity at low and high levels of multinationality, while a decrease at moderate levels.

This is likely because, at the initial stage of the geographic expansion of sales, the benefits outweigh the liability of foreignness. This study argues that stock liquidity increases significantly because the geographic expansion of sales reduces information asymmetry through new information (Sui & Baum, 2014) and information spill-over from product to capital markets (Bell et al., 2012), and increases the foreign investor base through improved international competition (Rialp et al., 2005), consumer trust and product reputation (Pagano et al., 2002a). This can also be supported by the Uppsala theory which is referred to as the incremental approach that the MNCs adopt a gradual process towards their efforts to sell in foreign markets (Pan & Tse, 2000). This theory proposes that foreign sales expansion is inherently risky because of the different political, cultural, and market systems that the MNCs must adapt to (Cieřlik et al., 2015). Due to these differences, MNCs may face additional costs – liabilities of foreignness - when they operate business in an overseas market that local firms may not (Bell et al., 2012). Therefore, at the early stage of internationalization, MNCs expand

their foreign sales into foreign markets with similar cultures and institutional conditions (De Villa et al., 2015).

Then MNCs move on to more dissimilar host countries where they may face increased liability of foreignness in managing the rising number and diversity of the markets it serves with varying cultural and legitimacy contexts (Cieřlik et al., 2015), and may face higher agency costs of monitoring managerial decisions worldwide (Doukas & Pantzalis, 2003). Higher agency costs delay the disclosure of information and add to information asymmetry problems (Attig et al., 2006), which result in a wider bid-ask spread and lower stock liquidity (Lei et al., 2013). Once the firm becomes global, this study argues that the firm has acquired knowledge regarding foreign markets, providing the firm with international experience to proceed with international business activities and managerial decisions worldwide. In turn, overcoming the liability of foreignness and agency costs improves stock liquidity.

2.5 Robustness Analysis

2.5.1 Industrial analysis

In order to test the robustness of my results to the industry of the firm, this study categorises firms using the Global Industry Classification Standard (GICS) as compiled by Standard & Poor. This study excludes financial firms and further classifies firms from communication services, health care, information technology and real estate industries as service firms and firms from energy, materials, industrials, consumer staples, consumer discretionary, utilities and financials industries as non-service firms. This study analyses the stock liquidity-multinationality relationship between service and non-service firms. Results show that the ABHK score is significant across all stock liquidity measures for the non-service firms, while it can significantly explain the

Aninvest's and Trading Volume for the service firms; the percentage of foreign sales is significant across all stock liquidity measures for both types of firms. Results are available in Tables A2-3 and A2-4 in the Appendix. Overall, service and non-service firms show a positive relationship between multinationality and stock liquidity. This finding is consistent with the main finding that a higher degree of multinationality rises firms' stock liquidity through the process of raising their trading activities.

2.5.3 Firm Size Analysis

This study next tests the robustness of my findings to firm size. This study segregates the sample into three groups based on annual sales figures. This study analyses the stock liquidity-multinationality relationship for large, medium and small firms. Results are available in Tables A2-5, A2-6 and A2-7 in the Appendix. For small firms, results show that the ABHK score significantly explains one stock liquidity proxy - trading volume, while the percentage of foreign sales explains four. For medium-sized firms, the ABHK score and the percentage of foreign sales significantly explain two stock liquidity proxies - illiquidity and trading volume. Furthermore, for large firms, the ABHK scores and percentage of foreign sales significantly explain all four stock liquidity proxies. The ABHK score shows a steady increase in the explanation power along with firms' annual sales figures, while the percentage of foreign sales lacks explanation power when explaining medium-sized firms. Although this study finds mixed results across four stock liquidity proxies for the two multinationality measures, this study concludes that the results are broadly consistent with the main model – the stock liquidity-multinationality relationship is positive and robust among alternative firm sizes.

2.5.4 Sub-period analysis

This study performs a sub-period analysis as the next robustness check. The sample period, from 1998 to 2018, contains many historical financial events, such as the Asian financial crisis, the dot-com bubble during the late 1990s and early 2000s, the September 11 attacks in 2001 and the global financial crisis. This study uses the Andrews-Quandt (1993) and Bai-Perron (1998) tests to check for breakpoints but no significant structural breakpoints are found. Following Mullen and Berrill (2017) and O'Hagan-Luff and Berrill (2015), this study then uses a graphical approach to determine the sub-periods. Figure 2-2 shows the monthly return of the Russell 3000 index between 1998 and 2018. This study identifies four distinct sub-periods. The first sub-period, from 1998 to 2003, shows a declining return, which contains major events such as the technology bubble and the 2001 September 11th attacks. The second sub-period covers 2004 – 2007 prior to the global financial crisis. The period between 2008 and 2011 contains the global financial crisis (GFC). The last sub-period, from 2012 to 2018 is characterised by its low volatility. This study uses these four sub-periods to test if the main results are robust in alternative market conditions.

Figure 2-1 Monthly return of the Russell 3000 index from 1998 to 2018

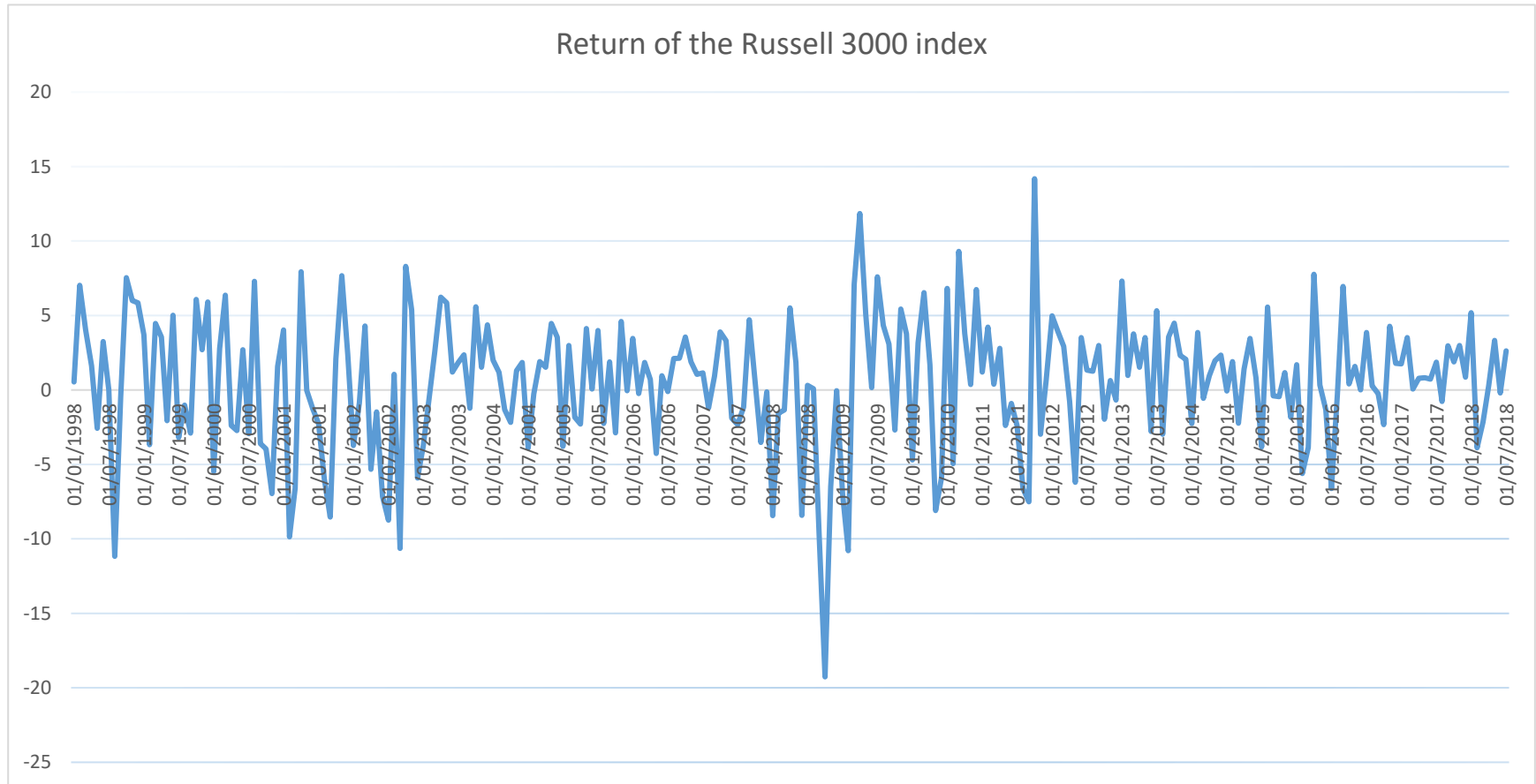


Table 2-7 shows the regression results for each of the four sub-periods. In the first sub-period, from 1998 to 2003, the ABHK model has no explanatory power on the stock liquidity proxies while the percentage foreign sales model explains two (CPQS and Illiquidity). The ABHK model significantly explains two stock liquidity proxies (Amivest's liquidity and Trading volume) in the second sub-period from 2004 to 2007, while the percentage foreign sales model explains three measures (Illiquidity, Amivest's liquidity and Trading volume). In the third sub-period, from 2008 to 2011, the ABHK model and FS model have no explanatory power on the stock liquidity proxies during this high volatility period. For the last period, the ABHK model significantly explains two stock liquidity proxies, CPQS and trading volume, while the percentage of foreign sales significantly explains three measures (CPQS, Illiquidity and Trading volume). All significant results, in general, support the main finding that firms with higher degrees of multinationality tend to have higher stock liquidity. The results are weak in the earlier sub-periods (1998 – 2003, 2004 – 2007 and 2008 – 2011), while the results of the period 2012 – 2018 remain consistent with the overall sample period. This is perhaps due to major financial events (technology bubble, September 11th attacks and global financial crisis) that occurred in the earlier sub-periods reducing stock liquidity for all firms. Hence, this study concludes that the multinationality-stock liquidity relationship is significantly impacted by major financial events that increase market volatility. This relationship stabilizes considerably over time. What initially began as a very weak relationship has become much stronger as markets became more stable. This also supports the argument that there is a negative relationship between stock liquidity and market volatility (Næs et al., 2011). Furthermore, this study argues that after the GFC, the world witnessed a recovery and steady economic growth using the US Gross Domestic Product (GDP) from the Federal Reserve Bank (2022) as the

proxy. This may be a result of the continuous integration and interconnectedness between countries which has led to free trade and capital flows (Coulibaly et al., 2018). This study argues that the integrated global economy after the GFC in turn helps reduce information asymmetry between investors and firms and therefore provides a broader investor base for firms.

Table 2-6 Subperiod analysis

Panel A - Subperiod 1: 1998 - 2003

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	-0.3108	-0.0061	-4.1065	-3.8754*
2	0.1732	-0.0018	-2.0597	0.2048
3	-1.0647*	0.000032	-1.2989	-0.9102
4	-0.0629	-0.0063*	-3.695	-0.6557
5	0.0865	0.0005	1.3509	-0.7685
6	1.0879	-0.0067	8.6795	-0.9003
R-squared	0.1433	0.0973	0.2565	0.667
Number of obs	3,574	3,647	3,716	3,748

FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-1.8458	-0.0207**	31.7326***	-1.5385
R-squared	0.1299	0.1177	0.0477	0.6821
Number of obs	3,284	3,352	3,411	3,442

Panel B - Subperiod 2: 2004 - 2007

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.8081	-0.0013	12.1718	-0.1859
2	0.1916	-0.0024	7.3196*	1.2658*
3	0.2258	-0.0015	11.0344***	0.1729
4	0.1121	-0.0024	13.8671***	2.4085***
5	-0.071	-0.0021	17.5638***	2.2369**
6	0.707	-0.0037	16.4433*	1.4477
R-squared	0.3004	0.0408	0.2826	0.728
Number of obs	4,251	4,336	4,217	4,321

FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.3801	-0.0046*	24.2014***	3.5598***
R-squared	0.2833	0.0439	0.352	0.7336
Number of obs	3,827	3,898	3,792	3,884

Panel C - Subperiod 3: 2008 - 2011

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.1384	0.0023	0.866	1.0157
2	-0.0129	0.0003	3.2572	0.2266
3	-0.081	0	-0.4997	0.8432
4	-0.1819	0.0001	-5.6024*	0.8783
5	-0.1489	0	-1.8252	0.3294
6	-0.2413	-0.0005	1.3307	1.1777
R-squared	0.0379	0.0391	0.4767	0.7434
Number of obs	5,799	5,732	5,691	5,760

FS model				
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	CPQS	Illiquidity	Amivest	Volume
FS	0.0788	0.001	4.3386	1.9092
R-squared	0.0146	0.0401	0.4461	0.6899
Number of obs	5,482	5,419	5,372	5,443

Panel D - Subperiod 4: 2012 - 2018

	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	-0.033	0.0004	2.1207	0.4423
2	-0.0385*	-0.0004	3.0387*	1.1008***
3	-0.0531**	-0.0013*	2.9118	1.2606***
4	-0.0523**	-0.0009	3.7619*	1.6032***
5	-0.0571*	-0.0012	0.2971	2.1021***
6	-0.0431	-0.0015	-1.5297	2.5291***
R-squared	0.1836	0.043	0.3412	0.6953
Number of obs	12,066	12,044	12,054	12,172
FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.0615**	-0.0018**	-2.6023	2.2081***
R-squared	0.2171	0.047	0.513	0.6998
Number of obs	12,044	12,022	11,956	12,141

This table shows the results of subperiod tests. This study uses a graphical approach to determine the sub-periods. This study identifies four distinct sub-periods: 1998-2003, 2004-2007, 2008-2011, and 2012-2018. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented. To save space, this study suppresses results for dependent variables and they are available in table A2-8 in the Appendix.

2.5.5 Alternative measures of multinationality

As a further robustness check, this study estimates the model using four alternative measures of multinationality: the Herfindahl concentration index (HHI), the Entropy measure (international diversification), the foreign assets to total assets ratio (FA) and the number of geographic segments reported in the firm's annual accounts.

$$\text{HHI is calculated as } HHI_{i,t} = \sum_{i=1}^t \left(\frac{SSale}{Sale} \right)^2 \quad (2.2)$$

Where Ssale is the segment sales for the firm and Sale is the total sales for all reported regions.

$$\text{Entropy is calculated as } Entropy_{i,t} = \sum_{i=1}^n P_{it} * \ln (1/P_{it}) \quad (2.3)$$

where P₂ is the share of the product sales in that geographic region i. These four measures have been widely used in existing studies (Keig et al., 2019; Kirca et al., 2011a; Qian et al., 2008). According to Marshall et al. (2020), the HHI and Entropy measure are multinationality measures that focus on a firm's revenue by region. The FA measures firm multinationality based on the concept of examining the total multinationality of a firm, while the final measure examines a firm's international scope. Results are reported in Table 2-8. All four multinationality measures have significant positive impacts on CPQS. The FA and the number of segments have significant negative impacts on the illiquidity, but significant positive impacts on Amivest's liquidity and Trading volume. In general, these results are consistent with the main model. This study concludes that the findings are robust across alternative measures of multinationality.

Table 2-7 Alternative measures of multinationality

Panel A HHI and stock liquidity determinants across four liquidity measurements				
	CPQS	Illiquidity	Amivest	Volume
HHI	0.4323***	0.001	1.1319	-0.2749
Volatility	0.3766**	-0.0060***	-8.5869***	13.3255***
Turnover	-1.4688***	-0.0117***	27.9265***	39.4565***
Assets	0.0337***	-0.0003***	0.6577***	0.7874***
Growth	0.0001	-0.0001***	0.0123**	0.0172***
Leverage	0.0636***	0.0003***	-0.3957***	-0.4142***
Analyst	-0.0011**	-0.0001***	0.0191***	0.0140***
R-squared	0.4227	0.0809	0.4186	0.7076
Number of obs	23,893	23,988	23,890	24,202
Panel B Entropy and stock liquidity determinants across four liquidity measurements				
	CPQS	Illiquidity	Amivest	Volume
Entropy	0.6285***	0.001	1.1617	-0.5791
Volatility	0.3946**	-0.0062***	-8.3474***	13.3172***
Turnover	-1.4534***	-0.0118***	28.3402***	39.6745***
Assets	0.0354***	-0.0003***	0.6546***	0.78119***
Growth	0.0002	-0.0001***	0.0106**	0.01695***
Leverage	0.0609***	0.0003***	-0.3858***	-0.4110***
Analyst	-0.0011***	-0.0001***	0.0189***	0.0137***
R-squared	0.4213	0.0803	0.4193	0.7078
Number of obs	24,001	24,100	24,003	24,314

Panel C Foreign Assets ratio and stock liquidity determinants across four liquidity measurements				
	CPQS	Illiquidity	Amivest	Volume
FA	0.0027*	-0.0001*	0.0574***	0.0158***
Volatility	0.4765***	-0.0061***	-6.9467***	14.6714***
Turnover	-1.3279***	-0.0129***	27.6596***	38.4435***
Assets	0.0279***	-0.0004***	0.6950***	0.8111***
Growth	0.0001	-0.0001***	0.0145***	0.0129***
Leverage	0.0542***	0.0003***	-0.3975***	-0.4361***
Analyst	-0.0011***	-0.0001*	0.0183***	0.0108***
R-squared	0.4238	0.0795	0.427	0.7112
Number of obs	21,365	21,408	21,350	21,607

Panel D No of Segments and stock liquidity determinants across four liquidity measurements				
	CPQS	Illiquidity	Amivest	Volume
No of Seg	0.0412**	-0.0003***	0.6464***	0.3660***
Volatility	0.5316**	-0.0054***	-4.1438*	12.5617***
Turnover	-1.2799***	-0.0142***	26.5066***	39.8120***
Assets	0.0239***	-0.0005***	0.8060***	0.9041***
Growth	0.0009*	-0.0001***	0.0157**	0.0182***
Leverage	0.0753***	0.0004***	-0.5332***	-0.5758***
Analyst	0.0002	-0.0001***	0.0135**	0.0106***
R-squared	0.4256	0.0809	0.4233	0.7026
Number of obs	21,992	22,074	21,988	22,270

This table shows the results of alternative measures. This study uses four alternative measures of multinationality including the HHI, Entropy, percentage of foreign assets and the number of segments. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: multinationality is measured using the number of geographic segments. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented.

2.5.4 Endogeneity test

This study employs the Heckman (1979) two-stage model to estimate the impacts of the ABHK scores and foreign sales on stock liquidity to correct for the potential self-selection biases. In the first-stage selection model, this study calculates the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. Results show that the inverse Mills ratio is statistically significant, which suggests that endogeneity may be less of a concern. Results are available in Table A2-9 in the Appendix.

2.6 Conclusion

This Chapter investigates the relationship between multinationality and stock liquidity using US data from 1998 to 2018. Previous research, almost exclusively based on event studies, finds mixed impacts on stock liquidity when firms become international. The regression analysis allows me to use a larger sample size and an extended sample period. This study examines how stock liquidity is influenced by both the breadth of multinationality (measured using the ABHK score) and total multinationality (measured using the percentage of foreign sales).

This study regressed stock liquidity on multinationality using several widely used stock liquidity measures. This study finds a positive relationship between stock liquidity and foreign composition, while the relationship between stock liquidity and the breadth of multinationality produces mixed results. More specifically, this study finds a negative relationship between bid-ask spreads and the international scope, while the price impact factors or the trading volume are positively related to the international scope. Moreover, it is found that the positive relationship between stock liquidity and the breadth of multinationality is not gradually increasing when using the ABHK model. This study finds an increase in stock liquidity at low and high levels of international scope, while a decrease at moderate levels. This study argues that the ABHK model provides a more in-depth analysis of the stock liquidity-multinationality relationship than the percentage of foreign sales. This study also finds that the multinationality - stock liquidity relationship is becoming more stable over time from a weak and insignificant relationship to a strong positive relationship as the market becomes less volatile. This study tests the robustness of the results to alternative industrial, size, sub-period conditions, and additional measures of multinationality and endogeneity. The main

result that multinationality is positively related to stock liquidity remains consistent across the robustness tests.

The findings in this study are subject to some limitations. This study applies low-frequency stock liquidity proxies using daily data that may not fully reflect the stock liquidity measured using high-frequency intraday data. This study only measures the breadth of multinationality. A more representative measure would be to use subsidiary data. However, This study leaves this to future research as it involves gathering hand-collected subsidiary data. These limitations suggest avenues for future research both in this area and also in the broader areas of defining and measuring these two important concepts. For example, Puhr and Müllner (2021) developed a new measure for firm multinationality using data from Google Trends. Different from traditional accounting-based measures, they provide a novel type of firm multinationality based on consumer recognition, which offers new insights into an additional dimension of multinationality.

The results have important implications for both investors and managers. Given the adverse impact of the COVID-19 pandemic on cash flows and the tightening of global stock liquidity (Nicola et al., 2020), stock liquidity is becoming ever more important to investors. This may result in investors targeting firms with greater total multinationality or international scope. The results also imply that international firms with better access to cash and credit in foreign markets may be less affected by the current global crisis (Ding et al., 2020).

Moreover, firms may extend their activities geographically or increase foreign sales with a view to improving stock liquidity and thus enhancing firm performance (Singh et al., 2015). When expanding business operations geographically, firms may face additional costs that come from LOF. Therefore, it is critical for managers to make

decisions such as market entry strategies, knowledge transfer and international human resources management. This is because, for example, utilizing and interlinking diverse knowledge across different geographically dispersed locations may lower MNCs' additional costs driven by cultural differences and information asymmetry, thus increasing stock liquidity and improving firm performance.

Chapter 3 Multinationality and Capital Structure: An Alternative Perspective

3.1 Introduction

The study of capital structure has received considerable attention in the academic literature as it is an important component of a firm's financial policy (Custódio et al., 2013) and leverage policy has usually been used as a monitoring tool to control for the level of agency costs (Jensen, 1986). A growing body of literature, such as Aggarwal and Kyaw (2010), proposes several reasons for the increasing importance of multinational corporations (MNCs) in capital structure studies. One of the keys is their access to the international capital market which causes MNCs' capital structure to differ from domestic corporations (DCs) (Jones et al., 2020; Mittoo & Zhang, 2008).

Understanding whether and how multinationality affects firms' capital structure is key for managers who have to design and implement internationalization strategies to revert to optimal leverage.

However, the extant literature provides different streams of theoretical argumentation to explain the relationship between capital structure and multinationality. For example, the trade-off theory (Bell et al., 2012; Lindner et al., 2018), the downstream hypothesis (Kwok & Reeb, 2000; Ribeiro et al., 2017) and the agency theory (Reeb et al., 2001; Singh & Nejadmalayeri, 2004) argue that MNCs have lower debt ratios than domestic firms. This may be due to costs arising from the increased risk of their geographical expansion, leading to higher costs of debt for multinational firms (Lindner et al., 2018). Alternatively, others argue that the trade-off theory (Mansi & Reeb, 2002; Shapiro & Hanouna, 2013), upstream hypothesis (Kwok & Reeb, 2000; Ribeiro et al., 2017), agency theory (Aggarwal & Kyaw, 2010) and pecking order theory (Adair & Adaskou,

2015; Avarmaa et al., 2011) may postulate the opposite effect which increases the MNCs debt ratio. They argue that the benefits of diversification from geographic expansion reduce an MNCs operation risk which in turn enables MNCs to bear more financial risk from debt issuance (Lindner et al., 2018). Furthermore, empirical results on this relationship are contradictory and far from conclusive (Akhtar, 2017). The relationship between multinationality and capital structure remains an open question. This study proposes that one reason for these conflicting findings may be that the degree of multinationality has not been appropriately measured within the existing literature. The literature primarily uses foreign assets ratios (Jones et al., 2020; Kwok & Reeb, 2000) and foreign sales ratios (Aggarwal & Kyaw, 2010; Mittoo & Zhang, 2008) to measure multinationality. However, both of these ratios show a similar distribution and strong positive correlation (Berrill, 2009; Nielsson, 2009). This study argues that the foreign sales ratio and foreign assets ratio may not capture the full diversification benefits or the costs of a firm's geographic expansion. This is in line with the argument of Wang and Mathur (2011): if an MNC has a large portion of sales in only one foreign country, although its foreign sales ratio suggests a large amount of multinational diversification, the effective degree of multinational diversification is small. Hence, the dominant findings may not reflect the expected relationship.

Therefore, this study uses two measures of multinationality. First, this study measures total multinationality using both the percentage of foreign sales and the percentage of foreign assets. These measures are commonly used throughout the literature (Marshall et al., 2020). Second, this study applies the ABHK model - to measure the breadth (geographical distribution) of multinationality. This second measure is more consistent with conventional measures of multinationality within the International Business literature and has been used extensively throughout the literature (Hutson & Laing,

2014; Mullen & O'Hagan Luff, 2018). Firms with greater breadths of multinationality have more agency costs from monitoring management and operations across multiple regions (Doukas & Pantzalis, 2003). Higher agency costs increase the information asymmetry problem (Attig et al., 2006). According to Aggarwal and Kyaw (2010), MNCs may need a higher debt ratio to mitigate the higher information asymmetry and agency costs. Therefore, this study hypothesises that firms with a greater breadth of multinationality may likely have a higher debt ratio. Existing studies fail to capture the breadth of multinationality but this study argues the importance of including it in this analysis.

Furthermore, this study considers product diversification as an important influence on capital structure. Singh and Nejadmalayeri (2004) and Chkir and Cosset (2001) posit that firms' product diversification provides a co-insurance, along with firms' multinational diversification, which lowers firms' cost of debt and enhances firms' debt capacity. However, Carnahan et al. (2008) argue that firms are conflicted in their choice between diversifying their products (product diversification) or entering into multiple markets (international diversification). They provide empirical evidence that higher levels of product diversification may constrain a firm's ability to pursue geographic expansion. This is in line with Wan and Hoskisson (2003) who report that due to resource and managerial constraints, firms with higher levels of product diversification have limited ability to expand their operations globally. Despite this inconsistency, product diversification is an important variable that may enhance or moderate the impact of geographic diversification on capital structure. However, few existing papers include this variable in their model (Low & Chen, 2004).

This research is unaware of existing studies to test whether the breadth of multinationality (measured using the ABHK score) influences a firm's capital structure

and distinguishes it from total multinationality (foreign assets and sales ratios).

Focusing on the constituents of the Russell 3000 for the period 1998 to 2020, this study uses two measures of multinationality, three measures of product diversification, seven measures of capital structure and a panel-based analysis to provide a more in-depth investigation into the capital structure - multinationality relationship than exists in the literature to date. This study performs several robustness tests, distinguishing between firms' industry and size, and also a sub-period analysis, in order to investigate whether the main results are robust across alternative industries, firm sizes, and time periods.

Overall, this study finds a positive relationship between capital structure and multinationality. More specifically, this study finds that the breadth of multinationality (measured using the ABHK score) and total multinationality (measured using the foreign sales ratio) have a significant positive impact on short-term debt, while total multinationality (measured using the foreign assets ratio) has a significant positive impact on long-term and total debt. It is also found that the relationship between the breadth of multinationality (measured using the ABHK score) and capital structure is not linear. This study further finds evidence that product diversification is an important determinant of capital structure. With mixed levels of significance, the results show that the results are consistent across firms from different industries and sizes. Finally, this study shows that the relationship between multinationality and firms' long-term and total debt changed significantly since the global financial crisis (GFC) of 2008. The breadth of multinationality (measured using the ABHK score) and the foreign sales ratio are positively related to both long-term and total debt before the GFC, while they become negatively related to the long-term and total debt after the GFC. This suggests that there is a non-linear relationship between multinationality (the ABHK score and the foreign sales ratio) and capital structure (long-term and total debt). This may be because

multinational firms face a greater probability of financial distress (Bell et al., 2012; Lindner et al., 2018). Therefore, MNCs choose to reduce their leverage and debt maturity as they may be unable to commit to a maturity structure since the GFC.

This Chapter offers several contributions to the literature. First, the research uses a robust measure of multinationality (the ABHK score) which captures the full geographic diversification benefits of debt policy in addition to measures of total multinationality (the foreign assets ratio and foreign sales ratio). This study provides evidence that using foreign sales and foreign asset ratios as proxies for multinationality leads to differing results; and the ABHK model provides a more comprehensive and in-depth analysis of this relationship. Second, along with a broad set of capital structure proxies and control variables, the research provides an in-depth analysis of the multinationality - capital structure relationship. In particular, it is found that the Entropy measure of multinationality (used as part of my robustness analysis) leads to a higher level of short-term debt, while the percentage of foreign assets leads to a higher level of long-term and total debts. Moreover, this research has important implications for MNCs' strategies with regard to their debt financing. MNCs use more short-term debt when they extend their activities geographically or increase foreign sales. This is likely because MNCs can meet their financing needs using short-term debt, especially at their initial stages of internationalization (M. Singh & Nejadmalayeri, 2004). This is particularly important during the current COVID-19 pandemic as both lenders and borrowers are reluctant to engage in long-term investments as uncertainty, risk and expected returns decline during a crisis (Demirgüç-Kunt et al., 2020). Third, by considering the LOF from IB research, this study directly answers the call of Puck and Filatotchev (2018) for future research on the integration of the capital structure theory with IB research and its relation to MNC international strategy. Fourth, the sub-period

analysis provides empirical evidence that the actual relationship between capital structure and multinationality is non-linear. This can be a possible reason for inconsistent findings in the literature. Finally, this research has important implications for managerial practice. Understanding whether and how expanding foreign sales geographically affects firms' capital structure is key for managers who have to design and implement internationalization strategies. Managers should monitor firms' leverage carefully when expanding foreign sales geographically as high leverage would lead to bankruptcy if firms cannot meet their obligations.

The remainder of this Chapter is organized as follows. Section 3.2 outlines the theoretical arguments. Section 3.3 describes the data and research methodology. Section 3.4 details the results of the analysis. Section 3.5 presents the robustness tests. Finally, Section 3.6 concludes.

3.2 Literature review and hypothesis development

3.2.1 The relationship between Multinationality and Capital Structure

Theoretical justifications exist for both a positive and negative relationship between multinationality and capital structure. In the trade-off theory, the capital structure decisions of firms depend on the benefits and costs of using more debt. More debt is used if the cost of bankruptcy is lower than the tax shield or other benefits of using debt (Aggarwal & Kyaw, 2010). Many articles, such as Bell et al. (2012) and Lindner et al. (2018), argue that exchange rate risk and political risk inherent in foreign expansion put multinational firms at a greater probability of financial distress. Much of the existing literature posits that because of a variety of risk factors (such as exchange rate risk, political risk, agency issues, systematic risk and so on), MNCs may have increased risk when compared to DCs (T. Huang et al., 2015; Park et al., 2013). Prior research also

proposes that firms suffer from the liability of foreignness (LOF) during their international expansion due to the lack of knowledge of foreign cultures and environments and unfamiliarity with foreign markets (Zaheer & Mosakowski, 1997). The LOF is likely to increase related costs such as transaction costs and costs associated with information collection, processing and dissemination (Chao & Kumar, 2010) which ultimately increase MNCs' default risk. As a consequence, MNCs often have a lower debt ratio compared to their domestic counterparts (Hennart, 2011).

Moreover, the downstream hypothesis proposed by Kwok and Reeb (2000) predicts that firms may have a higher risk if they come from more stable economies or countries that make international investments. This is likely because, first, if the host countries become more volatile, MNCs depending on this environment tend to increase uncertainty and risk (Cao & Alon, 2021). Second, the beta of their foreign investments is higher than the average beta of the firm (Mittoo & Zhang, 2008). Consequently, the increased risk may lead MNCs to have a lower debt ratio compared to DCs (Mittoo & Zhang, 2008). Furthermore, multinational firms may have lower leverage because of the greater cost of debt financing. There is a conflict between shareholders and debtholders whereas the former prefer higher returns which may involve higher-risk projects while the latter prefer low-risk projects, safer returns and continued debt repayments (Reeb et al., 2001). To prevent managers from taking actions that favour shareholders in international markets, debtholders place limits on the use of their capital and/or insist on detailed covenants in debt contracts. However, due to geographical constraints, cultural misunderstandings, language, and legal system differences, firm internationalization increases the difficulty in designing and monitoring these contracts, implying that multinational firms may have a greater cost of debt financing (M. Singh & Nejadmalayeri, 2004).

Alternatively, the classic corporate international diversification theories suggest that MNCs should have lower risk than purely DCs. MNCs operate in less than perfectly correlated markets which diversifies the risk of home country economic downturns (Chao & Kumar, 2010; Fatemi, 1984). Moreover, based on the Upstream hypothesis (Kwok & Reeb, 2000) and bonding theory (Bell et al., 2012), when firms from a less stable economy make international investments or cross-list in a more stable economy or developed country, it may decrease their risk. They believe that a more stable economy or developed country may have a better legal system and business environment to protect both the investors and the investment. A lower risk may lead MNCs to have a higher level of indebtedness in comparison to DCs (Ribeiro et al., 2017).

Furthermore, According to Aggarwal and Kyaw (2010), based on the agency theory, MNCs may need a higher debt ratio to mitigate the higher agency costs of equity. They argue that this happens because managers are tempted to use additional cash flows from the foreign market and make suboptimal decisions that may not work towards maximizing the value for the firm. To protect against this managerial sub-optimal behaviour and overinvestment, firms with higher levels of cash flow should use higher leverage. Therefore, by increasing firms' debt level, the periodic payment of debt and principal to creditors can result in managers being more cautious about making investment decisions and protecting from overinvestment (Frierman & Viswanath, 1994; Aggarwal & Kyaw, 2010).

Along with the contradictory theory on the direction of the multinationality–capital structure relationship, the empirical results also show inconsistency. Avarmaa et al. (2011), Zhang and Zhang (2016), Aggarwal and Kyaw (2010) and Akhtar and Oliver (2009) all report that debt levels decline as firm-level multinationality increases.

However, Mittoo and Zhang (2008), Singh and Nejadmalayeri (2004), Mansi and Reeb (2002), Ribeiro et al. (2017) and Reeb et al. (2001) find that multinational firms have significantly higher debt ratios than domestic firms and the level of debt increases with the degree of firm's multinationality; while, Akhtar (2005), Pacheco (2016) and Park et al. (2013) find there is no significant difference in debt ratio for MNCs versus DCs. In sum, Bowe et al. (2010), Lindner et al. (2018) and Gyimah et al. (2021) acknowledge this relation is under-explored and inconclusive in its current state.

Previous literature rarely considers LOF when analysing the relationship between capital structure and multinationality and their measures of internationalization, such as foreign sales or assets ratio, cannot capture these additional costs. MNCs face additional costs that a local firm may not incur, with liabilities of foreignness as the key driver of these costs (Zaheer, 1995). This study argues the importance of including LOF when analysing this relationship. Based on agency theory, these additional costs may make it more difficult to monitor managers in international markets (Reeb et al., 2001). For example, it is complex and costly for firms to provide multi-country financial statements and hire multi-country auditors (Reeb et al., 2001). This added complicity may underestimate the costs of a firm being internationalized and therefore may not accurately reflect the expected relationship. This study applies the ABHK model to capture these additional costs that a firm operating in international markets may incur. The ABHK model uses continent-based regions as a framework for examining the breadth of multinationality and it divides the world into six regions based on the inhabited continents (Aggarwal et al., 2011). Hence, the breadth of multinationality is associated with higher additional costs.

3.2.2 Measuring Multinationality and Product Diversification

3.2.2.1 Measuring Multinationality

There are numerous methods within the existing literature used to measure multinationality. Previous studies, such as Temiz and Gokmen (2014) use foreign direct investments (FDIs); Park et al. (2013) use the percentage of foreign sales; Contractor et al. (2003) use the number of foreign to total employees and the number of foreign offices to total offices; Levine and Schmukler (2006) and Banalieva and Robertson (2010) use cross-listing, cross-trading and issuing depositary receipts to measure multinationality. Others propose classification systems to measure firm-level multinationality. Rugman, Oh, and Lim (2012) and Collinson and Rugman (2008) divide multinationality into three categories - host and home region-oriented, bi-regional and global – all based on the firm's sales data. Aggarwal et al. (2011) review 393 studies and identify 19 measures of multinationality. They find that the percentage of foreign sales is the most common method used.

According to Marshall et al. (2020), foreign sales and foreign asset ratios are home-host-centric models of internationalization, which have both theoretical and measurement-related issues that limit the value and appropriateness of using them. First, with the development of the international markets, for many firms and situations, a home-country baseline neither exists and/or no longer retains specific importance. Second, Asmussen (2009) argues that these measures of internationalization can be affected by the home country's size. For example, Marshall et al. (2020) find that with the increase of a firm's foreign-to-domestic market share, the foreign sales or foreign asset ratios of firms from smaller countries increase more quickly than others.

Aggarwal et al. (2011) developed a classification scheme – the ABHK model.

Compared to foreign sales and asset ratios that are based on the concept of examining

the foreign composition of a firm (Marshall et al., 2020), the ABHK model proposes using the breadth of multinationality to describe a firm's geographical spread of market engagement is a classification scheme that focuses on the continent-based regions as the breadth of multinationality (Aggarwal et al., 2011). Therefore, this measurement is not affected by the above issues.

Moreover, it is important to distinguish the ABHK score from the foreign sales and assets ratio. This is because a high breadth of multinationality (measured using the ABHK score) may not necessarily have a high level of total multinationality (measured using the foreign sales or assets ratio). For example, in 2018, Kaman Corporation had an ABHK score of 6 (meaning it had sales in all 6 geographical regions of the world) while only having 13.9 percent foreign sales. Similarly, Silicon Laboratories had 86 percent foreign sales but an ABHK score of just 2 (sales in only two of the six geographical regions of the world). Therefore, this study uses the label total multinationality for clarity and to distinguish these measures from the breadth of multinationality.

Furthermore, according to Aggarwal et al. (2011), the ABHK model can provide a wide range of patterns of internationalization that a small, manageable set of high-level International Business theories can explain. They provide evidence that the ABHK model can cast light on the three best-known theories of the internationalisation process such as the ownership, Location and Internalization (OLI) paradigm, the Uppsala model and the new venture internationalisation theory (NVIT). Furthermore, the ABHK model not only is neutral to the typologies of MNCs' managerial intentions, marketing strategies and entry modes but it can also be used as a framework for consistent empirical testing of MNC typologies (Aggarwal et al., 2011). Therefore, these insights of the ABHK model may apply to the theoretical argument of this study and can further

capture the diversification benefits or additional costs (LOF) of firms being internationalized whereas the percentage of foreign sales or assets does not. This system has also been used extensively throughout the literature (Hutson & Laing, 2014; Mullen & O'Hagan Luff, 2018).

3.2.2.2 Measuring Product Diversification

A wide variety of measures have been used to capture a firm's product diversification. For example, Yang et al. (2017) and Rodríguez-Pérez and Hemmen (2010) use the Herfindahl-Hirschman index (HHI), while Fuente and Velasco (2020) use the number of different segments at the 4-digit SIC code level. Moreover, Chkir and Cosset (2001) investigated the relationship between the capital structure and firms' diversification strategy using 749 US firms from 1992 to 1996. They use the foreign tax ratio to measure international diversification while using the number of the firm's subsidiaries to measure product diversification. They find the capability of indebtedness increases with both international and product diversification. Furthermore, using data of 232 firms from 30 countries, Low and Chen (2004) study the impact of international and product diversification on capital structure. They use foreign sales/assets, exports and the number of subsidiaries to measure international diversification while using the product diversification index (unrelated and related product diversification) as the measure of product diversification. Their results show that firms' leverage is negatively related to international diversification for US firms only, while firms' leverage is positively related to product diversification. Developed by Palepu (1985), the Entropy index considers both the number of product segments and the proportion of sales contributed by each segment. It is one of the most valid and reliable measures (Stadler et al., 2018) and has been commonly used in the literature to capture firms' product diversification (Oh et al., 2015; Zúñiga-Vicente et al., 2019).

3.2.3 Hypothesis development

Based on the trade-off theory, capital structure decisions of firms depend on the benefits and costs of using more debt. More debt is used if the benefits of using debt are higher than the costs of bankruptcy. According to Mansi and Reeb (2002), MNCs should have more debt-carrying capacity due to their large size and better diversification opportunities that should lead to stable cash flows which may lower the bankruptcy risk; multinationals can also use foreign debt and other procedures to hedge against political and exchange rate risk.

Moreover, as a firm based in its local market classified as ‘less stable’, such as emerging markets, expands its business into a more stable market, such as developed markets, the overall beta of the firm may drop (Upstream effect). This is because the beta of the new operation in the developed markets may be lower due to potentially lower environmental and political risks (Kwok & Reeb, 2000). Therefore, MNCs should have higher debt levels and this study proposes the following hypotheses:

Hypotheses 3.1. There is a positive relationship between total multinationality (measured using the percentage of foreign sales and assets) and capital structure.

In addition, the increased agency costs that are driven by firms’ geographic expansion of sales may impact their capital structure. On the one hand, additional free cash flows from foreign markets create an agency problem since managers can use some of the free cash available for their benefit, thereby decreasing the value of the firm (Aggarwal & Kyaw, 2010). Therefore, by increasing firms’ debt level, the periodic payment of debt and principal to creditors can result in managers being more cautious about making investment decisions and protecting from overinvestment (Friedman & Viswanath, 1994).

On the other hand, compared to DCs, geographically diversified MNCs face a higher level of agency costs as it is more difficult to monitor managers in international markets (Jones et al., 2020). First, due to the LOF such as the institutional distance, information costs, unfamiliarity costs, and cultural differences, monitoring costs increase with firm international activity (Burgman, 1996); second, the cross-national differences also increase the complexity of providing multi-country financial statements and hiring multicountry auditors (Reeb et al., 2001). Bondholders find it more difficult to gather information and monitor MNCs' business operations (Mittoo & Zhang, 2008). These additional costs driven by LOF increase agency costs; thus MNCs should have a higher debt level in order to mitigate these higher information asymmetry and agency costs. (Aggarwal & Kyaw, 2010). Using the ABHK model to measure a firm's breadth of multinationality, this study proposes the following hypothesis:

Hypotheses 3.2. There is a positive relationship between the breadth of multinationality (measured using the ABHK score) and capital structure.

3.3 Methodology

3.3.1 Data

This study uses the constituents of the Russell 3000 index as the sample obtained from Thompson Reuters for the period 1998 – 2020. Observations with missing values are eliminated. Following Hrazdil and Scott (2013), this study uses the Global Industry Classification Standard (GICS) sectors to categorise firms into industries. The GICS code collected from Bloomberg contains eleven sectors - communication services, consumer discretionary, consumer staples, energy, financials, healthcare, industries, information technology, materials, real estate, and utilities. This study excludes financial and utility firms as they are highly regulated and usually have different capital

structures compared to other industries (Aggarwal & Kyaw, 2010; Mittoo & Zhang, 2008). Following Keefe and Yaghoubi (2016), this study winsorizes the data at the 1% level in both tails of the distribution. This leads to a final dataset of 28,169 firm years in total.

3.3.1.1 Dependent variables

This study uses three leverage measures: long-term debt ratio, short-term debt ratio, and total debt ratio. This study first takes into account the commonly used definition of leverage from Bontempi et al. (2020) which defines the long-term, short-term and total debt ratio respectively as

$$\text{Longterm debt ratio } 1_{i,t} = \frac{\text{Longterm debt}_{i,t}}{(\text{Total assets}_{i,t})} \quad (3.1)$$

$$\text{Shortterm debt ratio } 1_{i,t} = \frac{\text{Shortterm debt}_{i,t}}{(\text{Total assets}_{i,t})} \quad (3.2)$$

$$\text{Total debt ratio } 1_{i,t} = \frac{\text{Total debt}_{i,t}}{(\text{Total assets}_{i,t})} \quad (3.3)$$

However, Welch (2011) critiques that although there is no universally used measure of leverage, this commonly used measure that defines leverage as financial-debt divided by assets is inaccurate. As a firm's assets include financial debt, non-financial liabilities and equity, he argues that a lower debt ratio may not only be due to a higher level of equity but could also be due to a higher level of non-financial liabilities. A better alternative to measuring leverage is financial debt divided by the sum of total debt (long-term debt plus short-term debt) and equity (Mittoo & Zhang, 2008; Ribeiro et al., 2017). This study also follows this approach and measure the long-term, short-term and total debt ratio respectively as

$$\text{Longterm debt ratio } 2_{i,t} = \frac{\text{Longterm debt}_{i,t}}{(\text{total debt}_{i,t} + \text{equity}_{i,t})} \quad (3.4)$$

$$\text{Shortterm debt ratio } 2_{i,t} = \frac{\text{Shortterm debt}_{i,t}}{(\text{total debt}_{i,t} + \text{equity}_{i,t})} \quad (3.5)$$

$$\text{Total debt ratio } 2_{i,t} = \text{Longterm debt ratio } 2_{i,t} + \text{Shortterm debt ratio } 2_{i,t} \quad (3.6)$$

However, Akhtar and Oliver (2009) and Lindner et al. (2018) argue that due to the highly variable nature of the short-term debt, the Welch (2011) measure is inappropriate and the short-term debt should be excluded from the denominator. Followed by Wang et al. (2020) and Akhtar (2017), this study further measures the long-term debt as

$$\text{Longterm debt ratio } 3_{i,t} = \frac{\text{Longterm debt}_{i,t}}{(\text{longterm debt}_{i,t} + \text{equity}_{i,t})} \quad (3.7)$$

3.3.1.2 Multinationality

This study measures total multinationality using the percentage of foreign sales and foreign assets which have been widely applied in previous studies (Ahmed & Brennan, 2019; Park et al., 2013), while the ABHK model is used to measure the breadth of multinationality. The ABHK model focuses on the continent-based regions and classifies firms into seven degrees of multinationality, ranging from purely domestic firms (a score of 0) to fully global firms (a score of 6).

3.3.2 Model

This study states the model as follows:

$$\text{Leverage}_{i,t} = \alpha + \beta_1 M_{i,t} + \sum \beta_2 X_{\text{Control}} + M_{i,t} \sum \beta_3 X_{\text{Control}} + \varepsilon_{i,t} \quad (3.8)$$

where leverage is measured using each of the seven measures detailed above, $M_{i,t}$ is multinationality as measured by its ABHK score (breadth of multinationality) or percentage foreign sales ratio or foreign assets (total level of multinationality) for stock i in time t . X_{Control} represents the seven control variables used in the model – product

diversification, firm size, growth opportunity, profitability, tangibility, liquidity and non-debt tax shield. All data are annually based.

This study measures product diversification using the Herfindahl-Hirschman index (HHI). Following Rodríguez-Pérez and van Hemmen (2010) and Jiraporn et al. (2008), this study calculates the HHI for each firm i in year t as:

$$HHI_{i,t} = \sum_{i=1}^t \left(\frac{SSale}{Sale} \right)^2 \quad (3.9)$$

Where SSale is the segment sales for the firm and Sale is the total sales for all reported segments. The value of this composite measurement is greater than 0 and less than or equal to 1, whereby firms that have lower HHIs are more diversified in their products. For ease of interpretation, this study uses one minus HHI (1-HHI), thus a higher value indicates a higher level of industrial diversification. Following Palepu (1985) and Rodríguez-Pérez and van Hemmen (2010), this study calculates the Entropy index for each firm i in year t as:

$$Entropy_{i,t} = \sum_{i=1}^n P_{it} * \ln (1/P_{it}) \quad (3.10)$$

where P is the share of the product sales in that product segment i . The value is a ratio between 0 to 1 and the higher the ratio, the higher the product diversification. This study further uses the number of product segments (product lines) to capture a firm's product diversification. According to DataStream, a firm can have up to 10 product segments. It is also important to note that the product segment classification is based on a standard industry classification (SIC) 4-digit code, which is different from the GICS code that this study used as industry dummy variables.

In terms of control variables, firms' product diversification provides a co-insurance, along with firms' multinational diversification, which lowers firms' cost of debt and

enhances firms' debt capacity (M. Singh & Nejadmalayeri, 2004). Chkir and Cosset (2001) posit that firms usually combine international and product diversification in order to lower the bankruptcy risk. Therefore, this study expects a positive relationship.

Previous studies on capital structure generally identify the following four factors as key determinants of capital structure – firm size, growth opportunities, profitability and tangibility (Lemmon et al., 2008; Park et al., 2013). Accordingly, this study includes these firm characteristics in regression analyses. This study uses the natural logarithm of total assets to control for the size effect (Aggarwal & Kyaw, 2010; Ribeiro et al., 2017). This study controls for growth opportunities using the market-to-book ratio (Aggarwal & Kyaw, 2010; Akhtar & Oliver, 2009). Firms' profitability is measured using the ratio of firms' earnings before income tax (EBIT) to their total assets (Aggarwal & Kyaw, 2010; Singh & Nejadmalayeri, 2004). In terms of tangibility, this study uses firms' fixed assets divided by their total assets (Akhtar, 2017; Ribeiro et al., 2017). It is well-documented that large, fast-growing, less profitable firms with more tangible assets firms have higher leverage (Akhtar, 2017; Zhang & Zhang, 2016).

This study uses the natural logarithm of trading volume as the measure of equity liquidity (Lipson & Mortal, 2009). This control variable is motivated by the pecking order theory. Stock can be used as an internal source of funding, therefore stock liquidity is preferable to a firm's leverage according to the pecking order theory (Myers & Majiuf, 1984; Ribeiro et al., 2017). This study expects equity liquidity to be negatively correlated with debt. Higher stock liquidity implies a firm can raise funds through equity financing relatively easily and therefore, may not need to have high levels of debt (Lipson & Mortal, 2009; Udomsirikul et al., 2011).

This study also controls for the non-debt tax shield using the ratio of depreciation expenses to total assets (Aggarwal & Kyaw, 2010; Akhtar, 2017). This control variable is motivated by the trade-off theory. Capital structure decisions of firms depend on the benefits and costs of using more debt. Less debt is used if the cost of bankruptcy is higher than the tax shield or other benefits of using debt and vice versa (Bell et al., 2012). This study, therefore, expects a negative relation.

This study includes interaction terms for each of the seven control variables to investigate if a firm's leverage varies between alternative levels and breadths of multinationality and their domestic counterparts. Following Bris et al. (2012) and Deng et al. (2018), this study controls for industry and time effects by adding both industry and time annual dummy variables.

3.4 Results

3.4.1 Preliminary statistics

Table 3-1 reports the annual mean value of firms' capital structure and the level of multinationality across time. The average ABHK score shows that from 1998 to 2020, companies' average breadth of multinationality is 1.845. From 1998 to 2020, the average ABHK score slightly increased to 1.9932 in 2009 but declined in the following year. The average percentage of foreign assets shows a similar pattern. However, the average percentage of foreign sales shows a strong increase from 17.73 percent to 22.93 percent from 1998 to 2020. For firms' capital structure, the total debt (TD_1 and TD_2) shows a U-shaped pattern over the sample period. TD_2 and TD_1 fall from 81.16 percent and 26.37 percent respectively in 1998 to 70.7 percent and 22.44 percent in 2010 and then increase strongly to 78.25 percent and 28.05 percent respectively in 2020. The long-term debts (LTD_1, LTD_2 and LTD_3) show a similar U-shaped pattern

from 1998 to 2020. However, short-term debt (STD_2 and STD_1) showed a downward movement from 1998 (8.97 percent and 2.09 percent respectively) to 2020 (2.57 percent and 0.49 percent respectively).

Table 3-1 Sample Distribution of Multinationality and Capital Structure

Year	Multinationality			Capital Structure						
	ABHK	%FA	%FS	STD_1	LTD_1	TD_1	STD_2	LTD_2	TD_2	LTD_3
1998	1.745	12.36	17.33	0.0209	0.2241	0.2637	0.0897	0.7194	0.8116	0.8623
1999	1.9303	10.58	20.33	0.0213	0.226	0.2654	0.0966	0.7094	0.8108	0.8508
2000	1.895	9.72	20.29	0.0196	0.2074	0.2482	0.095	0.6718	0.7718	0.8131
2001	1.8535	9.33	20.22	0.0163	0.2125	0.2495	0.0704	0.6836	0.7603	0.8203
2002	1.861	9.99	21.17	0.0119	0.2164	0.249	0.056	0.6929	0.7568	0.8164
2003	1.8696	10.6	22.93	0.0102	0.203	0.234	0.0595	0.6929	0.7634	0.8131
2004	1.9301	10.86	23.54	0.0091	0.1912	0.2171	0.0574	0.6746	0.738	0.7845
2005	1.9194	10.99	23.78	0.01	0.1979	0.2259	0.0591	0.6762	0.7389	0.7914
2006	1.9164	10.85	23.52	0.0089	0.2005	0.2289	0.051	0.6804	0.7388	0.788
2007	1.9517	11.82	24.53	0.0116	0.2087	0.2417	0.0576	0.6889	0.7552	0.8029
2008	1.9428	11.44	24.92	0.0104	0.2229	0.2539	0.0535	0.6954	0.7607	0.8008
2009	1.9932	12.03	24.72	0.0082	0.204	0.2312	0.0422	0.6884	0.7367	0.7909
2010	1.8705	10.11	23.39	0.0068	0.198	0.2244	0.0367	0.6603	0.707	0.7613
2011	1.8881	9.49	24.26	0.0068	0.2027	0.2283	0.0376	0.6696	0.7189	0.7566
2012	1.9311	9.55	24.26	0.0063	0.2164	0.2419	0.028	0.6938	0.733	0.7792
2013	1.9305	8.07	23.44	0.0048	0.2194	0.245	0.0254	0.69	0.7231	0.7725
2014	1.886	7.33	23.53	0.0055	0.2424	0.2699	0.025	0.712	0.7488	0.7951
2015	1.8418	7.07	22.45	0.005	0.2545	0.2815	0.0255	0.7238	0.7556	0.8042
2016	1.8068	6.95	21.72	0.005	0.2673	0.2948	0.0209	0.7486	0.7778	0.826
2017	1.8245	6.65	21.58	0.0051	0.2677	0.2942	0.0229	0.7664	0.7982	0.8372
2018	1.808	6.68	22.11	0.005	0.2666	0.2948	0.0247	0.7649	0.7969	0.8403
2019	1.5019	6.21	21.9	0.0047	0.2634	0.2869	0.0231	0.7636	0.7931	0.8383
2020	1.6174	6.14	22.93	0.0049	0.2573	0.2805	0.0257	0.7516	0.7825	0.8249
Average	1.845	8.85	22.79	0.008	0.2298	0.258	0.0401	0.7105	0.7587	0.8056

This table shows the mean value of three measures of Multinationality and seven measures of Capital Structure across time. The seven measures of capital structure are as follows: STD_1 - Short-term debt to total assets; LTD_1 - Long-term debt to total assets; TD_1 - total debt to total assets; STD_2 - Short-term debt to the sum of total debt and equity; LTD_2 - Long term debt to the sum of total debt and equity; TD_2 - the sum of STD_2 and LTD_2; LTD_3 - Long term debt to the sum of long term debt and equity. The independent variables are as follows: ABHK score - company's breadth of multinationality. %FA and %FS- company's total level of multinationality.

Table 3-2 provides a summary of the statistics of all variables. Compared to the commonly used measures of capital structure (STD_1, LTD_1 and TD_1), Welch's (2011) measures of capital structure (STD_2, LTD_2 and TD_2) have a comparatively lower standard deviation. Whereas the long-term debt measurement (LTD_3) proposed by Akhtar and Oliver (2009) and Lindner et al. (2018) has the highest standard deviation of the three long-term debt measures. The different movements between short-term debts and long-term/total debts indicate how important it is to distinguish short-term debt from other long-term measures as it has a different trend. Similarly, for multinationality, the percentage of foreign assets has the lowest standard deviation (0.16) compared to the breadth of multinationality (measured using the ABHK) (1.83) and total multinationality (measured using the percentage of foreign sales) (0.27). The breadth of multinationality (measured using the ABHK score) shows a more volatile change in multinationality over the sample period. For product diversification, the Entropy index has the lowest standard deviation, while the number of segments has the highest. In relation to the control variables, the growth opportunity and profitability have negative values at their minimum. This may be due to some observations having a negative book value or a negative earning ratio.

Table 3-2 Descriptive statistics for all variables

	Mean	Min	Max	Std.Dev
Dependent Variables				
STD_1	0.008	0	0.2615	0.027
LTD_1	0.2298	0	0.9163	0.1996
TD_1	0.258	0	0.9583	0.2097
STD_2	0.0401	0	0.9557	0.1334
LTD_2	0.7105	0	0.999	0.3694
TD_2	0.7587	0	0.9993	0.3567
LTD_3	0.8056	0	0.9998	0.375
Independent Variables				
ABHK	1.845	0	6	1.8274
%Foreign Assets	0.0885	0	1	0.1657
%Foreign Sales	0.2279	0	1	0.2749
1 - Herfindahl Index	0.347	0	1	0.3335
No. of Segments	2.7111	0	10	1.7446
Entropy Index	0.2259	0	0.976	0.2213
Size	6.1906	4.6824	8.2498	0.6869
Growth	3.3815	-20.12	36.55	4.3293
Profitability	0.0575	-0.6904	0.3882	0.1357
Tangibility	0.0075	0	0.1667	0.0194
Stock Liquidity	6.4966	4.6546	8.3005	0.771
Non-Debt Tax Shield	0.0819	0.0027	0.6526	0.0943

This table shows the descriptive statistics for all variables. The independent variables are as follows: ABHK score - company's breadth of multinationality. %FA and %FS- company's total level of multinationality. 1 - Herfindahl Index, number of segments and Entropy index are the measures of firms' product diversification. Size is measured as the natural log of total assets. Growth is measured as the company's market-to-book ratio. Profitability is measured as the ratio of earnings before income tax to total assets. Tangibility is measured as the ratio of fixed assets to total assets. Stock liquidity is measured as the natural log of the total trading volume. No debt tax shield is measured as the ratio of depreciation expenses to total assets. Descriptive statistics for variables after winsorizing 1 percent at each end excluding ABHK score.

Table 3-3 reports the correlation coefficients between all variables and their degrees of significance. In general, variables tend not to be highly correlated. The breadth of multinationality (ABHK scores) is positively correlated with the commonly used leverage ratios (STD_1, LTD_1 and TD_1) and the long-term debt measurement (LTD_3) from Akhtar and Oliver (2009) and Lindner et al. (2018). However, the breadth of multinationality (ABHK scores) is negatively correlated with Welch's (2011) measures of long-term debt (LTD_2) and total debt (TD_2), while still positively correlated with short-term debt (STD_2). Other measures of multinationality, such as the percentage of foreign assets and sales, have similar correlations. All three measures of multinationality are positively correlated with the three product diversification measures at the 1 percent significance level. This implies that a firm with an increased level of multinationality may likely have well-diversified products. Moreover, both the ABHK scores and the percentage of foreign sales are positively correlated with firms' size, growth opportunity, profitability and stock liquidity at the 1 percent significant level, while being negatively correlated with firms' tangibility and non-debt tax shield at the 1 percent significant level. This implies that a more multinational firm tends to be larger, have higher growth opportunities and be more profitable and more liquid stock. Furthermore, a more multinational firm tends to have fewer fixed assets and less depreciation expenses. The percentage of foreign assets has similar correlations with the exception of a negative correlation with growth opportunity and non-debt tax shield at the 1 percent significant level.

Table 3-3 Correlation coefficients between variables and their degrees of significance.

	ABHK	%FA	%FS	STD1	LTD1	TD1	STD2	LTD2	TD2	LTD3	1 - HHI	Segments	Entropy	Size	Growth	Profitability	Tangibility	Liquidity	Non-debt tax shield
ABHK	1																		
%FA	0.479***	1																	
%FS	0.760***	0.528***	1																
STD1	0.101***	0.0880***	0.0844***	1															
LTD1	-0.104***	-0.0179**	-0.122***	-0.0324***	1														
TD1	-0.0867***	-0.00418	-0.108***	0.104***	0.975***	1													
STD2	0.103***	0.0739***	0.0858***	0.709***	-0.166***	-0.0744***	1												
LTD2	0.0152*	0.0695***	-0.0243***	-0.111***	0.660***	0.612***	-0.231***	1											
TD2	0.0520***	0.0972***	0.00567	0.139***	0.614***	0.598***	0.120***	0.938***	1										
LTD3	0.0586***	0.106***	0.0121	0.109***	0.586***	0.602***	-0.0262***	0.923***	0.932***	1									
1 - Herfindahl	0.320***	0.167***	0.228***	0.0782***	0.0968***	0.108***	0.0398***	0.200***	0.218***	0.226***	1								
Segments	0.219***	0.129***	0.138***	0.0886***	0.107***	0.123***	0.0415***	0.197***	0.216***	0.228***	0.770***	1							
Entropy	0.294***	0.159***	0.205***	0.0885***	0.101***	0.114***	0.0439***	0.201***	0.220***	0.229***	0.934***	0.896***	1						
Size	0.207***	0.136***	0.159***	0.110***	0.344***	0.361***	0.0130*	0.407***	0.420***	0.426***	0.295***	0.358***	0.331***	1					
Growth	0.0198**	-0.0229***	0.0280***	0.0345***	-0.0189**	-0.0148*	0.0140*	-0.0829***	-0.0796***	-0.0872***	-0.0698***	-0.0732***	-0.0654***	-0.0260***	1				
Profitability	0.105***	0.0857***	0.0764***	0.0629***	-0.0423***	-0.0362***	0.0713***	0.0239***	0.0497***	0.0409***	0.100***	0.112***	0.108***	0.198***	0.0443***	1			
Tangibility	-0.0721***	-0.0204**	-0.0832***	0.00213	0.159***	0.167***	-0.0229***	0.109***	0.103***	0.112***	0.0243***	0.0590***	0.0335***	0.112***	-0.0849***	-0.00765	1		
Liquidity	0.206***	0.0870***	0.194***	0.0501***	0.105***	0.110***	0.00576	0.165***	0.170***	0.165***	0.149***	0.204***	0.184***	0.787***	0.196***	0.189***	0.0108	1	
Non-debt tax shield	-0.231***	-0.0960***	-0.183***	-0.0925***	0.324***	0.311***	-0.111***	0.161***	0.125***	0.124***	-0.155***	-0.111***	-0.147***	0.101***	-0.0714***	-0.283***	0.245***	0.0249***	1

This table shows the correlation coefficients between variables.

1. *** to show significance at 1% or bellow
2. ** to show significance at 5% or bellow
3. * to show significance at 10% or bellow

3.4.2 Regression analysis

3.4.2.1 ABHK model analysis

This study first analyses the relationship between capital structure and the breadth of multinationality (measured using the ABHK score). Results are presented in Table 3-4 (Panels A, B and C), which contain the Herfindahl-Hirschman index (HHI), Entropy index and Number of segments respectively as proxies for product diversification. Results in Table 3-4 suggest that only short-term debt (STD_1 and STD_2) is positively and significantly related to the breadth of multinationality (measured using the ABHK score). This indicates that multinationality leads to higher levels of short-term leverage in a firm's capital structure. These results suggest that firms with a greater breadth of multinationality have more agency costs (Doukas & Pantzalis, 2003) and higher information asymmetry problems (Attig et al., 2006). Therefore, the findings are in line with Custódio et al. (2013) who found firms with higher information asymmetry use more short-term debt. Furthermore, this study finds that this relationship is not gradual. Firms with an ABHK score of 5 or 6 have the highest short-term debts (STD_1 or STD_2, respectively), while firms with an ABHK score of 3 have the lowest short-term debts (STD_2). Although the relationship between multinationality and capital structure is positive, this study does not find that firms with the largest degree of multinationality may have higher leverage. This result highlights the importance of using the ABHK model.

In terms of product diversification, the coefficient for 1 - HHI is positive and significant for long-term debt_1 and total debt_1 (Panel A) of Table 3-4. Moreover, the coefficient for the Entropy index and the number of segments is positive and significant for long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1), while it is negative and

significant for short-term debt (STD_2) (Panel B and C respectively). In general, this is in line with the arguments made by Lowe et al. (1994) and Low and Chen (2004) that diversification is negatively related to risk and therefore positively related to a firm's indebtedness. More specifically, they argue that product-diversified firms tend to generate less than perfectly correlated income streams from several product lines, which reduces the volatility of earnings and gives diversified firms greater debt capacity.

While a negative and significant relationship between a firm's size with short-term debt (STD_2) is found, the firm's size has a positive and significant relationship with long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2). This suggests that larger firms can afford more long-term debt and total debt. This finding is in line with previous research by Mittoo and Zhang (2008) and Zhang and Zhang (2016). The positive influence of a firm's size on leverage is assumed to occur due to the likelihood that larger firms have lower potential bankruptcy costs (Avarmaa et al., 2011); larger firms tend to have lower information asymmetry and therefore have easier access to capital markets (Pacheco, 2016); and banks prefer to deal with larger clients because of the large number of fixed monitoring costs (Nivorozhkin, 2005). Moreover, the results suggest larger firms have less short-term debt.

The coefficient for growth opportunities (Growth) is positive and significant. Firms with higher growth opportunities have higher long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2). One possible explanation is that firms expand and grow through borrowing (Akhtar, 2017). Furthermore, this positive relationship is also supported by the pecking order theory that a firm's internal source has priority in raising funds compared to a firm's debt financing (Akhtar & Oliver, 2009; Ribeiro et al., 2017).

Profitability has an expected negative and significant correlation with long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2). This result is consistent with Park et al. (2013b) and Zhang and Zhang (2016) and is also supported by the pecking order theory where more profitable firms may have a better ability to self-finance and need lower debt (Myers & Majiuf, 1984).

Asset tangibility is expected to have a positive relationship with leverage. This is because, first, tangible assets may be used as collateral which increases a firm's capacity to borrow (Lindner et al., 2018). Second, the existence of collateral lowers the agency's cost of debt (Avarmaa et al., 2011). Furthermore, empirical evidence supports this positive relationship (Aggarwal & Kyaw, 2010; Zhang & Zhang, 2016). However, inconsistent with these findings, this study finds no significant result for my asset tangibility variable.

Stock liquidity has a significant negative coefficient with long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2), but a significant positive coefficient with short-term debt (STD_2). Stock can be used as an internal source of funding, therefore stock liquidity is preferable to a firm's leverage according to the pecking order theory (Myers & Majiuf, 1984; Ribeiro et al., 2017). Higher stock liquidity implies a firm can raise funds through equity financing relatively easily and therefore, may not need to have high levels of debt (Lipson & Mortal, 2009; Udomsirikul et al., 2011).

Lindner et al. (2018) and Park et al. (2013b) predict that tax benefits from additional debt decrease as non-debt tax shields increase and firms with lower tax burdens have lower leverage. However, the effect of the non-debt tax shield on the long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2) does not pose a

significant issue, but the result is negative and significant in the short-term debt (STD_1). One possibility is that multinational firms may have to face multiple tax systems that differ from their domestic ones. Therefore, the effect of the non-tax debt shield may reflect differently on MNCs and DCs.

Table 3-4 Panel regressions for capital structure using ABHK as the explanatory variable

Panel A 1 - HHI is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0064	0.0178	0.0199	0.0487	0.096	0.2271	-0.0858
2	0.0058	0.0953**	0.0821*	0.2143***	0.1584*	0.4041***	0.1221
3	0.0039	0.0811*	0.058	0.1645***	-0.0616	0.0883	-0.0734
4	0.0289***	0.0296	0.0311	0.2412***	-0.0503	0.2082**	-0.0166
5	0.0489***	-0.0594	-0.039	0.3143***	-0.1851	0.1046	0.0087
6	0.0480***	0.0338	0.0463	0.3442***	-0.2161	0.1013	-0.162
Firm Factors							
1 - HHI	0.0016	0.0231***	0.0306***	-0.0105	0.0129	0.0081	0.0177
Size	0.002	0.1370***	0.1487***	-0.0121*	0.2749***	0.2596***	0.2785***
Growth	0.0001	0.0026***	0.0029***	0.0001	0.0021**	0.0021**	0.0016*
Profitability	-0.0029	-0.1105***	-0.1264***	0.0081	-0.1243***	-0.1113***	-0.1378***
Tangibility	-0.0057	-0.007	0.019	-0.0154	-0.1215	-0.1254	0.0374
Liquidity	-0.0009	-0.0514***	-0.0596***	0.0102**	-0.0803***	-0.0711***	-0.0927***
Non-debt tax shield	-0.0151***	0.0183	-0.006	-0.0315	-0.018	-0.0321	-0.0432
No	25,220	25,363	25,367	25,227	25,332	25,411	25,374
R-squared	0.034	0.2316	0.2373	0.0087	0.202	0.2104	0.2269
Panel B Entropy index is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0072	0.0119	0.0135	0.0515	0.0819	0.2178	-0.1029
2	0.0059	0.0924**	0.0795*	0.2161***	0.1494*	0.3958***	0.1164
3	0.0041	0.0784*	0.0561	0.1642***	-0.0741	0.0755	-0.0844
4	0.0288***	0.0273	0.0287	0.2411***	-0.0599	0.1987*	-0.0272
5	0.0491***	-0.0579	-0.038	0.3120***	-0.1834	0.1054	0.0076
6	0.0479***	0.0361	0.0489	0.3386***	-0.2217	0.0901	-0.1707
Firm Factors							
Entropy	-0.0005	0.0357***	0.0452***	-0.0174*	0.0408*	0.0229	0.0470*
Size	0.0023	0.1365***	0.1483***	-0.0118*	0.2727***	0.2584***	0.2762***
Growth	0.0001	0.0026***	0.0029***	0.0001	0.0021**	0.0020**	0.0016*
Profitability	-0.0031	-0.1110***	-0.1271***	0.0084	-0.1241***	-0.1114***	-0.1376***
Tangibility	-0.0052	-0.0067	0.0198	-0.0151	-0.1247	-0.1271	0.035
Liquidity	-0.001	-0.0512***	-0.0594***	0.0101**	-0.0796***	-0.0705***	-0.0919***
Non-debt tax shield	-0.0152***	0.0188	-0.0057	-0.0317	-0.016	-0.031	-0.0415
No	25,220	25,363	25,367	25,227	25,332	25,411	25,374
R-squared	0.0333	0.2313	0.2374	0.0085	0.2009	0.2091	0.226

Panel C the number of segments is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0062	0.0314	0.0369	0.0477	0.0931	0.2232	-0.0772
2	0.0061	0.0918**	0.0811*	0.2184***	0.1542*	0.4003***	0.1264
3	0.004	0.0808*	0.0601	0.1642***	-0.0691	0.081	-0.0779
4	0.0284***	0.0272	0.0293	0.2414***	-0.0559	0.2027*	-0.0228
5	0.0495***	-0.0559	-0.0356	0.3100***	-0.1836	0.1032	0.0047
6	0.0486***	0.0375	0.0508	0.3437***	-0.222	0.0962	-0.1697
Firm Factors							
Segments	-0.0001	0.0019*	0.0026**	-0.0023*	0.0036	0.0016	0.0041
Size	0.0023	0.1380***	0.1502***	-0.0117*	0.2736***	0.2592***	0.2775***
Growth	0.0001	0.0026***	0.0029***	0.0001	0.0021**	0.0020**	0.0016*
Profitability	-0.0031	-0.1121***	-0.1284***	0.0086	-0.1250***	-0.1120***	-0.1386***
Tangibility	-0.0053	-0.0025	0.0251	-0.0165	-0.1195	-0.1238	0.0422
Liquidity	-0.001	-0.0516***	-0.0598***	0.0101**	-0.0799***	-0.0707***	-0.0922***
Non-debt tax shield	-0.0153***	0.0175	-0.0072	-0.0324	-0.0167	-0.032	-0.0425
No	25,220	25,363	25,367	25,227	25,332	25,411	25,374
R-squared	0.0324	0.2326	0.2395	0.0082	0.2007	0.2094	0.2263

This table shows the regression results for this relationship using the ABHK score as a measure of multinationality. The dependent variables are the commonly used leverage ratios (STD_1, LTD_1 and TD_1), the Welch's (2011) leverage ratios (STD_2, LTD_2 and TD_2) and the Akhtar and Oliver's (2009) leverage ratio (LTD_3). The control variables are as follows: product diversification – this study uses 1-Herfindahl-Hirschman index (HHI), Entropy index and No of segments in Panel A, B and C, respectively; Size is the natural logarithm of total assets; growth opportunity is the measure of the market to book ratio; Firms' profitability is measured using firms' earning before income tax (EBIT) to its total assets; tangibility is the fixed assets divide by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. Following Park et al. (2013), this study uses annual fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A3-1 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.4.2.2 Foreign sales model analysis

Next, this study compares the capital structure among different levels of foreign sales after controlling for firm characteristics. Results are presented in Table 3-5 (Panels A, B and C), which contain the Herfindahl-Hirschman index (HHI), Entropy index and Number of segments respectively as proxies for product diversification. The coefficient of foreign sales in Table 3-5 is similar to the ABHK model analysis with the exception that the coefficient of the foreign sales ratio is negative and significant for long-term debt (LTD_2) in Panel B and C. In general, this indicates that the foreign sales ratio leads to a higher level of short-term debt and a lower level of long-term debt in firms' capital structure. This result is in line with Aggarwal and Kyaw (2010) who find that the percentage of foreign sales is negatively associated with long-term debt.

Table 3-5 Panel regressions for capital structure using foreign sales as the explanatory variable

Panel A 1 - HHI is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0356***	0.0135	0.0279	0.2918***	-0.204	0.0854	-0.1114
1 - HHI	0.0012	0.0151***	0.0213***	-0.0071	0.0177	0.0132	0.0302**
Size	0.0027**	0.1327***	0.1464***	-0.0220***	0.2617***	0.2345***	0.2652***
Growth	0.0001	0.0024***	0.0028***	0.0001	0.0022***	0.0022***	0.0017**
Profitability	-0.0052*	-0.1151***	-0.1368***	0.0085	-0.1151***	-0.1152***	-0.1291***
Tangibility	-0.0166	-0.0203	-0.0113	-0.0412	-0.0461	-0.0874	0.0521
Liquidity	-0.0015*	-0.0532***	-0.0615***	0.0112***	-0.0744***	-0.0626***	-0.0833***
Non-debt tax shield	-0.0178***	0.0392*	0.0092	-0.0344	0.0007	-0.0206	-0.0393
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.0313	0.2352	0.2434	0.0075	0.2058	0.2137	0.2295
Panel B Entropy index is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0363***	0.0041	0.02	0.2928***	-0.2297*	0.0628	-0.1346
Entropy	-0.0003	0.0265***	0.0341***	-0.0134	0.0389*	0.0218	0.0552***
Size	0.0030**	0.1318***	0.1458***	-0.0214***	0.2595***	0.2337***	0.2636***
Growth	0.0001	0.0024***	0.0028***	0.0001	0.0023***	0.0021***	0.0017**
Profitability	-0.0053*	-0.1152***	-0.1371***	0.0087	-0.1148***	-0.1151***	-0.1291***
Tangibility	-0.016	-0.0213	-0.0113	-0.0399	-0.0492	-0.0877	0.0523
Liquidity	-0.0015*	-0.0530***	-0.0615***	0.0111***	-0.0739***	-0.0624***	-0.0831***
Non-debt tax shield	-0.0180***	0.0400*	0.01	-0.0348	0.0026	-0.0197	-0.0373
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.0304	0.2349	0.2435	0.0073	0.2048	0.2127	0.2291
Panel C the number of segments is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0374***	0.004	0.023	0.2978***	-0.2224*	0.0754	-0.1163
Segments	-0.0002	0.0016*	0.0023**	-0.0019*	0.0042*	0.0018	0.0061***
Size	0.0031**	0.1331***	0.1473***	-0.0213***	0.2602***	0.2346***	0.2647***
Growth	0.0001	0.0024***	0.0028***	0.0001	0.0022***	0.0021***	0.0016**
Profitability	-0.0054*	-0.1164***	-0.1387***	0.0088	-0.1161***	-0.1161***	-0.1308***
Tangibility	-0.016	-0.0194	-0.0084	-0.0408	-0.045	-0.0846	0.0593
Liquidity	-0.0015*	-0.0532***	-0.0617***	0.0112***	-0.0742***	-0.0626***	-0.0834***
Non-debt tax shield	-0.0181***	0.0393*	0.0093	-0.0354	0.0033	-0.0197	-0.0362
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.0293	0.2361	0.2454	0.0068	0.2046	0.2126	0.2293

This table shows the regression results for this relationship using %FS as a measure of multinationality. The dependent variables are the commonly used leverage ratios (STD_1, LTD_1 and TD_1), the Welch's (2011) leverage ratios (STD_2, LTD_2 and TD_2) and the Akhtar and Oliver's (2009) leverage ratio (LTD_3). The control variables are as follows: product diversification – this study uses 1- Herfindahl-Hirschman index (HHI), Entropy index and No of segments in Panel A, B and C, respectively; Size is the natural logarithm of total assets; growth opportunity is the measure of the market to book ratio; Firms' profitability is measured using firms' earning before income tax (EBIT) to its total assets; tangibility is the fixed assets divide by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. Following Park et al. (2013), this study uses annual fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A3-2 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.4.2.3 Foreign assets model analysis

Finally, this study conducts regression analyses to compare the capital structure among different levels of foreign assets after controlling for firm characteristics. Results are presented in Table 3-6 (Panel A, B and C), which contains the Herfindahl-Hirschman index (HHI), Entropy index and Number of segments respectively as a proxy of product diversification. The coefficient of foreign assets in Table 3-6 is quite different from the ABHK model analysis and the foreign sales analysis. The coefficient of foreign assets is positive and significant for long-term debt (LTD_1, LTD_2 and LTD_3) and total debt (TD_1 and TD_2). This indicates that foreign assets lead to a higher level of long-term debt and the total debt in firms' capital structure. This result is in line with Reeb et al. (2001) who find that multinationals have a lower cost of debt financing and hence have higher leverage. This study argues that this inconsistent regression result may likely be because the foreign assets ratio is a different type of expansion abroad compared to foreign sales and selling abroad is easier than acquiring assets abroad. A firm's investment in overseas activities involves larger costs, hence a firm especially at its early stage may prefer to become multinational by selling abroad (Pagano et al., 2002).

In sum, this research finds that multinationals that sell abroad tend to use short-term debt while multinationals that have assets abroad have high long-term debt. This finding is in line with the hypothesis of Singh and Nejadmalayeri (2004). They argue that MNCs expanding abroad using foreign sales, especially at their initial stages of internationalization, can meet their financing needs using short-term debt as they may find it difficult to raise long-term debt due to investors perceived higher information asymmetries. This logic further implies that once these firms have established themselves in the host market (having foreign assets), investors may prefer investing in long-term debt and MNCs may reduce their dependence on short-term debt.

Table 3-6 Panel regressions for capital structure using foreign assets as the explanatory variable

Panel A 1 - HHI is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0132	0.2592***	0.2559***	0.0191	0.3273*	0.4165**	0.3176*
1 - HHI	-0.0002	0.0171***	0.0203***	-0.0115**	0.0209*	0.0104	0.0207*
Size	0.0016	0.1315***	0.1448***	-0.0309***	0.2689***	0.2320***	0.2736***
Growth	0.0001	0.0030***	0.0034***	-0.0003	0.0035***	0.0029***	0.0032***
Profitability	-0.0057**	-0.1331***	-0.1510***	0.0074	-0.1730***	-0.1654***	-0.1819***
Tangibility	-0.0153	-0.0297	-0.0267	-0.0452	-0.0745	-0.1232	-0.0278
Liquidity	-0.0014*	-0.0499***	-0.0580***	0.0113***	-0.0691***	-0.0561***	-0.0789***
Non-debt tax shield	-0.0171***	0.0549**	0.0283	-0.0194	-0.0016	-0.0038	-0.0391
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.04	0.2219	0.231	0.0104	0.206	0.2142	0.2352
Panel B Entropy index is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0136	0.2587***	0.2549***	0.0192	0.3129*	0.4011**	0.3071*
Entropy	-0.0017	0.0225***	0.0268***	-0.0195**	0.0304*	0.007	0.0304*
Size	0.0018	0.1317***	0.1451***	-0.0306***	0.2688***	0.2327***	0.2735***
Growth	0.0001	0.0030***	0.0034***	-0.0003	0.0035***	0.0029***	0.0032***
Profitability	-0.0058**	-0.1336***	-0.1516***	0.0074	-0.1734***	-0.1661***	-0.1823***
Tangibility	-0.0152	-0.0286	-0.0254	-0.0454	-0.0743	-0.1224	-0.0266
Liquidity	-0.0015**	-0.0501***	-0.0582***	0.0114***	-0.0692***	-0.0562***	-0.0791***
Non-debt tax shield	-0.0173***	0.0551**	0.0285	-0.02	-0.0006	-0.0038	-0.0382
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.0387	0.2221	0.2315	0.01	0.2054	0.2132	0.2348
Panel C the number of segments is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0142	0.2543***	0.2507***	0.0238	0.3203*	0.4118**	0.3142*
Segments	-0.0003	0.0013	0.0017*	-0.0027***	0.0031	-0.00003	0.0031*
Size	0.0018	0.1329***	0.1463***	-0.0307***	0.2696***	0.2334***	0.2742***
Growth	0.0001	0.0030***	0.0034***	-0.0002	0.0035***	0.0029***	0.0032***
Profitability	-0.0057**	-0.1345***	-0.1527***	0.0076	-0.1743***	-0.1667***	-0.1832***
Tangibility	-0.0155	-0.0274	-0.0239	-0.0473	-0.0712	-0.1216	-0.0235
Liquidity	-0.0014*	-0.0503***	-0.0584***	0.0116***	-0.0695***	-0.0563***	-0.0793***
Non-debt tax shield	-0.0173***	0.0543**	0.0278	-0.0208	-0.0008	-0.0047	-0.0383
No	25,298	25,442	25,446	25,305	25,409	25,488	25,453
R-squared	0.0381	0.2237	0.2335	0.0097	0.2048	0.2127	0.2342

This table shows the regression results for this relationship using %FA as a measure of multinationality. The dependent variables are the commonly used leverage ratios (STD_1, LTD_1 and TD_1), the Welch's (2011) leverage ratios (STD_2, LTD_2 and TD_2) and the Akhtar and Oliver's (2009) leverage ratio (LTD_3). The control variables are as follows: product diversification – this study uses 1- Herfindahl-Hirschman index (HHI), Entropy index and No of segments in Panel A, B and C, respectively; Size is the natural logarithm of total assets; growth opportunity is the measure of the market to book ratio; Firms' profitability is measured using firms' earning before income tax (EBIT) to its total assets; tangibility is the fixed assets divide by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. This model also controls the industry effect using the GLCS sector dummy and the Time effect using the year dummy. Following Park et al. (2013), this study uses annual fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A3-3 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.5 Robustness Analysis

3.5.1 Industry analysis

This study performs three sets of robustness tests – tests based on industrial analysis, tests based on firm size and a sub-period analysis. In order to test the robustness of the results to industry, this study uses the 6-digit GICS code to categorise firms into Service and Manufacturing firms and re-test the relationship between multinationality and capital structure. Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials (excluding commercial services and suppliers, airfreight and logistics, airline, marine), Consumer Discretionary (excluding hotels restaurants and leisure and media), Information Technology (excluding internet software and services, IT consulting and services, software) as Manufacturing firms, while this study categorises firms from Healthcare, Financials, Telecommunications Services, Energy and the above-named excluded subcategories as service firms. This study then analyses the Capital Structure - Multinationality relationship between Manufacturing and Service firms and present the results in Tables 3-7 and 3-8 respectively. The results of the ABHK model are consistent with the main model for service and manufacturing firms in general. However, The foreign assets model significantly explains LTD_1 and TD_1 for manufacturing firms while it significantly explains LTD_2 and TD_2 for service firms. The foreign sales model significantly explains all short-term debt (STD_1 and STD_2) for manufacturing firms but STD_2 only for service firms. Overall, service and manufacturing firms show a positive relationship between multinationality and capital structure. Although this study finds mixed results for the foreign assets and foreign sales models, this study concludes that this finding remains consistent with the main finding that a higher ABHK or foreign sales score leads to a higher level of short-term

debt, while a higher foreign assets score leads to a higher level of long-term and total debt.

Table 3-7 Industry analysis - Manufacturing Firms

Panel A - ABHK model - Manufacturing Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0052	0.0069	-0.0159	-0.024	0.0462	0.1312	-0.3051
2	0.0094	0.0918*	0.0748	0.1432**	0.0568	0.2446*	-0.0454
3	0.0084	0.0629	0.0477	0.1401**	-0.0525	0.0795	-0.0801
4	0.0315**	0.0268	0.0356	0.2389***	-0.0699	0.1954	-0.0785
5	0.0577***	-0.0661	-0.0193	0.3061***	-0.1935	0.0801	-0.0105
6	0.0374*	0.045	0.0878	0.2581**	-0.1709	0.0606	-0.1271
Firm Factors							
Herfindahl	-0.0012	0.0244***	0.0264***	-0.0232**	0.0349	0.0226	0.0308
Size	0.0043*	0.1505***	0.1580***	-0.0156	0.2531***	0.2374***	0.2403***
Growth	0.0003	0.0015**	0.0012*	0.0001	0.0025	0.0016	0.0018
Profitability	-0.0073	-0.1234***	-0.1553***	0.0009	-0.1728***	-0.1673***	-0.2022***
Tangibility	0.0267	0.105	0.1099	-0.0126	0.2324	0.2887	0.3817
Liquidity	-0.0012	-0.0605***	-0.0640***	0.0157**	-0.0822***	-0.0697***	-0.0835***
Non-debt tax shield	-0.0017	0.0463	0.0176	-0.0245	-0.0333	-0.0389	-0.0007
No	14,246	14,438	14,437	14,287	14,354	14,405	14,432
R-squared	0.0446	0.2182	0.2382	0.0093	0.1825	0.1938	0.2122
Panel B - Foreign Assets model - Manufacturing Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.0085	0.2435***	0.2774***	0.0195	0.1328	0.2659	0.2584
Herfindahl	0.0007	0.0217***	0.0234***	-0.0102	0.0266*	0.019	0.0198
Size	0.0042**	0.1365***	0.1497***	-0.0264***	0.2361***	0.2040***	0.2414***
Growth	0.0001	0.0033***	0.0034***	-0.0005	0.0042***	0.0030**	0.0035***
Profitability	-0.0116***	-0.1486***	-0.1795***	-0.0078	-0.1817***	-0.1949***	-0.2001***
Tangibility	0.0033	0.0292	0.0119	-0.0862	0.0063	-0.0469	0.0246
Liquidity	-0.0019*	-0.0512***	-0.0581***	0.0106*	-0.0590***	-0.0472***	-0.0655***
Non-debt tax shield	-0.0061	0.1082***	0.0821**	-0.0121	0.0547	0.0725	0.032
No	14,275	14,468	14,467	14,316	14,384	14,435	14,462
R-squared	0.0486	0.2143	0.2348	0.0095	0.1866	0.2017	0.2239

Panel C - Foreign Sales model - Manufacturing Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0497***	-0.0058	0.0293	0.2622***	-0.2764	-0.0155	-0.2085
Herfindahl	0.0008	0.0201***	0.0241***	-0.0081	0.0304*	0.0291*	0.0361**
Size	0.0062***	0.1407***	0.1539***	-0.0188*	0.2207***	0.1978***	0.2175***
Growth	0.0002*	0.0028***	0.0027***	0.0001	0.0024*	0.0019	0.0016
Profitability	-0.0114**	-0.1465***	-0.1806***	-0.0021	-0.1449***	-0.1625***	-0.1675***
Tangibility	-0.0006	0.0702	0.0454	-0.095	0.2674	0.2017	0.3394*
Liquidity	-0.0022*	-0.0586***	-0.0653***	0.0124**	-0.0614***	-0.0505***	-0.0631***
Non-debt tax shield	-0.0106	0.0741*	0.041	-0.0458	-0.0306	-0.0476	-0.0574
No	14,275	14,468	14,467	14,316	14,384	14,435	14,462
R-squared	0.0371	0.2189	0.2398	0.007	0.1807	0.1897	0.2076

This table shows the regression results of industry analysis (Manufacturing firms). Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials (excluding commercial services and suppliers, airfreight and logistics, airline, marine), Consumer Discretionary (excluding hotels restaurants and leisure and media), Information Technology (excluding internet software and services, IT consulting and services, software) as Manufacturing firms. This study categorises firms from Healthcare, Financials, Telecommunications Services, and Energy and the above-named excluded subcategories were classed as service firms. This study uses HHI as product diversification here. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 3-8 Industry analysis - Service Firms

Panel A - ABHK model - Service Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0062	0.1224	0.0963	0.0792	0.3818	0.4648	0.4644
2	0.0017	0.0835	0.0502	0.2962***	0.2580*	0.5550***	0.2545*
3	-0.0059	0.0588	-0.0085	0.1723***	-0.1453	-0.0046	-0.1959
4	0.0230*	0.0053	-0.0316	0.2036***	-0.0588	0.1398	0.0008
5	0.0217	-0.148	-0.2124*	0.2480***	-0.2163	0.0424	-0.0911
6	0.0780**	-0.0466	-0.1173	0.5673***	-0.4267	0.1151	-0.4496
Firm Factors							
Herfindahl	0.0051**	0.0251**	0.0389***	0.004	-0.0098	-0.0048	0.0055
Size	-0.0002	0.1216***	0.1347***	-0.0136*	0.2871***	0.2666***	0.3002***
Growth	0	0.0029***	0.0036***	0.0002	0.0019*	0.0021**	0.0016*
Profitability	0.0008	-0.0927***	-0.0966***	0.0107	-0.0954**	-0.0751*	-0.0986**
Tangibility	-0.0223	-0.1064	-0.0663	-0.0227	-0.3387*	-0.3887*	-0.1757
Liquidity	-0.0009	-0.0441***	-0.0553***	0.0057	-0.0744***	-0.0666***	-0.0961***
Non-debt tax shield	-0.0213***	0.0052	-0.0181	-0.0379	-0.0045	-0.0257	-0.0576
No	10,853	10,803	10,808	10,819	10,856	10,884	10,820
R-squared	0.0108	0.2195	0.2238	0.0074	0.2225	0.2232	0.2429
Panel B - Foreign Assets model - Service Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0594**	0.2034	0.1415	-0.0371	0.6066*	0.5582*	0.3749
Herfindahl	-0.0014	0.0163**	0.0214***	-0.0135*	0.0165	0.0021	0.0244
Size	-0.0019	0.1228***	0.1349***	-0.0378***	0.2985***	0.2528***	0.3001***
Growth	0.0001	0.0029***	0.0035***	-0.0001	0.0031***	0.0029***	0.0031***
Profitability	0.0012	-0.1161***	-0.1201***	0.0215	-0.1741***	-0.1431***	-0.1744***
Tangibility	-0.0301**	-0.1029	-0.0809	-0.0192	-0.1731	-0.2279	-0.0932
Liquidity	-0.0005	-0.0461***	-0.0547***	0.0111**	-0.0769***	-0.0629***	-0.0909***
Non-debt tax shield	-0.0203***	0.0183	-0.0069	-0.0204	-0.0356	-0.042	-0.0778
No	10,901	10,851	10,856	10,867	10,902	10,930	10,868
R-squared	0.0169	0.2154	0.2194	0.009	0.2348	0.2333	0.2527

Panel C - Foreign Sales model - Service Firms							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0215	-0.0092	-0.0218	0.3850***	-0.2564	0.1246	-0.0796
Herfindahl	0.0021	0.0133	0.0219**	-0.0053	0.0034	-0.0038	0.0226
Size	-0.0012	0.1179***	0.1303***	-0.0258***	0.2897***	0.2566***	0.2976***
Growth	0	0.0023***	0.0029***	0	0.0021**	0.0021**	0.0016*
Profitability	-0.0008	-0.0877***	-0.0995***	0.0118	-0.0989**	-0.0837*	-0.1101***
Tangibility	-0.0257*	-0.1192	-0.0795	-0.0013	-0.3301*	-0.3594*	-0.2037
Liquidity	-0.0004	-0.0442***	-0.0532***	0.0097*	-0.0802***	-0.0666***	-0.0958***
Non-debt tax shield	-0.0192***	0.0214	-0.0066	-0.0286	0.0232	0.0015	-0.0196
No	10,901	10,851	10,856	10,867	10,902	10,930	10,868
R-squared	0.0176	0.2331	0.2342	0.0072	0.2389	0.2429	0.2549

This table shows the regression results of industry analysis (Service firms). Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials (excluding commercial services and suppliers, airfreight and logistics, airline, marine), Consumer Discretionary (excluding hotels restaurants and leisure and media), Information Technology (excluding internet software and services, IT consulting and services, software) as Manufacturing firms. This study categorises firms from Healthcare, Financials, Telecommunications Services, and Energy and the above-named excluded subcategories were classed as service firms. This study uses HHI as product diversification here. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.5.2 Size analysis

Next, this study tests the robustness of the findings to firm size. This study segregates the sample into three groups based on the firm's total assets. It analyses the Capital Structure-Multinationality relationship for large, medium and small firms, and present the results in Tables 3-9, 3-10 and 3-11 respectively. The breadth of multinationality (measured using the ABHK score) shows a significantly negative impact on the long-term and total debt for small firms (LTD_2 and TD_2) and large firms (LTD_2, LTD_1, TD_1 and LTD_3), while it shows a significantly positive impact on the short-term debt for large firms (STD_1 and STD_2). The result of foreign assets shows significantly positive impacts on the long-term and total debt (LTD_1 and TD_1) for all firms in general. The foreign sales score shows significantly positive impacts on the short-term debt for large firms, while it has significant negative impacts on the long-term and total debt for medium and large firms. Although the results show a mixed relationship between capital structure and multinationality under the effect of firm size, the results of the ABHK score and foreign sales score on capital structure remain consistent with the main model for large firms and the results of the foreign assets are consistent with the main model for all types of firms. This study argues that the inverse relationship in which the ABHK score and foreign sales score have a negative impact on the capital structure for medium and large firms do not run contrary to the results of the main model but a supplementary specification. Using the foreign sales ratio as a proxy of multinationality, Aggarwal and Kyaw (2010) and Mittoo and Zhang (2008) provide empirical evidence that MNCs have higher 'trade-off' cost and agency cost respectively and therefore have a lower long-term and total debt ratio compared to DCs. This is in line with the results discussed above. Moreover, This study argues that this negative relationship between capital structure - multinationality becomes more significant for

medium and large firms based on the analysis, while the results cancel each other out when using a large sample size.

Furthermore, the mixed results may be used to support the argument that the use of different measurements of multinationality might be one of the factors causing contradictory empirical results in the existing literature. Contrary to Lee and Kwok (1988), this study argues that the foreign assets ratio is very different from foreign sales and the ABHK score. From Figure 3-1, the average percentage of foreign assets has a downward trend over time. The average percentage of foreign sales has an overall upward trend, while the average ABHK score shows a more volatile change in multinationality over time. Moreover, foreign assets represent the percentage of a firm's investment in overseas activities, while the foreign sales ratio measures the firm's participation in international markets (Jones et al., 2020). This study, therefore, argues that the foreign assets ratio is a different type of expansion abroad compared to foreign sales and selling abroad is much easier than having assets abroad. This may be because a firm's investment in overseas activities involves a large number of costs, hence a firm especially at its early stage prefers to become multinational by selling abroad (Pagano et al., 2002).

Figure 3-1 Mean value of ABHK, FS and FA from 1998 to 2020

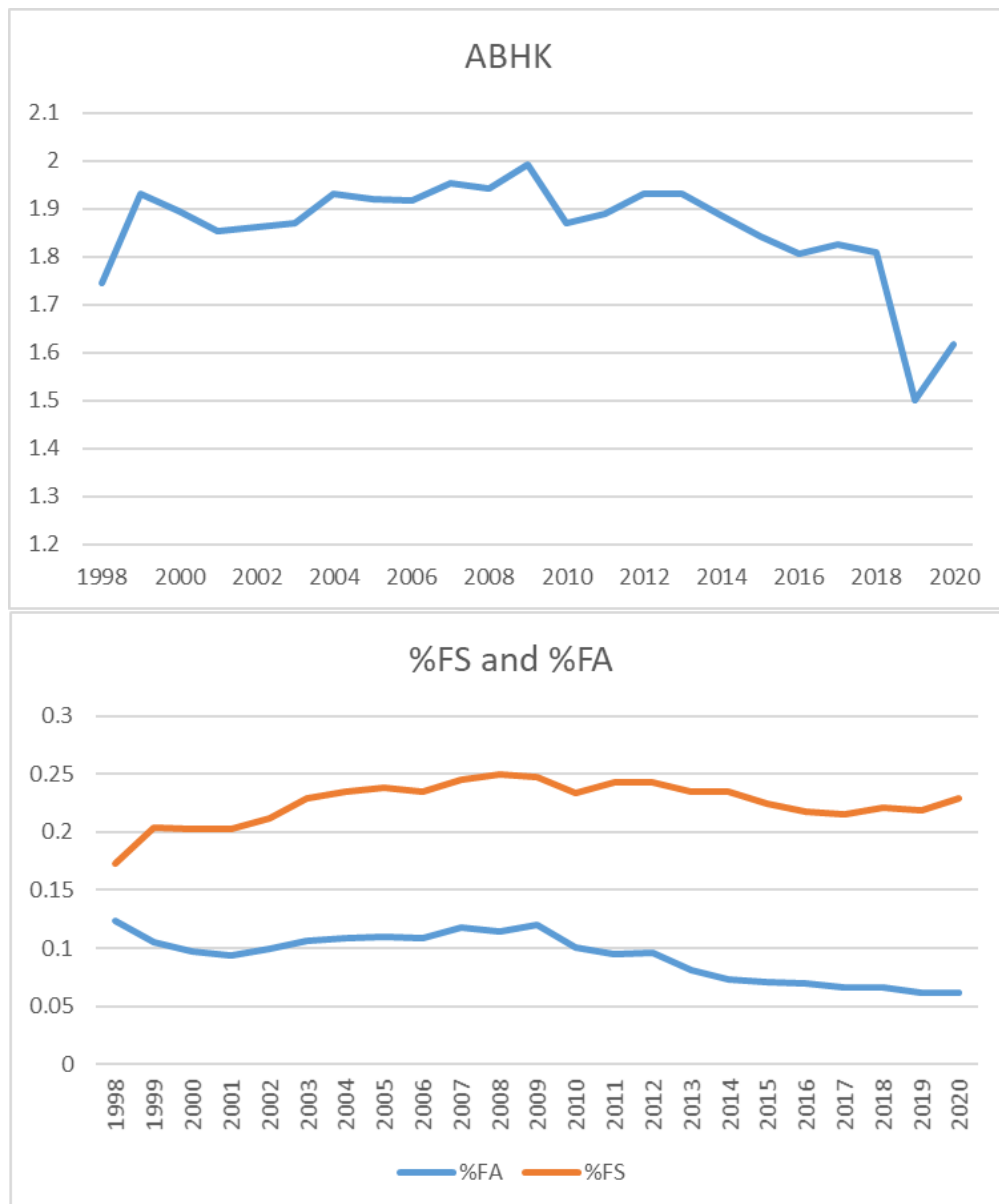


Table 3-9 Size analysis - ABHK model

Panel A - small firms - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0195	-0.0461	-0.15	-0.1838	0.8175	0.1701	1.7623
2	0.0134	-0.0209	0.0486	0.0088	0.0965	0.2342	0.1719
3	0.0004	0.0086	0.0627	0.1642	-0.4283	-0.3946	-0.0336
4	-0.0074	-0.2159*	-0.1628	0.0166	-0.7486*	-1.0041**	-0.5566
5	-0.0838*	-0.1749	-0.1485	-0.0353	-1.1559*	-2.1484***	-0.5588
6	0.1004	0.5287	0.7152*	1.2182**	-2.9541**	-2.1519*	-2.4153*
Firm Factors							
Herfindahl	0.001	0.0241*	0.0224*	-0.0019	0.0033	0.0097	0.0097
Size	-0.0007	0.1869***	0.1985***	-0.0324*	0.3874***	0.3396***	0.3694***
Growth	0.0002	0.0032***	0.0034***	0.0004	0.0032*	0.0037**	0.0025
Profitability	-0.0037	-0.0941***	-0.1088***	0.0107	-0.1859***	-0.1651***	-0.2103***
Tangibility	0.0184	0.0314	0.114	0.0529	0.1685	0.3652	0.7505*
Liquidity	-0.0016	-0.0401***	-0.0501***	0.005	-0.0851***	-0.0851***	-0.1021***
Non-debt tax shield	-0.0073	-0.0449	-0.0547	-0.0271	-0.1111	-0.1061	-0.1551
No	8,101	8,120	8,119	8,033	8,138	8,163	8,167
R-squared	0.0164	0.1294	0.1453	0.0088	0.1155	0.1214	0.1187
Panel B - medium firms - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.014	0.6976	0.4379	0.0104	0.2177	0.1663	0.0931
2	-0.0362	0.0703	0.0649	0.1223	-0.2169	0.1416	-0.1462
3	-0.0793*	0.1632	0.0792	0.2563	-0.0162	0.273	-0.0997
4	-0.0112	-0.4266**	-0.4031**	0.2558	-1.1733***	-0.8796**	-0.7043*
5	-0.0188	0.019	0.0579	0.0346	0.0791	0.399	0.3639
6	0.0774	-0.1831	0.0992	-0.0181	-0.522	-0.3036	0.3866
Firm Factors							
Herfindahl	0.0062*	0.0169	0.0361***	-0.0162	-0.0099	-0.0113	0.0188
Size	-0.0019	0.1158***	0.1271***	-0.0199	0.1540***	0.1315***	0.1706***
Growth	0	0.0019***	0.0026***	0.0003	0.0026*	0.0024*	0.0023
Profitability	0.0052	-0.1889***	-0.1961***	0.0431	-0.1517*	-0.1006	-0.1142
Tangibility	-0.0117	0.0313	0.0482	-0.0607	-0.1245	-0.2036	-0.213
Liquidity	-0.0007	-0.0307***	-0.0412***	0.0089	-0.0344*	-0.0186	-0.0471**
Non-debt tax shield	-0.0094	0.1471**	0.0955*	-0.0114	0.1785	0.1889	0.0734
No	8,512	8,567	8,572	8,546	8,551	8,581	8,595
R-squared	0.0266	0.2323	0.2277	0.008	0.0728	0.0558	0.0728

Panel C - Large firms - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0001	-0.0696	-0.2686	0.0126	0.7023	0.7606*	0.0969
2	0.0402	-0.2219**	-0.3313***	0.3519***	-0.1323	0.2593	-0.3135**
3	0.0445*	-0.0957	-0.1411	0.2788**	-0.3750*	-0.0723	-0.4137***
4	0.0895***	-0.3382***	-0.3266***	0.4724***	-0.5470**	-0.0015	-0.3142*
5	0.1019***	-0.3070**	-0.3148**	0.5897***	-0.5991**	0.0278	-0.2966*
6	0.1594***	-0.3722**	-0.3836**	0.8839***	-0.1744	0.8036***	0.1647
Firm Factors							
Herfindahl	-0.0011	0.0122	0.0169	-0.0206*	-0.0118	-0.0333*	-0.02
Size	0.0051	-0.0246*	-0.0139	0.0083	0.0074	0.0176	0.0253
Growth	0	0.0007	0.0007	0.0001	0	0	-0.0002
Profitability	-0.0017	-0.1922***	-0.2119***	-0.0034	-0.1037	-0.0986	-0.1299**
Tangibility	-0.0002	0.0607	0.0707	-0.0127	-0.0309	-0.0496	0.002
Liquidity	0.0031	-0.0402***	-0.0460***	0.0207**	-0.0396**	-0.0183	-0.0325**
Non-debt tax shield	-0.0141	-0.0573	-0.0434	-0.0231	-0.073	-0.0854	-0.0259
No	8,399	8,467	8,467	8,440	8,435	8,457	8,407
R-squared	0.0723	0.1405	0.117	0.0384	0.0581	0.0372	0.0456

This table shows the regression results of size analysis (ABHK model). This study segregates the sample into three groups based on the firm's total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study uses HHI as product diversification here. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 3-10 Panel regression using the Foreign Assets model

Panel A - small firms - FA model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.0503	0.8152***	1.0128***	0.1264	0.7874	1.1966	0.9962
Herfindahl	0.0008	0.0178*	0.0193*	0.0006	-0.0045	0.0036	0.0047
Size	0.0003	0.1935***	0.2016***	-0.0361**	0.4387***	0.3937***	0.4080***
Growth	0.0001	0.0027***	0.0031***	0.0001	0.0038**	0.0038**	0.0033**
Profitability	-0.0062*	-0.1025***	-0.1254***	0.0082	-0.2063***	-0.2002***	-0.2436***
Tangibility	0.0155	-0.0384	-0.0065	0.06	-0.0445	0.1526	0.403
Liquidity	-0.0021*	-0.0342***	-0.0438***	0.0027	-0.0769***	-0.0711***	-0.0945***
Non-debt tax shield	-0.0126*	-0.043	-0.0615*	-0.0469	-0.117	-0.1181	-0.1779*
No	8,127	8,146	8,145	8,059	8,164	8,189	8,193
R-squared	0.0107	0.1406	0.1526	0.0023	0.1369	0.1458	0.1457
Panel B - medium firms - FA model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.1154	0.5243	0.5214*	0.0003	0.1469	0.0987	0.3041
Herfindahl	0.0024	0.0151*	0.0239***	-0.0195*	0.0134	0.0021	0.0201
Size	-0.0009	0.1444***	0.1566***	-0.0467***	0.1954***	0.1398***	0.1847***
Growth	0	0.0022***	0.0024***	0.0001	0.0032**	0.0027**	0.0032***
Profitability	-0.0014	-0.1911***	-0.1904***	0.0268	-0.2013***	-0.1752***	-0.1579***
Tangibility	-0.0153	0.0503	0.0426	-0.1001	-0.0739	-0.1926	-0.1772
Liquidity	-0.0006	-0.0487***	-0.0591***	0.0153**	-0.0398**	-0.0211	-0.0436***
Non-debt tax shield	-0.0159	0.1915***	0.1478***	0.0055	0.2513*	0.2709**	0.16
No	8,537	8,593	8,598	8,571	8,577	8,607	8,621
R-squared	0.0369	0.2278	0.2202	0.0126	0.0813	0.0564	0.0908
Panel C - large firms - FA model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0088	0.4135**	0.3998**	-0.2426	0.4526	0.1971	0.3046
Herfindahl	-0.0026	-0.0003	-0.0006	-0.0079	0.0034	-0.0114	0.0004
Size	0	0.0298***	0.0457***	-0.0361***	0.0782***	0.0392**	0.0946***
Growth	0.0002	0.0028***	0.0032***	-0.0002	0.0030***	0.0027***	0.0027***
Profitability	-0.0053	-0.1799***	-0.1898***	-0.0078	-0.0901*	-0.0846*	-0.0474
Tangibility	-0.027	-0.0305	-0.0346	-0.1093	-0.0772	-0.1936*	-0.1469
Liquidity	0.0021	-0.0657***	-0.0696***	0.0211***	-0.0726***	-0.0501***	-0.0641***
Non-debt tax shield	-0.0114	0.0133	0.0085	0.0007	-0.0347	-0.0202	-0.0189
No	8,426	8,494	8,494	8,467	8,460	8,482	8,434
R-squared	0.0905	0.1413	0.1329	0.0564	0.0539	0.0351	0.0492

This table shows the regression results of size analysis (FA model). This study segregates the sample into three groups based on the firm's total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study uses HHI as product diversification. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 3-11 Panel regression using the Foreign Sales model

Panel A - small firms -FS model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0309	0.1161	0.1319	0.1519	0.0564	-0.2909	0.4363
Herfindahl	0.0005	0.0175*	0.0183*	0.0032	0.0095	0.0179	0.024
Size	-0.001	0.1947***	0.2016***	-0.0366**	0.4403***	0.3831***	0.4109***
Growth	0.0001	0.0031***	0.0033***	0.0003	0.0034**	0.0037**	0.0025
Profitability	-0.0062*	-0.0906***	-0.1173***	-0.0013	-0.1791***	-0.1868***	-0.2173***
Tangibility	0.009	0.0457	0.087	0.0551	0.1647	0.3387	0.6222
Liquidity	-0.0022*	-0.0421***	-0.0523***	0.006	-0.0863***	-0.0823***	-0.0976***
Non-debt tax shield	-0.0121*	-0.04	-0.0621*	-0.0526	-0.0975	-0.1134	-0.1596
No	8,127	8,146	8,145	8,059	8,164	8,189	8,193
R-squared	0.0118	0.1446	0.1544	0.0063	0.1376	0.1437	0.1394
Panel B - medium firms - FS model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.056	-0.4071*	-0.3521	0.1569	-1.4309**	-1.0877**	-1.0268**
Herfindahl	0.0041*	0.0079	0.0203*	-0.0105	-0.0017	-0.0011	0.0325
Size	-0.0005	0.1149***	0.1288***	-0.0346*	0.1469***	0.1078***	0.1536***
Growth	0	0.0014**	0.0015***	0.0001	0.0021	0.002	0.0017
Profitability	-0.0008	-0.1715***	-0.1781***	0.0444	-0.1128*	-0.0788	-0.0767
Tangibility	-0.0214	0.0149	-0.0032	-0.1241	-0.0846	-0.2276	-0.166
Liquidity	-0.001	-0.0414***	-0.0511***	0.0104	-0.0438**	-0.0268*	-0.0527***
Non-debt tax shield	-0.0183	0.1674***	0.1167**	-0.0161	0.2399*	0.2335*	0.1386
No	8,537	8,593	8,598	8,571	8,577	8,607	8,621
R-squared	0.0338	0.2412	0.2342	0.0099	0.0788	0.0573	0.0759
Panel C - large firms - FS model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.1194***	-0.4508***	-0.5019***	0.5939***	-0.7320**	-0.11	-0.4498**
Herfindahl	-0.0025	0.005	0.007	-0.0167*	0.0037	-0.0175	0.0014
Size	0.0034	-0.0057	0.0093	-0.0159	0.0251	0.0078	0.0526***
Growth	0.0002*	0.0007	0.0011*	0.0002	-0.0001	0.0001	-0.0001
Profitability	-0.0044	-0.1886***	-0.2075***	0.0051	-0.0367	-0.035	-0.0263
Tangibility	-0.0214	0.0353	0.0455	-0.0827	0.0692	-0.0207	0.0401
Liquidity	0.0029	-0.0536***	-0.0584***	0.0259***	-0.0551***	-0.0271**	-0.0455***
Non-debt tax shield	-0.0114	-0.0178	-0.0227	-0.011	-0.046	-0.0478	-0.0458
No	8,426	8,494	8,494	8,467	8,460	8,482	8,434
R-squared	0.0724	0.1581	0.1526	0.0386	0.057	0.0493	0.0536

This table shows the regression results of size analysis (FS model). This study segregates the sample into three groups based on the firm's total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study uses HHI as product diversification here. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.5.3 Sub-period analysis

This study performs a sub-period analysis as the final robustness check. Similar to the previous Chapter, the Andrews-Quandt (1993) and Bai-Perron (1998) tests suggest no significant structural breakpoints on the return of the Russell 3000 index from 1998 to 2020. This study then uses a graphical approach to determine the sub-periods, following Mullen and Berrill (2017) and O'Hagan-Luff and Berrill (2015). Figure 3-2 shows the monthly return of the Russell 3000 index between 1998 and 2020. This study identifies four distinct sub-periods. The first sub-period, from 1998 to 2003, shows a volatile period, which contains major events such as the Asian financial crisis, the technology bubble and the 2001 September 11th attacks. The second sub-period covers 2004 – 2007 before the global financial crisis. The period between 2008 and 2011 contains the global financial crisis and its aftermath. The next sub-period, from 2012 to 2019, contains the European debt crisis. The last sub-period, 2020, is quite volatile due to the Covid pandemic. This study uses these five sub-periods to test if the main results are robust in alternative market conditions.

Table 3-12 shows the regression results for each of the four sub-periods. In the first sub-period, from 1998 to 2003, the ABHK model and the foreign sales model, for the most part, significantly explain all short-term debt variables, while the foreign assets model has no explanatory power. In the second period from 2004 to 2007, the ABHK model generally shows significantly positive impacts on the long-term debt 1 and total debt 1, while the foreign sales and foreign assets model does not have any explanatory power. All three models have no significant power in the third period from 2008 to 2011 with the exception that the foreign sales model can significantly explain long-term debt 1 only. For the fourth period, from 2012 to 2019, the ABHK model and the foreign sales model show a significant negative impact on long-term debt 1 and total debt 1,

while the foreign assets model has no explanatory power. All three measures of multinationality have no explanatory power in the last sub-period.

Figure 3-2 Monthly return of the Russell 3000 index

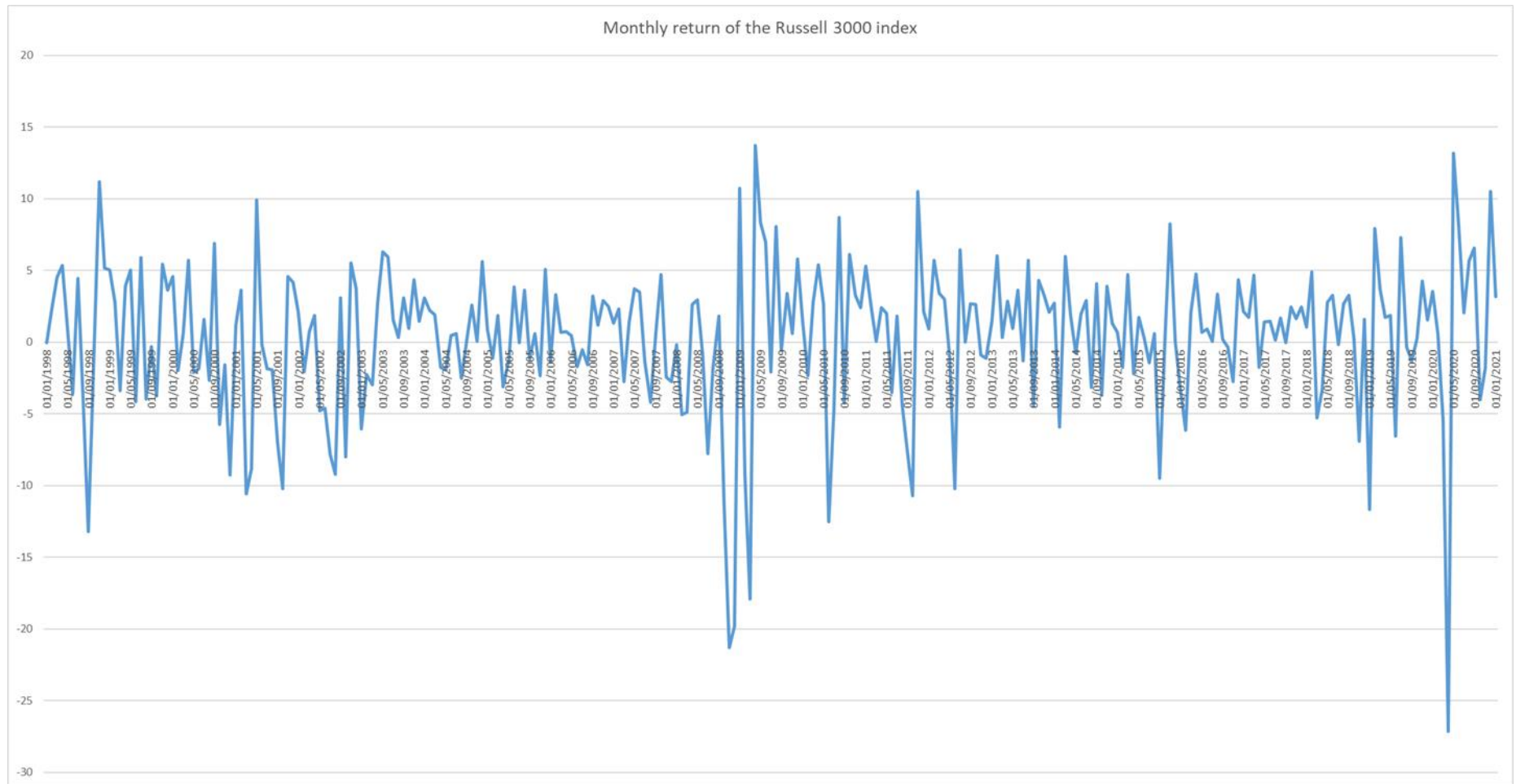


Table 3-12 Subperiod analysis

Panel A 1998 - 2003							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0527	0.066	0.0773	0.122	-0.0699	0.0084	0.2194
2	0.0692	0.0813	0.1524	0.4809**	-0.2381	0.2512	0.0394
3	0.0583	-0.0195	0.028	0.3935*	-0.442	-0.0216	-0.2751
4	0.1172**	-0.0605	0.0392	0.6731***	-0.4012	0.3144	-0.1141
5	0.1193*	0.0894	0.2029	0.6147**	-0.3749	0.2704	-0.1043
6	0.1192	0.1373	0.2073	0.5336	-0.9093	-0.313	-0.9208*
No	3,896	3,933	3,932	3,904	3,922	3,925	3,930
R-squared	0.0426	0.1545	0.2007	0.0099	0.1259	0.1999	0.2043
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.1074	0.1275	0.2244	0.3931	-0.4654	-0.0245	-0.5902
No	3,924	3,961	3,960	3,932	3,950	3,953	3,958
R-squared	0.0492	0.1603	0.2025	0.0185	0.1413	0.1921	0.2088
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.1390*	0.009	0.2259	0.6616*	-0.5853	0.1253	-0.2317
No	3,924	3,961	3,960	3,932	3,950	3,953	3,958
R-squared	0.0298	0.1548	0.2006	0.0048	0.1376	0.1963	0.2076
Panel B 2004 - 2007							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.1687	1.2502	1.2007	0.0718	2.1882	2.4382	1.0216
2	-0.0568	0.6846***	0.3596**	-0.2051	1.2313**	0.8278*	0.2382
3	-0.0825*	0.6171***	0.3782**	-0.4171*	1.0573**	0.4197	0.2532
4	-0.0463	0.5172***	0.3445**	-0.2818	0.5914	0.1309	-0.0031
5	-0.0833	0.5648***	0.3740*	-0.4166	0.8329	0.2528	0.4345
6	-0.1620*	0.7264**	0.3032	-0.7179	1.4039	0.4957	0.1253
No	3,577	3,625	3,623	3,588	3,637	3,639	3,636
R-squared	0.043	0.2019	0.2076	0.0032	0.1671	0.1989	0.1868
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0285	0.0599	0.0528	-0.0563	0.4869	0.3911	0.512
No	3,587	3,636	3,634	3,598	3,648	3,650	3,647
R-squared	0.0278	0.1483	0.1691	0.0018	0.1944	0.2013	0.2146
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0721	0.1918	0.1544	-0.3511	-0.0004	-0.578	-0.4129
No	3,587	3,636	3,634	3,598	3,648	3,650	3,647
R-squared	0.0324	0.1782	0.1957	0.0002	0.2016	0.2037	0.2059

Panel C 2008 - 2011							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0079	0.5888**	0.3028	-0.0446	1.7903**	1.7950**	1.2715*
2	-0.0708*	0.2027	0.1494	-0.1629	0.2938	0.0897	0.3435
3	-0.0422	0.1361	0.0878	0.0621	0.2244	0.0816	0.2401
4	-0.016	0.08	0.0207	0.0366	0.1977	0.0819	-0.0422
5	-0.0321	0.1395	0.0939	0.0981	-0.0254	-0.3311	0.0973
6	0.029	0.0846	-0.0081	0.8845**	0.245	0.4799	0.5805
No	4,709	4,734	4,732	4,697	4,712	4,724	4,708
R-squared	0.013	0.1565	0.1627	0.0009	0.1745	0.1871	0.1976
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0184	0.1679	0.1185	-0.0149	0.1354	0.0382	-0.0274
No	4,721	4,746	4,744	4,709	4,724	4,736	4,720
R-squared	0.0133	0.1764	0.1779	0.0077	0.234	0.2298	0.2428
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0033	0.3901*	0.2696	0.0075	0.6847	0.6342	0.2664
No	4,721	4,746	4,744	4,709	4,724	4,736	4,720
R-squared	0.0217	0.1871	0.179	0.0071	0.2344	0.2297	0.2347
Panel D 2012-2019							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0103	-0.3030*	-0.2487*	-0.0074	-0.3015	-0.2732	-0.4154
2	0.0097	-0.1757**	-0.1718**	0.1286*	-0.118	0.0686	-0.0787
3	0.0042	-0.1863**	-0.1851**	0.0499	-0.2705	-0.138	-0.1696
4	0.0159	-0.2850***	-0.2690***	0.091	-0.4289*	-0.2064	-0.3085
5	0.0266*	-0.2547**	-0.2383**	0.1582*	-0.0731	0.1211	0.1916
6	0.0101	-0.3429**	-0.3053**	0.0812	-0.4396	-0.3012	-0.2846
No	11,527	11,549	11,556	11,523	11,546	11,598	11,575
R-squared	0.0022	0.1684	0.1819	0.0009	0.1966	0.1975	0.228
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.0324	0.0448	0.0663	0.1895	-0.0664	0.2289	0.0667
No	11,552	11,574	11,581	11,548	11,570	11,622	11,600
R-squared	0.0013	0.1903	0.1989	0.0001	0.2097	0.2118	0.2396
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0051	-0.1669*	-0.1949*	0.0426	-0.3714	-0.2694	-0.2814
No	11,552	11,574	11,581	11,548	11,570	11,622	11,600
R-squared	0.0002	0.1916	0.2048	0	0.2011	0.2039	0.2355

Panel E 2020							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0013	0.1856	0.0658	-0.1373	1.3783*	1.1749*	1.3062*
2	-0.0156	0.1204	0.0806	-0.0184	0.3313	0.315	0.2571
3	0.0107	0.2229	0.1661	0.0749	0.1107	0.2271	-0.0993
4	0.0099	0.1114	0.07	0.0514	-0.0594	0.0209	-0.1531
5	-0.0043	0.4813*	0.3801	0.0391	1.1016**	1.1314**	0.9888*
6	-0.1079*	0.5828	0.3483	-0.0455	1.0173	0.9366	0.6936
No	1,511	1,522	1,524	1,515	1,515	1,525	1,525
R-squared	0.0581	0.3186	0.3199	0.0558	0.2747	0.2811	0.304
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0261	-0.3013	-0.3735	0.1149	0.6359	0.7313	0.7368
No	1,514	1,525	1,527	1,518	1,517	1,527	1,528
R-squared	0.0435	0.2917	0.2961	0.0396	0.2493	0.2547	0.2792
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0067	0.2176	0.1559	0.0508	0.2754	0.4197	0.0099
No	1,514	1,525	1,527	1,518	1,517	1,527	1,528
R-squared	0.0435	0.2943	0.2974	0.0427	0.2514	0.2602	0.28

This table shows the results of the sub-period analysis. First, the Andrews-Quandt (1993) and Bai-Perron (1998) tests suggest no significant structural breakpoints on the return of the Russell 3000 index from 1998 to 2020. This study then uses a graphical approach to determine the sub-periods, following Mullen and Berrill (2017) and O'Hagan-Luff and Berrill (2015). This study identifies five sub-period: 1998-2003, 2004-2007, 2008-2011, 2012-2019 and 2020. To save space, this study suppresses results for dependent variables and they are available in table A3-4 in the Appendix.

Although the results of the sup-period analysis are inconsistent with the main model, this study argues that the inverse relationship of multinationality on LTD_1 and TD_1 in the period 2004-2007 and 2012-2019 is likely due to the impact of the Global Financial Crisis (GFC). This study further splits the sample period into pre-GFC (1998 to 2008) and post-GFC (2009 to 2020) and analyses the impact of multinationality on LTD_1 and TD_1. Table 3-13 shows that all three models of multinationality (the ABHK, foreign assets and foreign sales) have significant positive impacts on LTD_1 and TD_1 before the GFC. However, the ABHK and foreign sales model have significant negative impacts on LTD_1 and TD_1 after the GFC in general, while the foreign assets model has no explanatory power. The results imply that there is a non-linear relationship between multinationality (the ABHK score and foreign sales ratio) and capital structure (long-term and total debt). This may explain why this study did not find a significant relationship between them in the main model. The results are in line with Pacheco (2016) who argues that the insignificance of coefficients is likely because the actual relationship between capital structure and multinationality is non-linear.

This study argues that the Global Financial Crisis (GFC) may significantly influence or even change MNCs' decisions on debt financing as the GFC was mainly caused by leverage. Although financial events, such as the Asian financial crisis, the technology bubble and the 2001 September 11th attacks, happened during the first period from 1998 – 2003, the regression result of this subperiod is consistent with the main model – there is a positive relationship between multinationality (ABHK and FS) and short-term debts (1 and 2). During a relatively stable period from 2004 – 2007 (shown in Figure 3-2), the subperiod analysis proposes that MNCs tend to have higher leverage (long-term and total debt) than DCs. This is likely because banks aggressively expand leverage before the GFC, which in turn increases housing and mortgage-backed securities prices (Crotty,

2009). For example, Citibank and Bank of America had leverage ratios of 50 or more before the crisis (Ferguson, 2008). With such high leverage rates, any fall in asset prices could trigger a crash as banks start a quick de-leveraging (Crotty, 2009).

Multinationality has no explanatory power in the sub-period from 2008 – 2011 (during the GFC).

The regression result of the sub-period from 2012 – 2019 shows that MNCs tend to have lower leverage (long-term and total debt) than DCs after the GFC compared to the crisis before. This is likely because macroeconomic conditions influence firms' financial choices and firms may adjust their external debt when they face high default risk (He & Kyaw, 2021). Compared to DCs, MNCs face a greater probability of financial distress as they have comparatively higher exchange rate risk and the political risk inherent in foreign expansion (Bell et al., 2012; Lindner et al., 2018). Given a rise in default probabilities during and after the GFC, not only does the long-term debt become less attractive to lenders as the term premium at which the lender is willing to lend creases significantly during a crisis, but also firms choose to reduce their leverage and debt maturity as they may be unable to commit to a longer maturity structure (Demirgüç-Kunt et al., 2020).

Table 3-13 Pre- and Post-GFC analysis

Panel A: Pre-GFC analysis 1998 - 2008							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0257	0.2814	0.3722*	-0.1197	-0.0625	0.3344	-0.4681
2	-0.0113	0.3457***	0.3052***	0.1433	0.4550**	0.6197***	0.2872*
3	-0.029	0.4313***	0.3620***	-0.0269	0.3749*	0.2493	0.0737
4	0.0039	0.3881***	0.3571***	0.1921*	0.2419	0.3286*	0.0331
5	0.0147	0.4628***	0.4565***	0.2178	0.1659	0.2823	0.1281
6	-0.0197	0.4643***	0.3961**	-0.0191	0.0103	-0.0145	-0.4534
Firm Factors							
Herfindahl	0.0005	0.0135	0.0163	-0.0232	0.0134	-0.0113	0.0036
Size	0.0095**	0.1761***	0.1905***	-0.0007	0.2807***	0.2949***	0.2536***
Growth	0.0001	0.0016**	0.0023***	0.0002	0.0004	0.0009	0.0002
Profitability	-0.0075	-0.1221***	-0.1389***	0.0116	-0.1169*	-0.0971	-0.1387**
Tangibility	-0.0124	0.0461	0.096	-0.0431	-0.0327	-0.0462	0.0004
Liquidity	-0.0031*	-0.0361***	-0.0463***	0.0052	-0.0475***	-0.0537***	-0.0561***
Non-debt tax shield	-0.0377***	0.027	-0.001	-0.042	0.1285	0.0869	0.0686
No	8,483	8,577	8,574	8,499	8,575	8,583	8,586
R-squared	0.0521	0.204	0.2315	0.0091	0.1589	0.1976	0.2037
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.0109	0.2937**	0.2816**	0.0827	0.5657*	0.6939**	0.4066
Herfindahl	-0.0002	0.0059	0.007	-0.0108	-0.0115	-0.0151	-0.0238
Size	0.0092***	0.1371***	0.1566***	-0.0139	0.2467***	0.2503***	0.2402***
Growth	0.0001	0.0017***	0.0024***	-0.0003	0.0018	0.0017	0.0018
Profitability	-0.0092	-0.1482***	-0.1656***	0.0198	-0.1361***	-0.1166**	-0.1283***
Tangibility	-0.0188	0.0349	0.0507	-0.076	-0.0088	-0.0597	-0.07
Liquidity	-0.0024	-0.0339***	-0.0445***	0.0112*	-0.0376***	-0.0363***	-0.0468***
Non-debt tax shield	-0.0318**	0.0106	-0.0315	0.0025	0.1024	0.0919	0.0764
No	8,523	8,618	8,615	8,539	8,616	8,624	8,627
R-squared	0.0556	0.1696	0.201	0.0068	0.1592	0.1938	0.2093
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0277	0.4020***	0.4901***	0.2699	-0.1105	0.1418	-0.1973
Herfindahl	0.0004	0.0128	0.0151	-0.0085	0.0063	-0.0008	-0.00004
Size	0.0102***	0.1519***	0.1736***	-0.0062	0.2447***	0.2554***	0.2329***
Growth	0	0.0009	0.0015**	-0.0002	0.0005	0.0005	0.0004
Profitability	-0.0071	-0.1151***	-0.1352***	0.0294	-0.0732	-0.0594	-0.0817*
Tangibility	-0.027	0.0625	0.0597	-0.0949	0.0342	-0.0425	-0.0726
Liquidity	-0.0025	-0.0399***	-0.0498***	0.0113	-0.0465***	-0.0443***	-0.0524***
Non-debt tax shield	-0.0331**	0.0029	-0.0361	-0.0182	0.0814	0.0501	0.0698
No	8,523	8,618	8,615	8,539	8,616	8,624	8,627
R-squared	0.0481	0.2044	0.2295	0.003	0.1675	0.1958	0.2047

Panel B: Post GFC analysis 2009 - 2020							
ABHK							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0099	-0.1988*	-0.2141*	-0.0761	0.2084	0.1357	-0.0154
2	0.0008	-0.0891*	-0.1163**	0.0912*	-0.005	0.0966	-0.0228
3	0.0037	-0.1205**	-0.1521***	0.0306	-0.1607	-0.1185	-0.129
4	0.0099	-0.1548**	-0.1739***	0.0821	-0.1579	-0.0117	-0.1361
5	0.0299**	-0.1761**	-0.1752**	0.0971	-0.0836	0.0245	0.0802
6	0.0301*	-0.1564*	-0.1571*	0.1610*	-0.1358	0.0416	-0.0995
Firm Factors							
Herfindahl	0.0014	0.0146*	0.0237***	-0.0001	-0.0094	-0.0025	0.008
Size	0.0008	0.1547***	0.1642***	-0.0045	0.2961***	0.2801***	0.3147***
Growth	0.0001	0.0034***	0.0034***	0.0002	0.0037***	0.0035***	0.0033***
Profitability	-0.0014	-0.0970***	-0.1150***	0.0028	-0.1031**	-0.0849*	-0.1251***
Tangibility	-0.0116	-0.0712	-0.1335*	-0.066	-0.1451	-0.1927	-0.1033
Liquidity	-0.0018*	-0.0534***	-0.0621***	-0.0019	-0.0841***	-0.0839***	-0.1167***
Non-debt tax shield	-0.004	0.0242	0.0059	-0.0054	-0.0167	-0.012	-0.0276
No	16,737	16,786	16,793	16,728	16,757	16,828	16,788
R-squared	0.0027	0.1956	0.1971	0.0019	0.2208	0.2188	0.2401
Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.002	0.0261	0.0329	0.0739	0.1565	0.2206	0.2888
Herfindahl	0.0009	0.0096*	0.0151**	0.0026	0.0181	0.0241*	0.0384**
Size	-0.0002	0.1708***	0.1807***	-0.0151*	0.3051***	0.2741***	0.3168***
Growth	0.0001*	0.0034***	0.0037***	0	0.0046***	0.0042***	0.0046***
Profitability	-0.0028	-0.1191***	-0.1363***	0.0081	-0.1462***	-0.1294***	-0.1431***
Tangibility	-0.0151	-0.0919	-0.1372**	-0.0488	-0.0164	-0.0701	-0.0183
Liquidity	-0.0009	-0.0565***	-0.0631***	0.0047	-0.0856***	-0.0758***	-0.1101***
Non-debt tax shield	-0.0059	0.0583**	0.0428*	-0.0002	-0.0054	0.0033	-0.0222
No	16,775	16,824	16,831	16,766	16,793	16,864	16,826
R-squared	0.001	0.2139	0.2183	0.0012	0.2243	0.2242	0.2482
Foreign Sales							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.0106	-0.1694**	-0.2196***	0.0403	-0.0936	-0.0004	-0.1125
Herfindahl	0.002	0.0066	0.0154**	0.0057	-0.0011	0.0109	0.0280*
Size	0.0001	0.1651***	0.1746***	-0.0131*	0.3091***	0.2852***	0.3198***
Growth	0.0001	0.0033***	0.0034***	0.0002	0.0043***	0.0041***	0.0041***
Profitability	-0.003	-0.1110***	-0.1316***	0.0064	-0.1138***	-0.1029***	-0.1304***
Tangibility	-0.0207*	-0.1042	-0.1524**	-0.0751	-0.0738	-0.142	-0.019
Liquidity	-0.0018*	-0.0563***	-0.0644***	0.0021	-0.0924***	-0.0885***	-0.1186***
Non-debt tax shield	-0.0058	0.0371	0.0182	-0.0037	-0.0293	-0.0261	-0.0584
No	16,775	16,824	16,831	16,766	16,793	16,864	16,826
R-squared	0.0035	0.2124	0.2168	0.002	0.2229	0.2207	0.2452

This table shows the regression results of pre and post-GFC analysis. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.5.4 Alternative measures of multinationality

As a further robustness check, this study estimates the model using three alternative measures of multinationality: the Herfindahl concentration index (HHI_2), the Entropy (Entropy_2) measure and the number of geographic regions. It is worth noting that the HHI_2 and Entropy_2 measures used here are proxies for multinationality which are different from the HHI and Entropy measures used as control variables for product diversification.

This study calculates the HHI for each firm i in year t as:

$$HHI_2_{i,t} = \sum_{i=1}^t \left(\frac{SSale_2}{Sale_2} \right)^2 \quad (3.11)$$

Where $Ssale_2$ is the segment sales for the firm and $Sale_2$ is the total sales for all reported regions. Following Palepu (1985) and Rodríguez-Pérez and van Hemmen (2010), this study calculates the Entropy_2 index for each firm i in year t as:

$$Entropy_2_{i,t} = \sum_{i=1}^n P_2_{it} * \ln (1/P_2_{it}) \quad (3.12)$$

where P_2 is the share of the product sales in that geographic region i . These three measures have been widely used in existing studies (Keig et al., 2019; Kirca et al., 2011a; Qian et al., 2008). Results are reported in Table 3-14. Results show that all additional measures of multinationality have significant positive impacts on short-term debts (STD_1 and STD_2). Moreover, the HHI_2 and Entropy_2 have significant negative impacts on the LTD_2. Along with the results of the control variables, the regression results using these alternative measures of multinationality are consistent with the ABHK and the percentage of foreign sales model in general. This study concludes that the findings are robust across alternative measures of multinationality.

Table 3-14 Alternative measures of multinationality

Panel A Using HHI_2 as a proxy of multinationality							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
HHI_2	0.0429***	-0.0012	0.0305	0.3732***	-0.2848*	0.0763	-0.2161
Herfindahl	0.0012	0.0194***	0.0268***	-0.0056	0.017	0.0161	0.0288*
Size	0.0021*	0.1318***	0.1447***	-0.0184***	0.2564***	0.2323***	0.2597***
Growth	0	0.0024***	0.0027***	0	0.0023***	0.0021***	0.0018**
Profitability	-0.0037	-0.1161***	-0.1343***	0.0098	-0.1277***	-0.1167***	-0.1421***
Tangibility	-0.0144	-0.0195	-0.0041	-0.031	-0.1283	-0.1697	-0.0124
Liquidity	-0.0006	-0.0517***	-0.0591***	0.0131***	-0.0749***	-0.0623***	-0.0840***
Non-debt tax shield	-0.0152***	0.0222	-0.0047	-0.0322	0.0018	-0.014	-0.039
No	24,508	24,647	24,651	24,520	24,619	24,695	24,662
R-squared	0.0333	0.2328	0.2408	0.0058	0.1984	0.2096	0.2232
Panel B Using Entropy_2 as a proxy of multinationality							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
Entropy_2	0.0474***	0.0103	0.0426	0.3967***	-0.2846*	0.0985	-0.1872
Herfindahl	0.0008	0.0203***	0.0273***	-0.0072	0.0203	0.0168	0.0314**
Size	0.002	0.1308***	0.1435***	-0.0217***	0.2593***	0.2314***	0.2634***
Growth	0.0001	0.0022***	0.0025***	0	0.0023***	0.0022***	0.0018**
Profitability	-0.0031	-0.1157***	-0.1331***	0.0135	-0.1305***	-0.1158***	-0.1429***
Tangibility	-0.014	-0.0133	0.0013	-0.0275	-0.1233	-0.1668	-0.0097
Liquidity	-0.0006	-0.0502***	-0.0576***	0.0135***	-0.0743***	-0.0610***	-0.0839***
Non-debt tax shield	-0.0148***	0.0223	-0.0043	-0.0248	-0.0046	-0.0111	-0.0429
No	24,508	24,647	24,651	24,520	24,619	24,695	24,662
R-squared	0.0353	0.2325	0.2405	0.0084	0.2017	0.21	0.2264
Panel C Using the number of segments as a proxy of multinationality							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
Segments	0.0047***	0.0028	0.0058	0.0396***	-0.0237	0.01	0.0013
Herfindahl	-0.0001	0.0238***	0.0288***	-0.0121*	0.0329*	0.0221	0.0402**
Size	0.002	0.1278***	0.1403***	-0.0195***	0.2674***	0.2409***	0.2792***
Growth	0.0001	0.0015***	0.0017***	0.00001	0.0019*	0.0018*	0.0015
Profitability	-0.0003	-0.1022***	-0.1148***	0.0278	-0.1215***	-0.0905**	-0.1293***
Tangibility	-0.01	-0.0252	-0.0052	-0.018	-0.142	-0.1872	0.0081
Liquidity	-0.0001	-0.0461***	-0.0529***	0.0138***	-0.0816***	-0.0689***	-0.0913***
Non-debt tax shield	-0.0163**	0.0203	-0.0076	-0.031	-0.0004	-0.0103	-0.0445
No	24,508	24,647	24,651	24,520	24,619	24,695	24,662
R-squared	0.0355	0.2249	0.2352	0.0102	0.2034	0.2116	0.2309

This table shows the results of the alternative measures. As a further robustness check, this study estimates the model using three alternative measures of multinationality: the Herfindahl concentration index (HHI_2), the Entropy (Entropy_2) measure and the number of geographic regions. It is worth noting that the HHI_2 and Entropy_2 measures used here are proxies for multinationality which are different from the HHI and Entropy measures used as control variables for product diversification. The HHI_2 measures if international diversification is the squared sum of market shares of Sales in all firms in each region. The Entropy_2 measure of international diversification weights each P_{it} by the logarithm of $(1/P_{it})$, where P_{it} is the proportion of the value of a firm i (revenues) at time t . This study uses HHI as product diversification here. Size is the natural logarithm of total assets; growth opportunity is the measure of the market-to-book ratio; Firms' profitability is measured using the firm's earnings before income tax (EBIT) to its total assets; tangibility is the fixed assets divided by its total assets; stock liquidity is the natural logarithm of the trading volume; Non-debt tax shield is proxied by the ratio of depreciation expenses to total assets. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

3.5.5 Endogeneity test

This study employs the Heckman (1979) two-stage model to estimate the impact of multinationality on dividend policy to correct for potential self-selection biases. In the first-stage selection model, this study calculates the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. Results (available in Table A3-5 in the Appendix) show that the inverse Mills ratio is statistically significant, which suggests that endogeneity may be less of a concern.

3.6 Conclusion

This Chapter investigates the relationship between multinationality and capital structure using US data from 1998 to 2020. Previous research, almost exclusively using foreign sales or foreign asset ratios as the proxy of multinationality, finds mixed results on this relationship. This study extends previous research by applying a new classification scheme – the ABHK model – as a proxy of multinationality and considering product diversification as one of the determinates of capital structure. Moreover, this study regresses capital structure on multinationality using seven measures of capital structure. This study not only uses long-term and total debts but also considers short-term debts as proxies for capital structure. This study examines how different types of debt are influenced by the ABHK score, foreign sales ratio and foreign assets ratio.

The analysis shows that the ABHK score and the foreign sales ratio have a significant positive impact on short-term debt, while the foreign assets ratio has a significant positive impact on long-term debt. This indicates that multinationals that sell abroad tend to use short-term debt while multinationals that have assets abroad have higher long-term debt. This is in line with the hypothesis of Singh and Nejadmalayeri (2004) who argue that MNCs expanding abroad using foreign sales, especially at their initial

stages of internationalization, can meet their financing needs using short-term debt as they may find it difficult to raise long-term debt due to investors perceived higher information asymmetries. This logic further implies that once these firms have established themselves in the host market (having foreign assets), investors may prefer investing in long-term debt and MNCs may reduce their dependence on short-term debt. Moreover, this study finds that the relationship between capital structure and multinationality is not gradual when using the ABHK model. In general, it is found that firms with an ABHK score of 5 or 6 have the highest short-term debts (STD_1 or STD_2, respectively). This study argues that the ABHK model provides a more in-depth analysis of the capital structure-multinationality relationship than the foreign sales and foreign assets ratios. This study also finds evidence that product diversification is an important determinant of capital structure.

This study further tests the robustness of the results to alternative industrial, size and sub-period conditions. The main result that the ABHK score and the foreign sales ratio are positively related to the short-term debt while the foreign assets ratio is positively related to the long-term debt, remains overall consistent across the robustness tests. Furthermore, it is found that the ABHK score and the foreign sales ratio are negatively related to the long-term and total debt of medium and large-size firms. This study also finds that the relationship between multinationality and long-term and total debt changed significantly since the GFC. The ABHK score and the foreign sales ratio are positively related to the long-term and total debt before the GFC, while they become negatively related to the long-term and total debt after the GFC.

The results have important implications for firms under the current global conditions. The GFC has had a significant and lasting impact on this relationship. It has caused us to question long-established theories and relationships. Moreover, given the decrease in

profits and the equity shortfall triggered by the COVID-19 lockdown (Carletti et al., 2020), debt financing is increasingly important to firms. However, according to Demirgüç-Kunt et al. (2020), lenders and borrowers are reluctant to lock in capital in long-term investments as uncertainty and risk increase and expected returns decline during a crisis. Therefore, short-term debt financing is becoming ever more important to firms. Firms may extend their activities geographically or increase foreign sales with a view to improving their ability to absorb short-term debt.

Chapter 4 The impact of multinationality on dividend policy

4.1 Introduction

The study of dividend policy and dividend determinates has a long history since the pioneering work of Miller and Modigliani (1961). As an important corporate strategy, some companies pay dividends to shareholders in order to attract external investors while others invest the company's resources back into the business. Dividend policy has important implications for both shareholders and managers. Most studies on dividend policy discuss the tax environment (Balachandran et al., 2019), the composition of the corporate boards (Ye et al., 2019), ownership structure (Denis & Osobov, 2008) and investment opportunities (Chay & Suh, 2009) as important influences on dividend policy. However, few studies investigating dividend policy distinguish between multinational corporations (MNCs) and domestic corporations (DCs) (Bahreini & Adaoglu, 2018; Dewasiri et al., 2019).

This study argues the importance of this distinction. According to Akhtar (2018a), there is a significant difference in relation to risk exposure, operation activities and financial activities between MNCs and DCs, all of which can influence dividend pay-out policy. Existing studies analysing the relationship between multinationality and dividend policy produce conflicting theoretical arguments. Some argue that there is a positive relationship between multinationality and dividend pay-out policy. As MNCs have greater access to external capital and can raise low-cost capital from external markets, Cheng et al. (2021) argue that MNCs can afford higher and more stable dividend payments than DCs. Moreover, Aggarwal and Kyaw (2010) report that MNCs pay higher dividends in order to mitigate their higher information asymmetry and agency costs. By paying dividends, managers return corporate earnings to shareholders and

hence are no longer capable of misusing these earnings (Brockman et al., 2014). On the other hand, some argue that multinationals face unexpected foreign risks (Huang et al., 2015) which may result in them reducing dividends relative to DCs.

Along with the contradictory theory on the direction of the multinationality–dividend policy relationship, the empirical results are also inconsistent. Recently, Cheng et al. (2021) investigate the relationship between multinationality and dividend policy. They measure a firm as multinational if it either cross-lists or issues American Depositary Receipts (ADR). They find that Chinese cross-listed firms pay significantly lower dividends than domestic firms. Moreover, Lam et al. (2012) and Huang et al. (2015) find that multinational firms pay significantly lower dividends than domestic firms. On the other side of the argument, Aggarwal and Kyaw (2010) report that US multinationals pay higher dividends compared to DCs. Akhtar (2018b) measures multinationality based on the total number of foreign subsidiaries. She uses a sample across several countries from 1995 to 2013 and finds that multinationals from Australia, the UK and Malaysian pay lower dividends, while US multinationals pay higher dividends compared to domestic firms. The relationship between multinationality and dividend policy remains an open question.

This study proposes that one reason for these conflicting findings may be that the measures of multinationality are inconsistent within the existing literature. Zheng (2019) measures a multinational firm if it reports foreign sales and foreign income, while Cheng et al. (2021) define a multinational firm as a firm that is cross-listed. Moreover, Akhtar (2018a) categorises firms as multinationals if they have at least two subsidiaries that both have foreign sales and assets outside their domestic country, while Chkir and Cosset (2001) use the foreign tax ratio to measure multinationality. Furthermore, the foreign assets ratio (Huang et al., 2015) and the foreign sales ratio (Aggarwal & Kyaw,

2010) have been commonly used as measures of multinationality. However, this study argues that the foreign sales ratio and foreign assets ratio may not capture the full diversification benefits of a firm's geographic expansion. This is because these measures can not identify whether foreign sales or assets only come from one foreign country or a large number of geographically spread countries (Aggarwal et al., 2011a; Wang & Mathur, 2011).

This Chapter, therefore, investigates the relationship between multinationality and dividend policy. First, this study uses the percentage of foreign sales and the percentage of foreign assets to measure the total level of multinationality. These two measures are commonly used throughout the literature (Jones et al., 2020; Mittoo & Zhang, 2008). Second, this study applies the ABHK model - to measure the breadth (geographical distribution) of multinationality. This system has been used extensively throughout the literature (Hutson & Laing, 2014; Mullen & O'Hagan Luff, 2018). This study also considers several commonly used measures of dividend policy when examining this relationship: common cash dividends, dividends to net income, dividends to net income plus extraordinary items, dividends to total cash flows, dividends to equity, dividends per share, dividend pay-out per share and dividend yield (Aggarwal & Kyaw, 2010; Akhtar, 2018a; Herron & Platt, 2021).

This Chapter uses three proxies to measure multinationality (the ABHK scores, the percentage foreign sales and the percentage foreign assets), eight measures of dividend policy and a panel-based analysis to provide a more in-depth investigation into the dividend policy-multinationality relationship than exists in the literature to date. Using the constituents of the Russell 3000 for the period 1998 to 2020, the study is the first to test whether the breadth of multinationality (measured using the ABHK score) influences dividend policy. This study distinguishes firms' international activities

(measured using foreign sales ratio) and international operations (measured using foreign assets ratio) with firms' geographical distribution of sales (measured using ABHK score). The lack of consistency within the literature on the measurement of both multinationality and dividend policy makes it difficult to compare results and find a decisive answer to the research question. However, this study argues that it provides a more robust analysis of this important topic.

My main findings are as follows. This study finds a negative relationship between dividend policy and multinationality. Moreover, it is found that this negative relationship between dividend policy and multinationality becomes more significant for medium and large firms. This study finds that the percentage of foreign sales has the strongest effect on dividend policy compared to the ABHK score and percentage of foreign assets. Moreover, it is found that the negative relationship between dividend policy and the ABHK score does not increase gradually. This indicates that as the breadth of geographic sales increases, firms do not necessarily reduce dividend payments. More specifically, this study finds that firms that have foreign sales only in one region pay the lowest dividends, while firms that have foreign sales from two regions pay the highest dividends. With mixed levels of significance, the results show that the industry analysis, size effect analysis, sub-period analysis, and alternative measures of multinationality and endogeneity are robust and consistent with the main findings.

This study makes several contributions to the literature. First, this study uses a robust measure of multinationality (measured using the ABHK score) which can capture the full geographic diversification benefits in addition to the measures of total multinationality (foreign assets ratio and sales ratio). Second, along with a broad set of dividend policy proxies and control variables, the research provides an in-depth analysis

of this multinationality - dividend policy relation. In particular, in the robustness tests where this study uses three alternative measures of multinationality (the HHI, Entropy and numbers of segments), it is found that the Entropy measure of multinationality leads to lower dividend policy when compared to the ABHK score, Herfindahl concentration index (HHI) measure of multinationality, percentage of foreign sales, foreign assets and the number of foreign segments. Third, this study assesses whether the degree of multinationality impacts firms' dividend policy. All existing studies that are aware of, such as Akhtar (2018a), Cheng et al. (2021) and Lam et al. (2012), measure multinationality as a dummy variable and examine whether multinationality impacts firms' dividend policy. Fourth, this study answers the call of Akhtar (2018a) for future empirical investigation on the relationship between international diversification and dividend policy. Moreover, this study incorporates the liabilities of foreignness (LOF) in the relationship between multinationality and dividend policy. this study answers the call for future research on the incorporation of finance and IB contributions made by Puck and Filatotchev (2018). Finally, the research has important implications for investors as it provides information on the relationship between multinationality and dividend payments. This is particularly important during the current Covid-19 pandemic as investors become more risk-averse and may seek a higher and more stable dividend payment.

The remainder of this Chapter is organized as follows. Section 4.2 reviews prior studies and provides the research hypothesis. Section 4.3 describes the data and research methodology. Section 4.4 details the results of the analysis. Section 4.5 presents the robustness tests. Finally, Section 4.6 concludes.

4.2 Literature review and Hypothesis development

4.2.1 Theoretical viewpoints on the relationship between multinationality and dividend policy

Existing literature proposes conflicting theoretical arguments on the relationship between multinationality and dividend payments. According to the bonding theory (Huang et al., 2016), firms that cross-list in higher reputational and/or legal/regulatory countries pay higher dividends as they provide their shareholders with better protection and stronger rights to influence corporate management to pay higher dividends. This is in line with Cheng et al. (2021) who suggest that multinationals that cross-list in the US market pay higher dividends as shareholders have greater rights and often demand higher dividends. Cheng et al. (2021) also suggest that multinationals that cross-list in a developed market have better access to foreign capital which lowers their capital cost. Therefore, in addition to retained earnings, if multinationals have to use external funds, they are more willing to pay higher dividends as low-cost foreign capital lowers the need for internal capital which can instead be paid out as dividends.

However, firms cross-listed in a more developed market may pay lower dividends. Based on the substitution hypothesis proposed by La Porta et al. (2000), strong legal protection for shareholders may substitute for higher dividend payments. Due to the strong legal protection, shareholders who feel safe may accept low dividend payments to allow firms to take advantage of good investment opportunities (Cheng et al., 2021). This is because shareholders believe that they may receive higher returns in the future (La Porta et al., 2000). In favour of this substitution hypothesis, Cheng et al. (2021) find empirical evidence that multinationals that cross-list in a country with strong shareholder protection may have lower dividend payments.

Along with the contradictory theory on the direction of the multinationality–dividend policy relationship, the empirical results also show inconsistency. Akhtar (2018b) and Aggarwal and Kyaw (2010) both report that US multinationals pay higher dividends compared to DCs. However, Lam et al. (2012), Cheng et al. (2021) and Huang et al. (2015) find that multinational firms pay significantly less dividends than domestic firms. Hence, it is unclear what role multinationality plays in explaining dividend policy across MNCs and DCs.

One explanation for the lack of consistency within the literature may be because that existing studies mainly focus on the cross-listing of shares. Cross-listing requires a significant level of managerial and financial commitments initially (Sharma & Erramilli, 2004), which is financially costly to small and medium-sized firms (Pagano et al., 2002b). Moreover, based on the bonding theory mentioned above, firms from developing countries tend to cross-list in a developed market for strong legal protection (Bell et al., 2012), whereas firms located in developed countries may prefer to cross-list in a more developed market such as the US market (Doidge et al., 2004). Cross-listing, therefore, limits the size of the firms and the host country that firms can choose to cross-list. There is limited literature which considers this relationship focusing on US firms that cross-list in other countries. This study, on the other hand, reviews this relationship from a broader perspective. This study considers firms as multinationals if they have foreign sales which require fewer upfront resources (Hollender et al., 2017) and analyses this relationship using US firms.

More specifically, this study measures the breadth of multinationality. This is important because when firms expand their sales geographically, they may face additional costs – the liabilities of foreignness (LOF) - that domestic firms would not incur (Zaheer, 1995). For example, MNCs face higher monitoring, bonding and auditing costs because of the

diversity of geographical locations, cultural differences, differing legal systems and language differences (Akhtar, 2018a), which may increase their default risk. In addition to political risks and foreign exchange risks driven by MNCs operating in an international environment (Akhtar, 2018a), various risks may lead the total business risk of MNCs to be higher than DCs (Bae & Noh, 2001). According to Abdoh and Varela (2017), riskier firms prefer to accumulate retained earnings by reducing dividends because they operate under high uncertainty. Therefore, these characteristics of MNCs may limit the number of dividends they can pay out to shareholders.

4.2.2 Measuring Multinationality and Dividend Policy

There are numerous methods within the existing literature used to measure multinationality as discussed previously in sections 2.2.2 and 3.2.2. Similarly, numerous measures have been used to capture dividend policy within the literature. The definition and use of dividend policy proxies are unusually varied. Empirical dividend policy proxies include direct measures such as the actual dividend payments and indirect measures such as the dividend pay-out ratio. For example, Herron and Platt (2021) directly use common cash dividend payments to examine firms' dividend policies and use share repurchases as robustness checks. Alternatively, the ratio of dividend-to-earnings is considered the most commonly used proxy in the literature (La Porta et al., 2000). For instance, Akhtar (2018a) uses common cash dividends scaled by net income; Attig et al. (2021) and Aggarwal and Kyaw (2010) use common cash dividends scaled by net income before extraordinary items; Brockman et al. (2014) use common cash dividends scaled by total cash flow. However, Breuer et al. (2014) argue that dividend-to-earnings proxy can be easily manipulated by firm management. They cast doubt on the relevance of earnings measures as dividends are reported before the final net earnings are calculated.

Two additional dividend pay-out ratios that have been widely used are dividend-to-sales (Breuer et al., 2014; Brockman et al., 2014) and dividend-to-equity (Attig et al., 2021; Cheng et al., 2021). Herron and Platt (2021) report that firms' sales and equity are less susceptible to measurement or reporting errors and these two ratios may be a better measure of dividend policy. Furthermore, several share-based methods are available in the literature for measuring dividend policy. Baker and Wurgler (2004) use dividend-per-share to test their catering theory of dividends. Lam et al. (2012) use dividend-per-share scaled by earnings-per-share to investigate the cross-listing impact on dividend policy in China. Finally, the dividend yield, which is calculated as the dividend-per-share as a percentage of the share price, can also be used as a proxy for dividend policy (Dewasiri et al., 2019; Shehata, 2022). Therefore, there is no consensus in the literature on how these variables interact with the breadth of multinationality (the ABHK score). This also brings difficulty to compare results and find a decisive answer to the research question.

4.2.3 Hypothesis development

MNCs acquire foreign assets and generate foreign sales, which may affect their dividend policy. According to the agency theory, both dividends and debt have been used as a monitoring technique for agency costs (Aggarwal & Kyaw, 2010). By paying a higher amount of dividends, managers retained earnings to shareholders in order to mitigate conflict of interests with shareholders (Brockman & Unlu, 2011). Or, by increasing the debt level, the periodic payment of debt and principal to the creditors can incentivise managers to be more cautious about making investment decisions (Frierman & Viswanath, 1994). Moreover, according to the pecking order theory that firms finance new investments first with retained earnings (Myers & Majiuf, 1984), firms with high growth opportunities should pay lower dividends. As MNCs have easier

access to foreign capital markets for funds (Huang et al., 2015) and may have higher growth opportunities from foreign markets (Akhtar, 2018a), MNCs should pay lower dividends particularly when debt financing is available. Hence, this study proposes the following hypotheses:

Hypotheses 4.1. There is a negative relationship between total multinationality (the percentage of foreign sales and assets) and dividend policy.

Furthermore, selling to multiple countries with varying cultural and legitimacy contexts may burden firms with an increase in transaction and operating costs (Cieřlik et al., 2015), often referred to as the liabilities of foreignness (LOF) (Gallego & Casillas, 2014). According to Bell et al. (2012), MNCs face four sources of LOF that include institutional distance, information costs, unfamiliarity costs, and cultural differences. All of these costs may impact a firm's dividend policy. For example, MNCs face higher monitoring, bonding and auditing costs because of the diversity of geographical locations, cultural differences, differing legal systems and language differences (Akhtar, 2018a), which may increase their default risk. In addition to political risks and foreign exchange risks as MNCs operate in an international environment (Akhtar, 2018a), various risks may lead the total business risk of MNCs to be higher than DCs (Bae & Noh, 2001). Therefore, these characteristics of MCs may limit the number of dividends they can pay out to shareholders. Using the ABHK model to measure a firm's breadth of internationalisation, this study proposes the following hypotheses:

Hypotheses 4.2. There is a negative relationship between the breadth of multinationality (measured using the ABHK score) and dividend policy.

4.3 Methodology

4.3.1 Data

This study uses the constituents of the Russell 3000 index as the sample obtained from Thompson Reuters for the period 1998 – 2020. Following Hrazdil and Scott (2013), this study uses the Global Industry Classification Standard (GICS) sectors to categorise firms into industries. The GICS code collected from Bloomberg contains eleven sectors - communication services, consumer discretionary, consumer staples, energy, financials, healthcare, industries, information technology, materials, real estate and utilities. This study excludes financial and utility firms as they are highly regulated and their dividend pay-out policy usually differs from those of other industrial firms (Huang et al., 2015; Ye et al., 2019). Following Keefe and Yaghoubi (2016), this study winsorizes the data at the 1 percent level in both tails of the distribution. This study excludes firms with missing data. The final sample comprises 21,603 firm-year observations.

4.3.1.1 *Dependent variables*

This study applies eight alternative measures of firms' dividend policies. Following Herron and Platt (2021), this study uses the logarithm of common cash dividends as the first proxy of dividend policy. This study then uses dividend-to-earnings (Brockman et al., 2014; Lai et al., 2020) as an alternative measure of firms' dividend policy. It is the most commonly used measure of dividend policy (La Porta et al., 2000). Dividend-to-earnings measures as dividends to net income (Akhtar, 2018a; Brockman et al., 2014), dividends to net income plus extraordinary items (Aggarwal & Kyaw, 2010; Herron & Platt, 2021) and dividends to total cash flows (Breuer et al., 2014). Next, this study uses dividend-to-sales (Breuer et al., 2014; Brockman et al., 2014) and dividend-to-equity (Attig et al., 2021; Cheng et al., 2021). These two measures are also widely used as proxies of dividend policy in various studies (Chay & Suh, 2009; La Porta et al., 2000).

Moreover, this study considers dividend pay-out per share as the seventh proxy (Lam et al., 2012). It is calculated as dividends per share divided by earnings per share. Finally, this study examines dividend yield from Datastream as the final proxy of dividend policy. It expresses the dividend per share as a percentage of the share price. All dividends mentioned in the above measures use common cash dividends as firms distribute returns to their shareholders primarily via cash dividends (Akhtar, 2018a). This study treats the variable as missing when the denominator is negative (Attig et al., 2021; Brockman et al., 2014).

4.3.1.2 Multinationality

This study measures multinationality using three proxies – the percentage of foreign sales, the percentage of foreign assets and the ABHK model. The first two measures have widely been applied in previous studies (Ahmed & Brennan, 2019; Attig et al., 2016). The ABHK model classifies the international scope of a firm based on the breadth of its operations across six geographical regions: Africa, Asia, Europe, North America, Oceania, and South America. A firm is categorised as domestic if it has sales within its home country (the US); a regional firm has sales in one region (North America in the sample); a trans-regional firm has sales in two or more regions while a global firm has sales in all six regions. This results in seven categories of multinationality, ranging from purely domestic firms (a score of 0) to fully global firms (a score of 6). It is important to distinguish the ABHK score from the foreign sales and assets ratio. This is because a high breadth of multinationality (measured using the ABHK score) may not necessarily have a high level of total multinationality (measured using the foreign sales or assets ratio). For example, in 2020, Weyco Group had an ABHK score of 6 (meaning it had sales in all 6 geographical regions of the world) while only having 19.3 percent foreign sales. Similarly, Applied Materials had 90 percent

foreign sales but an ABHK score of just 2 (sales in only two of the six geographical regions of the world). Moreover, the analysis provides measures of internationalisation under each category proposed by Marshall (2020).

4.3.2 Model

This study provides a panel model estimation. Following Shehata (2022) and Leary and Michaely (2011), this study uses annual fixed effects regressions, including nine control variables – stock liquidity, firm size, growth opportunity, profitability, free cash flow, leverage, firm’s life-cycle, risk and tax. This study states the model as follows:

$$Dividends_{i,t} = \alpha + \beta_1 M_{i,t} + \sum \beta_2 X_{Control} + M_{i,t} \sum \beta_3 X_{Control} + \varepsilon_{i,t} \quad (4.1)$$

where dividends are measured using each of the eight measures detailed above, $M_{i,t}$ is multinationality as measured by its ABHK score in model 1, percentage of foreign sales in model 2, or percentage of foreign assets in model 3 for stock i in time t . $X_{Control}$ represents the nine control variables used in the model. First, this study measures stock liquidity as the stock turnover ratio (Jain & Chu, 2014). This study controls for firm size (Rangvid et al., 2014), measured by the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity (Lai et al., 2020), and profitability is measured as the return on assets (Huang et al., 2015). This study proxies for free cash flow using the natural logarithm of total cash (Javakhadze et al., 2014). Leverage is measured as the total debt to total assets (Cheng et al., 2021), and the firm’s life cycle is measured as the retained earnings to book-value of assets (Brockman et al., 2014). This study includes risk as the beta of the stock (Aggarwal & Kyaw, 2010). Finally, this study measures tax as the average tax ratio (Breuer et al., 2014). This study also includes interaction terms for each of the nine control variables to investigate if a firm’s dividend policy determinants vary between alternative levels and breadths of

multinationality and their domestic counterparties. Following Brockman and Unlu (2011) and Cheng et al. (2021), this study controls for industry and time effects by adding both industry and year-annual dummy variables.

4.4 Results

4.4.1 Preliminary Statistics

Table 4-1 and Figure 4-1 report the annual mean value of the firms' multinationality levels and dividend policies over time. The average ABHK score shows a relatively stable term from 1998 to 2020 with the highest score of 2.1410 in 2013 and the lowest score of 1.6585 in 2019. The mean value of the ABHK scores across the 22 years is 2.0013. From 1998 to 2020, the mean value of the percentage of foreign assets is 0.0966 percent. However, the average percentage of foreign assets declines from 0.1257 percent in 1998 to 0.0704 percent in 2020. On the other hand, the average percentage of foreign sales increase from 0.1797 percent in 1998 to 0.2578 percent in 2020 with a mean value of 0.2452 percent. For the firm's dividend policy, common cash dividends (Div_1), dividends to total cash flows (Div_4) and dividends to sales (Div_5) show a U-shaped movement over the sample period. They fall from 2.8897, 0.1545 and 0.0324 respectively in 1998 to 2.0769, 0.1116 and 0.0221 in 2009 and then increase to 2.427, 0.1422 and 0.0359 in 2020. Similarly, dividends to sales (Div_5) and dividend yield (Div_8) show a U-shaped movement over the sample periods but are more volatile. Dividends to net income (Div_2) and dividends to net income plus extraordinary items (Div_3) show a similar stable trend from 1998 to 2020, while dividend pay-out per share (Div_7) takes a strong increase from 0.3611 in 1998 to 0.5851 in 2020.

Figure 4-1 Mean value of dividends from 1998 to 2020.

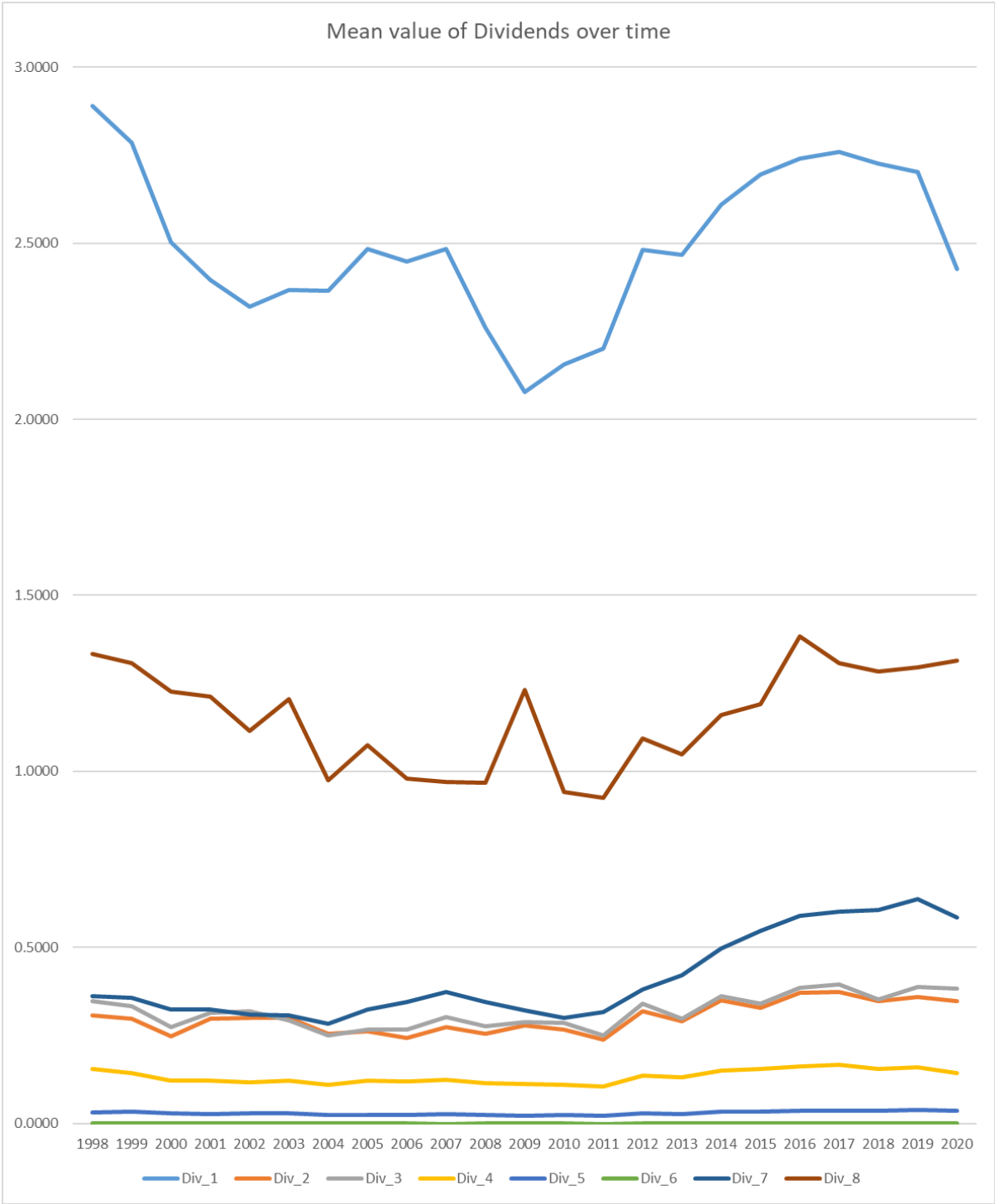


Table 4-1 Sample distribution of Multinationality and Dividend policy

Year	Multinationality			Dividend policy							
	ABHK	%FA	%FS	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
1998	1.7823	12.57	17.97	2.8897	0.3063	0.3486	0.1545	0.0324	0.000015	0.3611	1.3327
1999	2.0208	10.95	21.41	2.7842	0.2986	0.3330	0.1440	0.0339	0.000016	0.3567	1.3076
2000	2.0665	10.33	22.09	2.5013	0.2472	0.2734	0.1220	0.0294	0.000014	0.3244	1.2274
2001	1.9601	10.33	21.27	2.3956	0.2988	0.3139	0.1209	0.0264	0.000015	0.3227	1.2124
2002	1.9152	10.68	21.47	2.3198	0.2991	0.3200	0.1182	0.0280	0.000012	0.3099	1.1156
2003	1.9304	11.52	23.50	2.3662	0.2994	0.2922	0.1225	0.0280	0.000015	0.3062	1.2042
2004	2.0286	11.38	24.60	2.3648	0.2550	0.2490	0.1110	0.0246	0.000011	0.2826	0.9745
2005	2.0495	11.72	25.07	2.4844	0.2611	0.2672	0.1210	0.0249	0.000012	0.3228	1.0740
2006	2.0306	11.34	24.62	2.4485	0.2430	0.2673	0.1199	0.0253	0.000011	0.3459	0.9799
2007	2.0785	12.29	25.85	2.4831	0.2735	0.3034	0.1231	0.0263	0.000011	0.3731	0.9700
2008	2.1008	12.38	26.76	2.2593	0.2552	0.2752	0.1154	0.0252	0.000011	0.3443	0.9676
2009	2.1122	12.40	26.04	2.0769	0.2776	0.2880	0.1116	0.0221	0.000015	0.3221	1.2313
2010	2.0231	11.01	25.28	2.1567	0.2660	0.2852	0.1110	0.0233	0.000012	0.2988	0.9417
2011	2.0380	10.37	26.21	2.2016	0.2374	0.2510	0.1059	0.0230	0.000011	0.3156	0.9254
2012	2.0860	10.47	25.91	2.4819	0.3196	0.3410	0.1368	0.0303	0.000014	0.3818	1.0931
2013	2.1410	8.97	25.45	2.4668	0.2908	0.2978	0.1303	0.0268	0.000012	0.4203	1.0481
2014	2.0608	8.43	25.72	2.6091	0.3492	0.3629	0.1496	0.0335	0.000013	0.4962	1.1596
2015	2.0253	7.82	24.80	2.6946	0.3294	0.3413	0.1557	0.0345	0.000013	0.5481	1.1908
2016	2.0033	7.44	23.41	2.7404	0.3716	0.3850	0.1615	0.0360	0.000015	0.5891	1.3828
2017	2.0041	7.51	23.26	2.7586	0.3737	0.3941	0.1668	0.0359	0.000014	0.6007	1.3066
2018	2.0097	7.29	24.20	2.7260	0.3475	0.3523	0.1557	0.0369	0.000014	0.6062	1.2832
2019	1.6585	6.81	24.18	2.7023	0.3596	0.3872	0.1599	0.0397	0.000014	0.6368	1.2954
2020	1.8306	7.04	25.78	2.4270	0.3465	0.3840	0.1422	0.0359	0.000015	0.5851	1.3155
Total	2.0013	9.66	24.52	2.4936	0.3062	0.3232	0.1350	0.0302	0.000013	0.4326	1.1513

This table shows the mean value of three measures of Multinationality and eight measures of Dividend policy across time. The eight measures of dividend policy are as follows: Div_1 - the logarithm of common cash dividends; Div_2 - dividends to net income; Div_3 - dividends to net income plus extraordinary items; Div_4 - dividends to total cash flows; Div_5 - dividends to equity; Div_6 - dividends per share; Div_7 - dividend pay-out per share and Div_8 - dividend yield. All dividends mentioned in the above equations use common cash dividends as firms distribute returns to their shareholders primarily via cash dividends. This study treats dependent variables as missing when the denominator is negative.

Table 4-2 presents the descriptive statistics for all the variables. Among the eight dividend policy proxies, the common cash dividends (Div_1) is the most volatile, while the dividends per share (Div_6) is the least. For multinationality proxies, the ABHK score has the highest standard deviation (1.8278) compared to the percentage of foreign assets (0.1703) and the percentage of foreign sales (0.2750). The ABHK score shows a more volatile change over time. In terms of control variables, growth opportunity has the highest volatility, while the average tax ratio has the lowest. Moreover, the growth opportunity, profitability, life-cycle and average tax ratio have negative values at their minimum. The former three may be due to the observations having a negative market value or a negative earnings ratio. These negative signs are in line with previous papers such as Cheng et al. (2021) and Aggarwal and Kyaw (2010).

Table 4-2 Descriptive statistics for all variables

	Mean	Std.Dev	Min	Max
Dependent variables				
Div_1	2.4936	2.4138	0	6.5467
Div_2	0.3062	0.5726	0	4.8259
Div_3	0.3232	0.6373	0	5.8989
Div_4	0.1350	0.2008	0	1.0408
Div_5	0.0302	0.0697	0	0.4786
Div_6	0.000013	0.000019	0	0.000116
Div_7	0.4326	0.6891	0	4.0000
Div_8	1.1513	1.6353	0	8.5100
Independent variables				
ABHK	2.0013	1.8278	0.0000	6.0000
%FA	0.0966	0.1703	0.0000	1.0000
%FS	0.2452	0.2750	0.0000	1.0000
Stock Liquidity	5.6169	0.7123	3.6232	7.4349
Size	6.2586	0.6689	4.6847	8.2498
Growth	3.2683	3.9012	-20.1200	35.9800
Profitability	0.0921	0.0851	-0.6352	0.3882
Free Cash Flow	5.2643	0.6703	3.6232	7.1459
Leverage	0.2537	0.2001	0.0000	0.9377
Lifecycle	0.2029	0.4277	-2.2325	1.1950
Risk (Beta)	0.2998	0.0987	0.1301	0.5949
Tax	0.0251	0.0304	-0.1083	0.1538

This table shows the descriptive statistics for all variables. The independent variables are as follows: ABHK score, %FA and %FS- company's level of multinationality. Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earnings to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. Descriptive statistics for variables after winsorizing 1 percent at each end excluding ABHK score.

Table 4-3 reports the correlation coefficients between all variables and their degrees of significance. In general, variables tend not to be highly correlated. With mixed significance levels, all three measures of multinationality are negatively correlated with dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). However, the ABHK score and the percentage of foreign assets are positively correlated with common cash dividends at the 1 percent significance level, while the percentage of foreign sales is positively correlated with common cash dividends. This may be because the denominators of dividend proxies 2 to 8 change the direction of this relationship as common cash dividends have been used as the numerator for these proxies. Moreover, all three measures of multinationality are positively correlated with stock liquidity, firm size, growth opportunity, profitability, free cash flow, firm life-cycle and tax, while they are negatively correlated with leverage and risk with mixed levels of significance.

Table 4-3 Correlation coefficients between variables and their degrees of significance

	ABHK	%FA	%FS	SL	Size	Growth	Profitability	FCF	Leverage	Lifecycle
ABHK	1									
%FA	0.468***	1								
%FS	0.745***	0.527***	1							
Stock Liquidity	0.169***	0.0743***	0.159***	1						
Size	0.170***	0.100***	0.123***	0.688***	1					
Growth	0.0472***	0.0027	0.0569***	0.150***	0.0472***	1				
Profitability	0.0131	0.0285***	-0.00211	0.0942***	-0.0232**	0.224***	1			
FCF	0.168***	0.101***	0.122***	0.703***	0.927***	0.132***	0.213***	1		
Leverage	-0.111***	-0.0274***	-0.134***	0.105***	0.348***	-0.00419	-0.220***	0.229***	1	
Lifecycle	0.111***	0.0860***	0.0556***	-0.0179*	0.0795***	0.0263***	0.415***	0.190***	-0.302***	1
Risk (Beta)	-0.0498***	-0.00651	0.0158*	-0.0691***	-0.406***	-0.0694***	-0.165***	-0.414***	-0.0756***	-0.375***
Tax	0.0357***	0.0264***	0.00712	0.0918***	0.0237**	0.137***	0.551***	0.175***	-0.189***	0.287***
Div_1	0.0715***	0.0620***	0.0117	0.206***	0.429***	0.0522***	0.220***	0.454***	0.0786***	0.300***
Div_2	-0.0934***	-0.0362***	-0.0900***	0.0367***	0.160***	-0.00388	-0.0605***	0.111***	0.182***	0.0089
Div_3	-0.105***	-0.0434***	-0.0987***	0.0300***	0.154***	-0.00622	-0.0671***	0.102***	0.191***	-0.00745
Div_4	-0.0787***	-0.0311***	-0.0768***	0.0615***	0.200***	0.0454***	0.0927***	0.167***	0.144***	0.0914***
Div_5	-0.163***	-0.0774***	-0.129***	0.0581***	0.167***	0.0184*	-0.00368	0.122***	0.238***	-0.0775***
Div_6	-0.0930***	-0.0214**	-0.0996***	0.0214**	0.195***	-0.0279***	0.0688***	0.180***	0.170***	0.0911***
Div_7	-0.00607	-0.00289	-0.0266***	0.109***	0.384***	0.0691***	0.0839***	0.372***	0.199***	0.132***
Div_8	-0.0778***	-0.0187*	-0.0878***	0.0534***	0.227***	-0.0323***	0.0477***	0.203***	0.191***	0.0917***

This table shows the correlation coefficients for all variables.

1. *** to show significance at 1% or below
2. ** to show significance at 5% or below
3. * to show significance at 10% or below

	Risk (Beta)	Tax	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
Risk (Beta)	1									
Tax	-0.120***	1								
Div_1	-0.573***	0.123***	1							
Div_2	-0.341***	-0.104***	0.538***	1						
Div_3	-0.332***	-0.112***	0.518***	0.976***	1					
Div_4	-0.460***	-0.0154*	0.690***	0.765***	0.751***	1				
Div_5	-0.336***	-0.0522***	0.441***	0.658***	0.670***	0.808***	1			
Div_6	-0.422***	-0.0354***	0.694***	0.718***	0.707***	0.857***	0.672***	1		
Div_7	-0.474***	-0.00565	0.668***	0.548***	0.542***	0.693***	0.588***	0.656***	1	
Div_8	-0.453***	-0.0517***	0.694***	0.694***	0.687***	0.812***	0.673***	0.903***	0.7	1

This table shows the correlation coefficients for all variables.

1. *** to show significance at 1% or bellow
2. ** to show significance at 5% or bellow
3. * to show significance at 10% or bellow

4.4.2 Regression Analysis

4.4.2.1 ABHK model analysis

This study first analyses the relationship between dividend policy and the breadth of multinationality (the ABHK score). Results are presented in Table 4-4. This study finds that the ABHK score can significantly and negatively explain dividend-to-equity, dividends per share and dividend yield (Div_6, Div_7 and Div_8, respectively). Results indicate that the geographic expansion of sales may lower the firm's dividend payments. This is in line with the hypothesis that due to the liabilities of newness, the geographic expansion of sales burdens firms with an increase in costs associated with institutional distance, information costs, unfamiliarity costs, and cultural differences. These additional costs that the DCs do not have may limit the number of dividends they pay out to shareholders.

Furthermore, this study finds that the negative relationship between dividend policy and the ABHK score does not increase gradually. Firms that have foreign sales only from one region pay the lowest dividends, while firms that have foreign sales from two regions pay the highest dividends. This study argues that this may be due to the mixed effect of additional cash flows and costs caused by the geographic expansion of sales. On one hand, an increase in geographic sales may provide additional cash flows, therefore, firms may have enough cash to pay dividends. On the other hand, the additional costs (LOF) caused by the increased geographic sales can also limit the number of dividend payouts.

Table 4-4 Panel regressions for dividend policy using ABHK as the explanatory variable

	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-0.937	-1.0762	-0.913	-0.2301	-0.058	-0.000045**	-1.8313***	-2.2218
2	1.0921	0.4974*	0.1809	0.0226	-0.0017	0.000021***	-0.7419***	-0.4314
3	1.0352	0.3937	0.2103	-0.054	-0.0161	0.000028***	-1.4358***	-1.4530***
4	-0.7924	0.4046	0.1854	-0.1830**	-0.0254	0.000041***	-1.5775***	-2.3177***
5	-0.8715	0.5209	0.3456	-0.0873	-0.0166	0.000032***	-1.6062***	-1.5564**
6	-0.6552	0.3749	0.1417	-0.2711**	-0.045	0.000043***	-1.7638***	-2.2027*
Firm Factors								
Stock Liquidity	-0.0433	0.0351*	0.0187	0.0045	-0.0021*	-0.000014**	-0.1003***	-0.0931**
Size	-0.1373	0.0082	0.0004	-0.0145	-0.0201***	0.000011***	-0.1671***	-0.7906***
Growth	0.0032	0.0071***	0.0072***	0.0016***	0.0007***	-0.000014**	0.0034*	-0.0248***
Profitability	0.3768	-0.7743***	-1.0055***	0.0436	-0.001	-0.000001	-0.1022	-0.5754*
Cash	0.6203***	-0.0835*	-0.0935*	-0.0431***	0.0201***	0.000029**	0.2063***	0.1486*
Leverage	-0.269	0.1633**	0.1975**	-0.0061	0.0035	0.000056***	0.3098***	0.8778***
Lifecycle	0.3526***	-0.0482	-0.0422	0.0047	-0.0025	-0.000001	0.2269***	0.2017**
Risk (Beta)	-5.2475***	-0.8127***	-0.7686***	-0.4935***	-0.0809***	0.000061***	-0.5956***	-4.7774***
Tax	1.6766*	0.047	0.1758	0.0039	-0.0125	-0.000015*	0.2522	-1.8545***
No	18,438	18,315	18,317	18,332	18,302	18,341	18,319	18,319
R-squared	0.3432	0.1051	0.094	0.1159	0.097	0.1132	0.1561	0.1184

This table shows regression results of the relationship between multinationality (measured using the ABHK score) – dividends. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A4-1 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

In terms of the control variables, stock liquidity has a significant negative relationship with the dividend-to-equity, dividends per share and dividend yield (Div_6, Div_7 and Div_8, respectively), but a significant positive relationship with dividends to net income (Div_2). While the results are quite mixed, this study concludes that overall, stock liquidity has a negative relationship with dividend policy. This may be because a lower level of stock liquidity leads to information asymmetry and managers thus pay high dividends in order to mitigate the adverse effects of information asymmetry (Shehata, 2022). Moreover, Lai et al. (2020) find empirical results that managers of firms with low stock liquidity may choose to pay high dividends to improve a firm's market value.

Firm size is negative and statistically significant in explaining the dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). These results may imply that larger firms pay less dividends. However, previous papers such as Brockman et al. (2014) and Rangvid et al. (2014) all find a positive relationship as larger firms usually have more resources to distribute to their shareholders (Akhtar, 2018a; H. K. Baker et al., 2008). This study finds the opposite result and leave this as an area for further analysis.

While the negative and significant relationship of a firm's growth opportunity with dividend-to-equity and dividend yield (Div_6 and Div_8, respectively) is found, the firm's growth opportunity has a positive and significant relationship with dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5) and dividend pay-out per share (Div_7). Although the pecking order theory predicts that firms with high growth opportunities should retain more earnings for future investments and pay fewer

dividends (Aggarwal & Kyaw, 2010), the mixed results suggest that overall firms with high growth opportunities pay high dividends. These results are consistent with Herron and Platt (2021) who also find a positive coefficient but small in magnitude.

The coefficient for profitability is negative and significant. Firms with higher profitability have lower dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3) and dividend yield (Div_8). The results are consistent with Breuer et al. (2014) and Herron and Platt (2021). However, previous papers, such as Aggarwal and Kyaw (2010) suggest a positive relationship as high-performance firms usually payout more dividends as costly credible signals according to the signalling hypothesis.

Free cash flow has a significant negative coefficient with dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3) and dividends to total cash flows (Div_4), while has a significant positive coefficient with common cash dividends (Div_1), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). Overall, the results are consistent with Cheng et al. (2021) and Akhtar (2018b) who suggest that firms with higher free cash flow enable them to retain dividends.

An increase in a firm's leverage has a significant positive effect on dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). These results suggest that highly leveraged firms are more likely to pay dividends. These results are in line with Cheng et al. (2021).

A firm's life-cycle, as measured by the retained earning to book value of assets, has a significantly positive relationship with common cash dividends (Div_1), dividend pay-

out per share (Div_7) and dividend yield (Div_8). This may indicate that as a firm becomes more mature, it pays more dividends. This result is consistent with Herron and Platt (2021) and Denis and Osobov (2008), who find a positive relationship between a firm's age and its dividend payments.

A firm's risk, as measured by its price volatility is expected to have a negative relationship with the dividend policy. This result is consistent with Herron and Platt (2021) and Aggarwal and Kyaw (2010) who find that a lower dividend payout is associated with a higher level of firm risk.

Finally, a significantly negative coefficient of tax ratio in explaining dividends to equity (Div_6) and dividend yield (Div_8), while a significantly positive coefficient of tax ratio in explaining common cash dividends (Div_1). Overall, these findings indicate that high tax expenses are costly and may decrease dividend payments (Akhtar, 2018a).

4.4.2.2 Foreign Sales Analysis

Next, this study analyses the dividend policy among firms with differing levels of foreign sales after controlling for firm characteristics. Results presented in Table 4-5 show a negative relationship between dividend policy and the percentage of foreign sales. This indicates that firms with larger foreign sales tend to pay fewer dividends. More specifically, the percentage of foreign sales has a significantly negative relationship with common cash dividends (Div_1), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The coefficient of foreign sales in Table 4-5 is similar to the ABHK model analysis with the exception that the coefficient of the percentage foreign sales ratio is negative and significant for common cash dividends (Div_1), dividends to total cash flows (Div_4) and dividends to sales (Div_5). This

further indicates that the percentage of foreign sales may impact dividend policy from a wider perspective.

Table 4-5 Panel regressions for dividends using foreign sales as the explanatory variable

	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-1.8182*	0.3635	0.0961	-0.2851***	-0.0593**	-0.000056***	-2.3295***	-3.9329***
Stock Liquidity	-0.0692	0.0266*	0.0229	0.0010	-0.0024**	-0.000001**	-0.0955***	-0.0668*
Size	-0.0597	0.0193	0.0051	0.0127	-0.0173***	-0.000009***	-0.0680*	-0.7212***
Growth	-0.0066	0.0058***	0.0051**	0.0013***	0.0004***	-0.000001***	0.0025	-0.0244***
Profitability	0.6125*	-0.7824***	-1.0223***	0.0618**	-0.0007	0.000001	-0.0340	-0.4153*
Cash	0.4931***	-0.1169***	-0.1136***	-0.0771***	0.0143***	0.000001*	0.1381***	0.0259
Leverage	-0.1705	0.1301**	0.1467**	-0.0036	0.0018	0.000005***	0.2643***	0.8231***
Lifecycle	0.3241***	-0.0165	-0.0180	0.0041	-0.0004	0.000001	0.1659***	0.1908***
Risk (Beta)	-5.5476***	-0.9423***	-0.9702***	-0.4879***	-0.0710***	-0.000058***	-0.5037***	-4.9038***
Tax	1.2884*	-0.3619	-0.2972	-0.0403	-0.0182	-0.000020***	0.2069	-1.9955***
No	18,490	18,367	18,368	18,384	18,354	18,393	18,371	18,371
R-squared	0.3426	0.1056	0.0958	0.1262	0.0477	0.1082	0.1559	0.1176

This table shows the regression results of the relationship between multinationality (%FS) – dividends. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A4-2 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

4.4.2.3 Foreign Assets Analysis

Finally, this study re-runs the model using the percentage of foreign assets as the measure of multinationality. Results presented in Table 4-6 show a negative relationship between dividend policy and the percentage of foreign assets. The results are consistent with the ABHK score and percentage of foreign sales, which indicate that firms with larger foreign sales tend to pay fewer dividends. More specifically, the percentage of foreign assets has a significantly negative relationship with dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The coefficient of foreign assets in Table 4-6 is similar to the ABHK model but different from the percentage of foreign sales model. These results may provide further evidence of the difference between the percentage of foreign sales and the percentage of foreign assets.

This may be because, a firm's investment in overseas activities involves a higher cost, hence selling abroad may be easier than having assets abroad. Therefore, in addition to dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8), the percentage of foreign sales can significantly explain the common cash dividends (Div_1), dividends to total cash flows (Div_4), dividends to sales (Div_5), which are cash or sales based measures.

Table 4-6 Panel regressions for dividends using foreign assets as the explanatory variable

	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-0.8674	0.3093	0.0749	-0.1806	-0.0333	-0.000034**	-1.3956***	-2.9494***
Stock Liquidity	-0.0735*	0.0286*	0.0175	0.0015	-0.0015	-0.000001*	-0.1073***	-0.0699**
Size	-0.0364	-0.0237	-0.0244	0.0153*	-0.0133***	-0.000008***	-0.0029	-0.6472***
Growth	-0.0031	0.0047***	0.0042**	0.0013***	0.0004***	-0.000001***	0.0032**	-0.0251***
Profitability	0.9239***	-0.7329***	-0.9317***	0.0734***	0.0053	0.000001	0.0813	-0.3118
Cash	0.4913***	-0.0799**	-0.0777**	-0.0731***	0.0106***	0.000001*	0.1438***	0.0483
Leverage	0.0476	0.1276***	0.1439**	0.0101	0.0038	0.000006***	0.2555***	0.7766***
Lifecycle	0.2536***	-0.0179	-0.0138	0.0082	-0.0009	0.000001	0.1292***	0.1781***
Risk (Beta)	-5.4421***	-0.9574***	-0.9594***	-0.4574***	-0.0715***	-0.000051***	-0.4475***	-4.3818***
Tax	0.6622	-0.3304	-0.2921	-0.0500	-0.0128	-0.000015**	0.1533	-1.6868***
No	18,490	18,367	18,368	18,384	18,354	18,393	18,371	18,371
R-squared	0.3521	0.0999	0.0894	0.1183	0.0644	0.0964	0.1639	0.1086

This table shows the regression results of the relationship between multinationality (%FA) – dividends. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. To save space, this study suppresses results for interaction terms and they are available in table A4-3 in the Appendix. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 4-4 presents results using an ordinal measure (the ABHK model), while Tables 4-5 and 4-6 present a continuous measure (percentage of foreign sales and assets). While the percentage foreign sales and percentage foreign assets model shows that firms' dividend payments decrease as their foreign sales or assets increases, the ABHK model provides further information on dividend payments among firms with different level of geographic engagement. For example, it is found that the negative relationship between dividend policy and the ABHK score does not increase gradually. This indicates that along with the increase in geographic sales, firms do not necessarily pay lower dividends. More specifically, this study finds that firms that have foreign sales from only one region (ABHK score =1) pay the lowest dividends to equity (Div_6) and dividend pay-out per share (Div_7), while firms that have foreign sales from two regions (ABHK score = 2) pay the highest dividends to equity (Div_6) and dividend pay-out per share (Div_7). Furthermore, this study finds that the percentage foreign sales has the strongest effect on dividend policy compared to the ABHK score and percentage foreign assets.

4.5 Robustness Analysis

4.5.1 Industry analysis

This study tests the robustness of the results to firms in different industries. My full sample does not contain sufficient observations to analyse this relationship across each industry. For example, the communication service industry only has 1074 firm-year observations and has an average of 939 firms over time. This study, therefore, uses the 6-digit GICS code to categorise firms into two categories - Service and Manufacturing firms and re-test the relationship between multinationality and dividend policy.

Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials, Consumer Discretionary, and

Information Technology as Manufacturing firms, while this study categorises firms from Healthcare, Financials, Telecommunications Services, Energy and the above-named excluded subcategories are classed as service firms. The results are presented in Tables 4-7 and 4-8 respectively. The results from service and manufacturing firms are consistent with the main model in general for all three measures of multinationality. More specifically, for service and manufacturing firms, the ABHK score can negatively and significantly explain dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The percentage foreign sales can negatively and significantly explain common cash dividends (Div_1), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8) for manufacturing firms, and also for service firms without common cash dividends (Div_1). The percentage foreign assets can negatively and significantly explain common cash dividends (Div_1), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8) for manufacturing firms, but dividend pay-out per share (Div_7) and dividend yield (Div_8) only for service firms. The results of the industry analysis are consistent with the main finding that multinational firms pay fewer dividends.

Table 4-7 Panel regression for capital structure - Manufacturing Firms

Panel A - ABHK model - Manufacturing Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	2.1626	-0.4221	0.1716	-0.2693	-0.0127	-0.000053*	-1.2541	-3.4158*
2	2.0488**	0.6210*	0.5488	0.0372	-0.0162	-	-0.3867	-0.9054
3	2.1810**	0.5145	0.4595	-0.0264	-0.0237	0.000035***	-	-
4	0.498	0.6800*	0.7213*	-0.1256	-0.025	0.000050***	0.8188***	2.3282***
5	-0.794	0.6681	0.6876	-0.156	-0.0441	0.000052***	-	-
6	-0.1327	0.5332	0.2301	-0.3139*	-0.0488	0.000051***	0.9914***	2.2243***
						-	1.4982***	-2.1961**
						0.000066***	-	-
							1.8410***	3.8302***
Firm Factors								
Stock Liquidity	-0.0765	0.0509*	0.0219	0.0039	-0.0026	-0.000001**	-	-
Size	0.0575	0.0027	-0.0181	-0.0095	-	-	0.1193***	-0.1049*
Growth	0.0054	0.0158***	0.0161***	0.0031***	0.0327***	0.000015***	-0.0283	-
Profitability	0.0585	-	-	-0.0136	0.0014***	-0.000001**	0.00625*	0.0357***
Cash	0.0585	1.3162***	1.6614***	-0.0136	0.0401***	-0.000003	-0.0531	-0.4455
Leverage	0.8597***	-0.0516	-0.0111	-0.0401**	0.0399***	0.000006***	0.2489***	0.3369**
Lifecycle	-0.3366	0.3289***	0.3747***	0.0003	0.009	0.000007**	0.5388***	1.4035***
Risk (Beta)	0.8111***	-0.0245	-0.0399	0.0284*	-0.0027	0.000003	0.4552***	0.4961***
Tax	-	-	-	-	-	-	-	-
	5.8232***	0.8811***	0.7761***	0.6092***	0.1101***	0.000077***	0.6165***	5.8517***
	0.3788	0.0682	0.5873	-0.1307	-0.0642*	-0.000041**	-0.1256	-3.0176**
No	11,765	11,675	11,667	11,676	11,617	11,699	11,699	11,656
R-squared	0.4036	0.1884	0.1739	0.1837	0.1764	0.1567	0.1567	0.1642

Panel B - Foreign Sales model- Manufacturing Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-2.6378*	0.726	0.5073	-0.2348*	-0.0608*	-0.00007***	-2.3493***	-4.9531***
Firm Factors								
Stock Liquidity	-0.0779	0.0492**	0.039	0.0013	-0.0026*	-0.000001**	-0.1053***	-0.0815*
Size	0.1618	0.0861	0.0491	0.0331*	-0.0242***	-0.000012***	0.0297	-0.9304***
Growth	-0.0018	0.0142***	0.0133***	0.0029***	0.0011***	-0.000001**	0.0062**	-0.0323***
Profitability	0.4274	-1.2116***	-1.4931***	0.0314	-0.0218*	-0.000001	-0.0051	-0.4067
Cash	0.5783***	-0.1624***	-0.1313*	-0.0927***	0.0262***	0.000004***	0.1783***	0.1737
Leverage	-0.3324*	0.2317***	0.2908***	-0.0107	0.0022	0.000006***	0.4451***	1.1519***
Lifecycle	0.7627***	0.0439	0.0453	0.0361***	0.0049*	0.000003**	0.3662***	0.4461***
Risk (Beta)	-6.7220***	-1.1342***	-1.1642***	-0.5891***	-0.0875***	-0.000073***	-0.5702***	-6.0504***
Tax	-0.0299	-0.6469	-0.2775	-0.2411**	-0.0674**	-0.000047***	-0.2393	-3.4824***
No	11,785	11,695	11,686	11,696	11,637	11,719	11,678	11,676
R-squared	0.4091	0.187	0.1737	0.1821	0.0444	0.1569	0.2082	0.1691
Panel C - Foreign Assets model- Manufacturing Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-3.1996*	0.4228	-0.0144	-0.4056**	-0.1054**	-0.000059***	-1.4895***	-5.3235***
Firm Factors								
Stock Liquidity	-0.1033*	0.0491**	0.0383*	0.0013	-0.0018	-0.000001**	-0.1242***	-0.1025**
Size	0.1026	-0.0001	-0.0132	0.0194	-0.0177***	-0.000011***	0.0959**	-0.8044***
Growth	0.0064	0.0111***	0.0105***	0.0031***	0.0011***	-0.000001***	0.0113***	-0.0291***
Profitability	0.6886*	-1.1039***	-1.3203***	0.0364	-0.014	-0.000001	0.1088	-0.312
Cash	0.6668***	-0.0883*	-0.0787	-0.0754***	0.0191***	0.000003***	0.1927***	0.1776*
Leverage	0.0287	0.2182***	0.2695***	0.0207	0.0048	0.000007***	0.4236***	1.0856***
Lifecycle	0.5898***	0.0105	0.0184	0.0311***	0.0023	0.000002**	0.2722***	0.3311***
Risk (Beta)	-6.4719***	-1.2152***	-1.2387***	-0.5574***	-0.0911***	-0.000062***	-0.6162***	-5.4344***
Tax	0.305	-0.3526	-0.1743	-0.1399*	-0.027	-0.000025**	0.0706	-2.2571***
No	11,785	11,695	11,686	11,696	11,637	11,719	11,719	11,676
R-squared	0.4153	0.185	0.1731	0.1774	0.078	0.147	0.147	0.1648

This table shows the results of industry analysis (Manufacturing Firms). This study uses the 6-digit GICS code to categorise firms into two categories - Service and Manufacturing firms and re-test the relationship between multinationality and dividend policy. Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials, Consumer Discretionary, and Information Technology as Manufacturing firms, while this study categorises firms from Healthcare, Financials, Telecommunications Services, Energy and the above-named excluded subcategories are classed as service firms. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 4-8 Panel regression for capital structure - Service Firms

Panel A - ABHK model - Service Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-2.4679	-1.2092	0.5099	-0.3445	0.0164	-0.0001	-1.5203	-4.0569*
2	0.6804	0.5765	0.1195	-0.0861	0.0237	-	-0.7940*	-
3	0.6981	0.474	0.3755	-0.1378	-0.0102	0.000055***	-	3.8737***
4	-1.3308	0.2201	-0.1549	-0.2837*	-0.0261	-	1.2796***	-
5	1.9741	1.2267*	1.1287	0.0995	0.0688	0.000041***	-1.2893**	6.4077***
6	10.0804**	1.5531	2.1988	-0.1092	0.0581	0.000074***	-0.4551	-3.0878*
						-0.000013	-0.2474	-1.1839
Firm Factors								
Stock Liquidity	-0.0201	0.0612*	0.018	0.0041	-0.0061**	-	-	-
Size	-0.4074**	-0.0779	-0.0613	-0.0316*	-	0.000002***	0.1425***	0.2331***
Growth	0.0005	0.005	0.0049	0.0016**	0.0007***	-	-	-
Profitability	0.8435	-	-	0.1845***	0.0176	0.000014***	0.2518***	1.2742***
Cash	0.7032***	1.0528***	1.3949***	-0.0141	0.0393***	-0.000002**	0.0035	0.0297***
Leverage	0.0543	0.0599	0.0551	-0.0141	0.0393***	0.000004**	-0.1017	-0.401
Lifecycle	0.1264	0.2055*	0.2551**	0.0047	-0.005	0.000010***	0.4043***	0.4664***
Risk (Beta)	0.1264	-0.0527	-0.053	0.003	-0.001	0.00000002	0.2691***	1.0516***
Tax	-	-0.3452	-0.1283	-	-	-	0.1903***	0.2635**
	4.2092***	-	-	0.4808***	0.0975***	0.000063***	0.8778***	5.0934***
	1.9624*	0.6634	0.9102	-0.1208	-0.0593	-	-	-
						0.000045***	-0.3003	3.8127***
No	7,149	7,055	7,045	7,090	6,995	7,085	7,066	7,033
R-squared	0.2518	0.0963	0.0674	0.1669	0.097	0.1739	0.1506	0.1751

Panel B - Foreign Sales model - Service Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-2.0067	-0.1766	-0.4709	-0.7477***	-0.1465**	-0.000122***	-2.3886***	-9.4772***
Firm Factors								
Stock Liquidity	-0.0765	0.0439	0.0161	0.0022	-0.0054**	-0.000001**	-0.1281***	-0.1653***
Size	-0.3529**	-0.0692	-0.0508	-0.0104	-0.0257***	-0.000012***	-0.1354**	-1.0661***
Growth	-0.0082	0.0037	0.0033	0.0013*	0.0006***	-0.000001**	0.0018	-0.0262***
Profitability	1.1418**	-0.8495***	-1.2336***	0.1868***	0.0145	0.000011**	0.0323	-0.0891
Cash	0.6525***	0.0324	0.0426	-0.0455***	0.0271***	0.000003*	0.2796***	0.2552*
Leverage	0.2176	0.1411*	0.1332	0.0129	-0.006	0.000011***	0.2631***	1.0593***
Lifecycle	0.1112	-0.0514	-0.0562	-0.0079	-0.0004	-0.000001	0.1180***	0.1764*
Risk (Beta)	-4.3198***	-0.5913***	-0.4931**	-0.5021***	-0.1031***	-0.000064***	-0.9236***	-5.1668***
Tax	0.877	0.2714	0.3477	-0.1203	-0.0524	-0.000045***	-0.4402	-3.6634***
No	7,181	7,087	7,076	7,122	7,027	7,117	7,098	7,065
R-squared	0.2603	0.1012	0.0799	0.1817	0.0251	0.1746	0.1793	0.1793
Panel C - Foreign Assets model - Service Firms								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	3.0288	-0.285	-0.3483	-0.0945	0.053	-0.000041	-1.9891**	-3.3324
Firm Factors								
Stock Liquidity	-0.0301	0.0365	-0.0039	0.0053	-0.0028	-0.000001**	-0.1098***	-0.1308**
Size	-0.2024	-0.0728	-0.0516	0.0082	-0.0197***	-0.000009***	-0.0756	-0.8564***
Growth	-0.0097*	0.0024	0.0021	0.0007	0.0003*	-0.000001***	-0.0023	-0.0288***
Profitability	1.3320***	-0.7276***	-1.0296***	0.1645***	0.0114	0.000009*	-0.0157	-0.1576
Cash	0.4759***	0.0373	0.0617	-0.0518***	0.0215***	0.000005*	0.2259***	0.2157*
Leverage	0.3023*	0.1646**	0.1583*	0.0062	-0.0041	0.000008***	0.2126***	0.8778***
Lifecycle	-0.0581	-0.0571	-0.057	-0.0129	-0.0023	-0.0000003	0.0463	0.1435*
Risk (Beta)	-4.4047***	-0.5560***	-0.4505**	-0.4571***	-0.0919***	-0.000057***	-0.7621***	-4.6696***
Tax	0.1246	0.1029	0.1924	-0.1066	-0.0447	-0.000037***	-0.3173	-2.9578***
No	7,181	7,087	7,076	7,122	7,027	7,117	7,098	7,065
R-squared	0.2851	0.1072	0.0874	0.1962	0.0429	0.181	0.1702	0.1698

This table shows the results of industry analysis (Service Firms). This study uses the 6-digit GICS code to categorise firms into two categories - Service and Manufacturing firms and re-test the relationship between multinationality and dividend policy. Following Sivabalan, Booth, Malmi, & Brown (2009), this study categorises firms from Energy, Materials, Consumer Staples, Industrials, Consumer Discretionary, and Information Technology as Manufacturing firms, while this study categorises firms from Healthcare, Financials, Telecommunications Services, Energy and the above-named excluded subcategories are classed as service firms. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

4.5.2 Size Analysis

Next, this study tests the robustness of my findings to firm size. This study segregates the sample into three groups based on the firm's total assets. This study analyses the dividend policy-Multinationality relationship for large, medium and small firms, and present the results in Tables 9, 10 and 11 respectively. The ABHK score has a significantly positive impact on dividend yield (Div_8) for small firms, while it has a significantly negative impact on four dividend proxies for medium-sized firms. Moreover, the ABHK score shows a significant positive impact on dividends to net income (Div_2) for large-sized firms, while it has significant negative impacts on explaining dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The percentage of foreign sales has no explanatory power for small-sized firms, while it can significantly explain four dividend proxies for medium-sized firms. Similar to the ABHK score, the percentage of foreign sales shows a significant positive impact on dividends to net income (Div_2) for large-sized firms, while it has significant negative impacts on dividends to equity (Div_6) and dividend yield (Div_8). The percentage of foreign assets has no explanatory power for small-sized firms, while it can significantly explain four dividend proxies for medium-sized firms and one for large-sized firms. Although the results show a mixed relationship between dividend policy and multinationality under the effect of firm size, this study argues that in general the results of the three multinationality measurements remain consistent with the main model. Moreover, this study argues that this negative relationship between dividend policy-multinationality becomes more significant for medium and large firms based on the analysis. The ABHK score provides more robust results compared to the percentage of foreign sales and foreign assets under the effect of firm size.

Table 4-9 Size analysis using ABHK model

Panel A - small firms - ABHK model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-1.8636	-1.4292	-1.4167	-0.1352	0.0727	0.000001	-0.9772	0.9074
2	2.4637	0.0591	0.1681	-0.0167	-0.0155	0.00001	0.2304	3.0789**
3	2.6838	0.0838	0.1473	0.1901	-0.0085	0.000014	0.001	2.9276*
4	3.0236	1.0198	0.8617	0.0922	0.0673	0.000018	0.069	2.8113*
5	-1.1592	0.4209	0.095	0.1114	0.0388	0.000011	-0.167	2.0226
6	-6.3239	-0.7197	-0.7311	0.1617	-0.0492	0.000102	0.1066	11.278*
Firm Factors								
Stock Liquidity	0.0829	0.0447	0.0613*	0.0327***	0.0051***	0.000001*	0.0343**	0.1126*
Size	0.0598	-0.1262	-0.0813	-0.0199	-0.0152**	-0.000007**	-0.0272	-0.1623
Growth	0.0104	0.0114***	0.0110**	0.0018*	0.0008***	0.0000001	0.0019	-0.0124*
Profitability	0.3494	-0.4987***	-0.6804***	0.0251	0.009	-0.0000025	0.0764	-0.112
Cash	0.3230*	-0.1579**	-0.2357***	-0.0701***	0.0005	0.0000001	0.0197	-0.2042
Leverage	-0.3493	0.0128	0.0519	-0.0601*	-0.0114*	-0.000007**	0.0642	-0.2049
Lifecycle	0.1539	-0.0073	0.0211	0.0054	-0.0052*	-0.0000005	0.0038	0.0797
Risk (Beta)	-5.7551***	-1.2854***	-1.3337***	-0.5877***	-0.0747***	-0.000055***	-0.6453***	-3.5485***
Tax	1.0643	-0.4731	-0.1539	-0.0482	-0.0092	-0.0000146	-0.7022***	-3.6540***
No	5,935	5,898	5,899	5,871	5,880	5,893	5,924	5,893
R-squared	0.2267	0.0666	0.0651	0.127	0.0345	0.1034	0.1029	0.1172
Panel B - medium firms - ABHK model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	4.5453	-0.9188	2.9786	-0.5154	-0.0329	-0.000058	-1.1136	-0.6899
2	1.2752	0.6751	-0.194	-0.0785	-0.1651***	-0.000024	-1.6316**	0.2376
3	0.64	-0.2258	-0.7362	-0.4610**	-0.2188***	-0.000062**	-2.5573***	-4.5325**
4	1.6266	0.1107	-0.5806	-0.2643	-0.2097***	-0.000061**	-1.0902*	-4.0509**
5	3.1672	-0.8477	-1.2494	-0.2331	-0.2009**	-0.000059*	-1.9101**	-4.7944*
6	-7.4612	-3.346	-3.7077	-0.7388*	-0.2219*	-0.000116**	-2.1587*	-10.7004**
Firm Factors								
Stock Liquidity	0.1275	0.0145	0.0084	-0.002	-0.0027	-0.000001	-0.0298	-0.0605
Size	0.2505	0.0426	-0.0336	-0.0301	-0.0375***	-0.000011***	-0.2607***	-0.9135***
Growth	-0.0095	0.0051	0.0072	0.0005	0.0002	-0.0000003***	-0.0029	-0.0386***
Profitability	0.3512	-1.0717***	-1.3548***	0.0638	-0.0188	-0.000005	-0.1319	-0.3147
Cash	0.4713**	-0.1434*	-0.1446	-0.0414**	0.0125**	0.000001	0.1841***	-0.0495
Leverage	0.2037	0.3131**	0.2352	0.0531*	0.0228***	0.000008**	0.6658***	1.3191***
Lifecycle	0.9947***	-0.0105	-0.0551	0.0362*	0.0222***	0.000003*	0.5353***	0.5622***
Risk (Beta)	-6.1693***	-1.3498***	-1.4913***	-0.5415***	-0.1034***	-0.00006***	-1.3793***	-5.0184***
Tax	1.6366	0.0115	0.2347	-0.095	-0.017	0	-0.1525	-1.9843*
No	6,350	6,294	6,288	6,301	6,290	6,289	6,305	6,289
R-squared	0.279	0.1679	0.1522	0.2149	0.0505	0.1946	0.1275	0.2071

Panel C - large firms - ABHK model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	4.856	-2.347	-3.1674	0.1809	0.0324	-0.000103*	-2.998	-5.5032
2	0.6839	2.2328***	0.7915	0.2058	0.0654	-0.000057***	-1.2098	-2.9872*
3	1.622	2.0517**	0.8095	0.0656	0.052	-0.000066***	-1.8089**	-3.6558**
4	2.5645	2.4335***	1.0461	-0.0485	0.0266	-0.000069***	-1.5362*	-3.8527**
5	2.6777	3.0507***	2.1655*	0.1785	0.0547	-0.000062**	-2.7481***	-3.6765*
6	1.4337	2.8525**	1.727	-0.4276	-0.0206	-0.000091***	-2.4307*	-4.7474*
Firm Factors								
Stock Liquidity	-0.3405***	0.0432	-0.0874	-0.0329***	-0.0114***	-0.000004***	-0.2783***	-0.4823***
Size	0.4338	0.1405	0.1024	0.0299	-0.0262***	-0.000013***	0.1208	-0.8941***
Growth	0.0161	0.0090*	0.0078	0.0039***	0.0015***	-0.000001**	0.0176***	-0.0314***
Profitability	0.4994	-1.5867***	-1.9042***	0.0452	-0.0186	0.0000001	-0.6096*	-1.6589**
Cash	0.9323***	0.1175	0.1486	-0.015	0.0601***	0.000007***	0.4321***	0.5680***
Leverage	0.8852*	0.7945***	0.8176***	0.1418***	0.0234*	0.000019***	1.3513***	2.2046***
Lifecycle	1.8078***	0.056	0.018	0.0772***	0.0063	0.000006***	1.2501***	0.9904***
Risk (Beta)	-4.9583***	-0.1011	0.3395	-0.3333***	-0.0454*	-0.000064***	-1.2501***	-6.3863***
Tax	-0.2351	0.4944	0.1617	-0.0648	-0.0406	-0.000034*	-0.0432	-0.8669
No	6,153	6,123	6,130	6,160	6,132	6,159	6,090	6,137
R-squared	0.2175	0.0908	0.0917	0.1073	0.0499	0.168	0.1404	0.1625

This table shows the regression results of size analysis (ABHK model). This study segregates the sample into three groups based on firms' total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study excludes the results of control variables and the results are available in the Appendix. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 4-10 Size analysis using percentage foreign sales

Panel A - small firms - FS model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	0.4378	0.501	0.7111	-0.1822	0.0791	-0.000002	-0.2336	1.1283
Firm Factors								
Stock Liquidity	-0.0134	0.0112	0.0252	0.0194**	0.0027*	0.0000006	0.0185	0.0388
Size	0.0278	-0.076	-0.0351	-0.0132	-0.0131**	-0.000008***	-0.0042	-0.2688
Growth	0.0006	0.0096***	0.0092**	0.0021*	0.0009***	0.0000001	0.0021	-0.0127*
Profitability	0.5714	-0.5134***	-0.6512***	0.0171	0.0004	-0.0000034	0.0655	-0.0913
Cash	0.3262**	-0.2027***	-0.2647***	-0.0831***	0.0017	-0.0000002	0.0024	-0.2503*
Leverage	-0.2411	-0.008	0.0223	-0.0552*	-0.0088*	-0.0000041	0.019	0.0465
Lifecycle	0.1515	0.0186	0.033	0.0093	-0.0041	-0.0000003	0.0195	0.1138
Risk (Beta)	-5.6002***	-1.0972***	-1.1468***	-0.5508***	-0.0597***	-0.000052***	-0.6091***	-3.6473***
Tax	1.0449	-0.3595	-0.1403	0.0033	0.0076	-0.000005	-0.4584*	-2.2760***
No	5,947	5,910	5,911	5,883	5,892	5,905	5,936	5,905
R-squared	0.2343	0.0622	0.0587	0.1344	0.0242	0.1068	0.1027	0.1374
Panel B - medium firms -FS model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	4.8245	0.2337	-0.427	-0.254	-0.2067**	-0.000073**	-1.3692	-6.0743**
Firm Factors								
Stock Liquidity	0.0604	0.0148	0.0252	-0.0001	-0.003	-0.000001	-0.011	-0.0128
Size	0.5906**	0.0268	-0.0644	0.0008	-0.0229***	-0.000009***	-0.087	-0.8984***
Growth	-0.0032	0.005	0.006	0.0009	0.0002	-0.000002**	-0.0018	-0.0303***
Profitability	1.0971*	-1.1792***	-1.6246***	0.0758	-0.0046	-0.000002	0.0698	-0.2142
Cash	0.3481*	-0.1051	-0.0771	-0.0596***	0.0097**	0.0000005	0.1333***	0.0252
Leverage	-0.0374	0.2292*	0.2423*	0.0414*	0.0116*	0.000008***	0.4547***	1.0124***
Lifecycle	0.5783***	-0.0063	-0.0157	0.0169	0.0067*	0.000003	0.2698***	0.2969**
Risk (Beta)	-6.9965***	-1.2223***	-1.4249***	-0.5267***	-0.0806***	-0.000060***	-1.3626***	-5.3933***
Tax	0.3702	-0.3013	-0.0908	-0.118	-0.0273	-0.000019	-0.3534	-2.7881***
No	6,368	6,312	6,306	6,319	6,308	6,307	6,323	6,307
R-squared	0.2998	0.1386	0.1306	0.2234	0.0694	0.2139	0.1771	0.2328
Panel C - large firms -FS model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	1.5098	2.3692**	0.5694	-0.0688	-0.0771	-0.000071**	-1.0423	-5.2993**
Firm Factors								
Stock Liquidity	-0.2061*	0.0452	-0.0171	-0.0245***	-0.0082***	-0.000002**	-0.2261***	-0.2593***
Size	0.6045**	0.1563*	0.1238	0.1034***	-0.0191***	-0.000007***	0.37307***	-0.4727**
Growth	-0.008	0.0082**	0.006	0.0021**	0.0006***	-0.0000001*	0.01229***	-0.0219***
Profitability	0.2453	-1.5141***	-1.8847***	0.0831	-0.0167	-0.000002	-0.7765***	-1.5899***
Cash	0.5962***	-0.0136	0.0312	-0.1121***	0.0371***	0.000002	0.2546***	0.0503
Leverage	1.0415***	0.6404***	0.5481***	0.1056***	0.0173*	0.000014***	1.0148***	1.5605***
Lifecycle	1.4896***	0.1097	0.0612	0.0554***	0.0120**	0.000004**	0.9114***	0.6431***
Risk (Beta)	-6.0245***	-0.8856***	-0.7765**	-0.4574***	-0.0784***	-0.000064***	-0.7485***	-6.0570***
Tax	0.5128	-0.4292	-0.5911	-0.0841	-0.0652*	-0.000039***	0.2294	-1.5427
No	6,175	6,145	6,151	6,182	6,154	6,181	6,112	6,159
R-squared	0.2361	0.1134	0.1102	0.1552	0.0112	0.1682	0.149	0.1777

This table shows the regression results of size analysis (FS model). This study segregates the sample into three groups based on the firms' total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study excludes the results of control variables and the results are available in the Appendix. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

Table 4-11 Size analysis using the percentage of foreign assets

Panel A - small firms -FA model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	0.6526	-0.0438	-0.16	-0.1983	0.0915	0.000023	-0.9042	1.1259
Firm Factors								
Stock Liquidity	0.0025	0.0091	0.0215	0.0163**	0.0034**	0.0000004	0.0061	-0.0257
Size	-0.0866	-0.1557*	-0.1146	-0.0302	-0.0142***	-0.000008***	-0.0281	-0.3474**
Growth	0.0052	0.0073**	0.0074**	0.0021**	0.0007***	0.0000001	0.0050***	-0.0114*
Profitability	0.2476	-0.4411***	-0.5463***	0.00001	0.004	-0.000003	0.0361	-0.2024
Cash	0.4326***	-0.1191**	-0.1863***	-0.0544***	0.0014	0.0000001	0.0355	-0.1321
Leverage	-0.1205	0.0153	0.0488	-0.0416*	-0.0076	-0.000003	0.0471	0.0645
Lifecycle	0.1994*	0.0055	0.0268	0.0142	-0.0033	0.0000001	0.0384*	0.0998
Risk (Beta)	-4.7688***	-0.9654***	-1.0051***	-0.4504***	-0.0621***	-0.000042***	-0.4823***	-2.9431***
Tax	0.8009	-0.3907	-0.285	-0.0402	0.0092	-0.000003	-0.3799*	-1.8826**
No	5,947	5,910	5,911	5,883	5,892	5,905	5,936	5,905
R-squared	0.2432	0.0585	0.0568	0.1198	0.0307	0.0957	0.0897	0.1242
Panel B - medium firms -FA model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	6.1843	-0.2616	-0.6376	-0.2791	-0.1802*	-0.000098**	-2.5613**	-9.8493***
Firm Factors								
Stock Liquidity	0.0093	0.0283	0.0342	0.0028	-0.001	-0.000001	-0.0178	-0.014
Size	0.4967**	-0.0151	-0.0751	0.0042	-0.0179***	-0.000009***	-0.0568	-0.8167***
Growth	-0.0002	0.0029	0.0034	0.0005	0.0001	-0.0000002***	-0.0022	-0.0306***
Profitability	0.9418*	-1.0810***	-1.4082***	0.054	-0.0033	-0.000004	-0.0445	-0.2442
Cash	0.3608**	-0.0715	-0.0449	-0.0587***	0.0082**	0.000001	0.1323***	0.028
Leverage	0.246	0.1711*	0.2031*	0.0501**	0.0126**	0.000009***	0.3557***	0.9425***
Lifecycle	0.4991***	0.0096	0.0059	0.0256**	0.0059*	0.000003**	0.2369***	0.3412***
Risk (Beta)	-6.8248***	-1.2920***	-1.4499***	-0.5152***	-0.0762***	-0.000053***	-1.1802***	-5.0105***
Tax	0.3809	-0.2132	-0.1354	-0.0678	-0.0322	-0.000016	-0.1121	-2.3426***
No	6,368	6,312	6,306	6,319	6,308	6,307	6,323	6,307
R-squared	0.3086	0.1447	0.1362	0.2199	0.0981	0.1924	0.1658	0.2159
Panel C - large firms -FA model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	0.9146	0.0735	0.0455	0.0053	0.0112	-0.000038	-1.6204	-4.8483*
Firm Factors								
Stock Liquidity	-0.1581*	0.0507	-0.0264	-0.0156*	-0.0060**	-0.000001	-0.2244***	-0.1309*
Size	0.7014***	0.0982	0.1379	0.1265***	-0.0066	-0.000004**	0.4243***	-0.44985***
Growth	-0.006	0.0060*	0.0045	0.0019***	0.0007***	-0.0000002***	0.0089***	-0.0290***
Profitability	1.2129*	-1.5905***	-1.8525***	0.1042*	-0.0071	-0.0000001	-0.4959**	-1.3561***
Cash	0.3736**	-0.0514	-0.0089	-0.1457***	0.0228***	0.0000004	0.2289***	0.0232
Leverage	1.0148***	0.4896***	0.4447***	0.0859***	0.0152**	0.000014***	0.7128***	1.4119***
Lifecycle	0.9368***	0.0892	0.0842	0.0412***	0.0076*	0.000003**	0.5912***	0.4311***
Risk (Beta)	-6.7653***	-1.0202***	-0.8237***	-0.4992***	-0.0803***	-0.000059***	-0.8657***	-6.0882***
Tax	-0.5199	-0.3311	-0.3921	-0.1001	-0.0530*	-0.000031***	-0.0197	-1.9904**
No	6,175	6,145	6,151	6,182	6,154	6,181	6,112	6,159
R-squared	0.2588	0.1294	0.1017	0.1742	0.0238	0.1544	0.1681	0.175

This table shows the regression results of size analysis (FA model). This study segregates the sample into three groups based on the firm's total assets. This study analyses the Capital Structure-Multinationality relationship for large, medium and small firms. This study excludes the results of control variables and the results are available in the Appendix. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

4.5.3 Sub-period analysis

This study performs a sub-period analysis as the final robustness check. The sample period, from 1998 to 2020, contains many historical financial events, such as the Asian financial crisis, the dot-com bubble during the late 1990s and early 2000s, the September 11 attacks in 2001, the global financial crisis, the European debt crisis and the Covid pandemic. This study first uses the Andrews-Quandt (1993) and Bai-Perron (1998) tests to check for potential breakpoints in the return of the Russell 3000 index from 1998 to 2020, but no significant structural breakpoints are found. Following Mullen and Berrill (2017) and O'Hagan-Luff and Berrill (2015), this study then uses a graphical approach to determine the sub-periods. Figure 4-1 shows the monthly return of the Russell 3000 index between 1998 and 2020. This study identifies four distinct sub-periods. The first sub-period, from 1998 to 2003, shows a volatile period, which contains major events such as the Asian financial crisis, the technology bubble and the 2001 September 11th attacks. The second sub-period covers 2004 – 2007 before the global financial crisis in 2008. The period between 2008 and 2011 contains the global financial crisis and its aftermath. The last sub-period, from 2012 to 2019, contains the European debt crisis. This study excludes 2020 as the return of the Index is quite volatile due to the Covid pandemic. This study uses these four sub-periods to test if the main results are robust to alternative market conditions.

Table 4-12 shows the regression results for each of the five sub-periods. In the first sub-period, all three measures of multinationality have no significant power from 1998 to 2003 with the exception that the percentage of foreign sales has a positive significant impact on common cash dividends (Div_1). In the second period from 2004 to 2007, the ABHK model in general shows significantly negative impacts on dividends to equity (Div_6) and dividend yield (Div_8), while the percentage of foreign sales shows

a significant negative impact on dividend yield (Div_8). The percentage of foreign assets has no explanatory power in this sub-period. For the third period from 2008 to 2011, the ABHK score shows a significant negative impact on dividend pay-out per share (Div_7), while it shows significant positive impacts on dividends to net income (Div_2) and dividends to net income plus extraordinary items (Div_3). The percentage of foreign sales has no explanatory power in this period, while the percentage of foreign assets shows a significant negative impact on the dividend payout per share (Div_7). For the fourth period, from 2012 to 2019, the ABHK model and the percentage foreign sales model do not have any explanatory power, while the percentage of foreign assets has significant negative impacts on common cash dividends (Div_1) and dividend yield (Div_8). For the last sub-period, the ABHK model has no explanatory power, while the percentage of foreign sales model and the percentage of foreign assets model have significant negative impacts on the dividends to total cash flows (Div_4) and common cash dividends (Div_1) respectively.

Figure 4-2 Monthly return of the Russell 3000 index

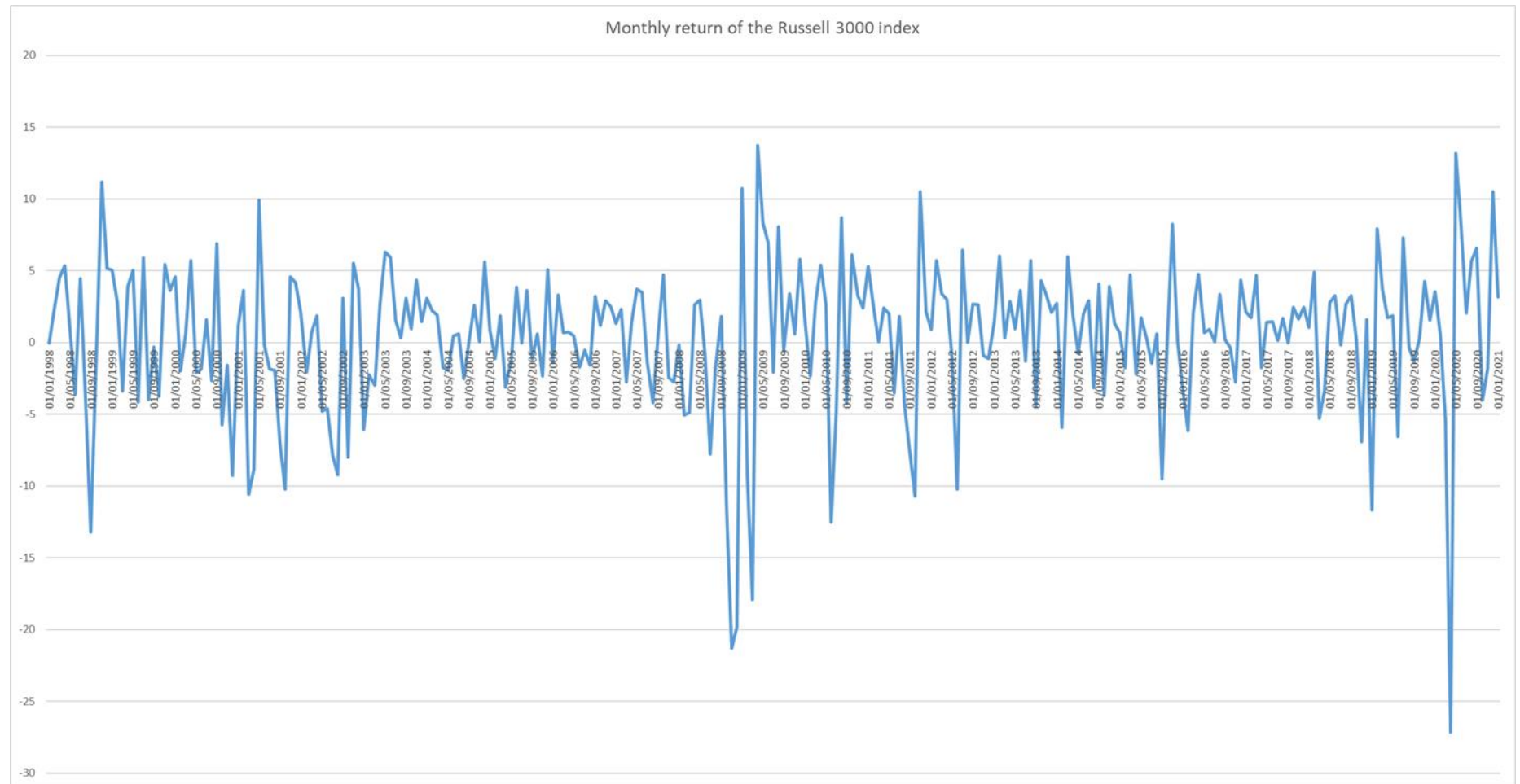


Table 4-12 Subperiod analysis

Panel A 1998 - 2003								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	7.9899*	-0.0553	-0.4144	0.7044	0.0269	0.000033	0.7437	2.3013
2	0.2827	-1.7421*	-1.8440	0.1472	0.0027	0.000008	0.1793	-0.4055
3	0.4645	-1.8950*	-2.0661*	0.1759	-0.0199	0.000022	0.0726	-0.3209
4	-0.7273	-1.8195	-2.0870	-0.1066	-0.0419	0.000025	0.0101	0.2240
5	2.7848	-1.3250	-1.6698	0.1765	-0.0146	0.000008	0.2233	-0.5313
6	-2.2407	-3.0171	-3.1470	-0.0308	-0.0116	-0.000074	-0.0947	-5.4911
No	2,494	2,485	2,481	2,489	2,475	2,463	2,489	2,436
R-squared	0.5058	0.1903	0.1546	0.2601	0.2504	0.2723	0.2734	0.2494
Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	5.2629*	-1.2946	-1.5988	0.1297	0.000012	0.000010	-0.3392	-1.0310
No	2,509	2,500	2,496	2,504	2,490	2,478	2,504	2,451
R-squared	0.5085	0.2028	0.1602	0.3043	0.2577	0.2961	0.2503	0.2892
Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	4.7793	0.4706	0.5863	0.1603	0.0099	0.000031	-0.4253	1.6900
No	2,509	2,500	2,496	2,504	2,490	2,478	2,504	2,451
R-squared	0.5198	0.1681	0.1339	0.2879	0.1682	0.3165	0.2411	0.3044
Panel B 2004 - 2007								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-3.4519	-5.1449	-5.4156	-0.8450	-0.0667	-0.000119	-0.2820	0.1290
2	1.4302	0.3622	0.2190	-0.2117	-0.1186	-0.000068**	0.6906	-6.5725***
3	1.2908	0.2576	-0.1116	-0.0940	-0.1725**	-0.000071**	0.5496	-5.729***
4	0.4304	0.4594	0.2111	-0.0971	-0.1664**	-0.000064*	0.5313	-6.4062***
5	0.6811	1.2412	0.4458	-0.2674	-0.1201	-0.000039	-0.0159	-5.3557**
6	-8.3358	0.6628	0.1849	-0.1144	-0.1769	-0.000049	-0.5844	-6.5488*
No	2,886	2,869	2,864	2,857	2,852	2,879	2,880	2,890
R-squared	0.0868	0.014	0.0039	0.0009	0.0002	0.2191	0.0148	0.186
Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	2.8484	0.2446	0.0635	0.0790	-0.1040	-0.000049	0.5728	-6.1959**
No	2,895	2,878	2,872	2,866	2,861	2,888	2,889	2,899
R-squared	0.197	0.0049	0.0012	0	0.0026	0.1933	0.0521	0.1676
Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	1.8079	2.0609	1.5063	0.1973	-0.0037	0.000008	-0.1381	-1.9114
No	2,895	2,878	2,872	2,866	2,861	2,888	2,889	2,899
R-squared	0.2317	0.0014	0.0002	0.002	0.0011	0.1891	0.0379	0.173

Panel C 2008 - 2011								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-3.1108	-4.7100	-4.3658	-0.7867	-0.1077	-0.000102	-1.6760	-8.1507
2	1.6055	1.5953	1.9374	0.0330	-0.0575	-0.000028	-1.5746***	-2.1631
3	0.8277	2.1988*	2.4114*	0.1499	-0.0239	-0.000007	-1.7293***	-2.6455
4	1.9131	2.8701**	3.7651**	0.2499	-0.0102	0.000003	-1.3474**	-0.7758
5	3.9377	3.6844**	4.7636***	0.4034	-0.0067	0.000015	-1.5204**	-0.1885
6	-1.3025	1.8899	2.6890	0.2524	-0.0694	-0.000004	-0.9551	-2.7712
No	3,568	3,539	3,538	3,547	3,545	3,543	3,565	3,539
R-squared	0.1866	0.0957	0.0741	0.06	0.0297	0.1416	0.223	0.1504
Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	2.1910	0.4642	0.5471	0.0954	0.0032	0.000018	-1.0091	0.9162
No	3,579	3,550	3,549	3,558	3,556	3,554	3,576	3,550
R-squared	0.1921	0.1536	0.161	0.1079	0.0319	0.1713	0.259	0.1515
Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-0.5343	-1.4399	-1.4502	-0.1563	-0.0208	-0.000001	-1.1876**	-1.8406
No	3,579	3,550	3,549	3,558	3,556	3,554	3,576	3,550
R-squared	0.2443	0.1241	0.1073	0.0881	0.0095	0.1701	0.2594	0.1663
Panel D 2012-2019								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-1.7512	-1.2982	1.0288	-0.0202	0.0411	0.000002	-0.5714	0.1136
2	1.1307	0.4926	0.7116	0.0874	0.0191	-0.000005	0.1512	-0.6302
3	-0.3909	0.5241	0.5845	0.0323	0.0208	0.000005	-0.2705	-0.8345
4	-1.5600	0.6629	0.7007	-0.0211	0.0305	0.000003	0.1360	-0.6020
5	-1.8083	0.5937	0.6836	0.1322	0.0359	0.000005	0.0082	-0.5525
6	-0.5430	0.7853	0.7689	-0.1980	-0.0100	-0.000015	-1.3575**	-1.9250
No	8,484	8,430	8,436	8,435	8,433	8,457	8,406	8,473
R-squared	0.3063	0.0226	0.0219	0.0071	0.1245	0.0184	0.1513	0.0539
Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-0.3953	0.6302	0.7851	-0.0491	-0.0138	-0.00001	-0.5717	-0.2396
No	9,575	9,518	9,523	9,522	9,519	9,548	9,497	9,564
R-squared	0.3108	0.0072	0.0068	0.0074	0.0521	0.0177	0.1036	0.0241
Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-5.2017**	0.7769	0.8683	-0.1536	0.0181	-0.000021	0.1195	-3.1324*
No	8,499	8,445	8,451	8,450	8,448	8,472	8,421	8,488
R-squared	0.331	0.0093	0.0105	0.0061	0.0559	0.0138	0.154	0.0391

Panel E 2020								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	7.0951	0.7760	0.8557	0.2353	-0.0780	0.000090	0.7506	7.2772
2	1.7082	-0.3760	-1.0080	-0.1816	-0.0770	-0.000002	0.6945	-0.6629
3	-2.0708	-1.3310	-0.4757	-0.6687**	-0.1222	-0.000036	-0.1120	-2.7239
4	0.7312	0.4464	0.6122	-0.1169	0.0391	0.000022	1.8691	1.0516
5	3.1620	-0.4919	-0.1883	-0.4482	-0.1549	-0.000004	0.4786	-1.3761
6	26.5896*	4.5483	4.9207	0.8756	0.1397	0.000119	-0.6911	7.9670
No	1,006	992	998	1,004	997	999	979	981
R-squared	0.5332	0.4019	0.3474	0.5875	0.6773	0.4289	0.4514	0.4276
Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-0.8862	-0.6137	-1.2435	-0.5322*	-0.0182	-0.000043	1.4941	-3.3577
No	1,008	994	1,000	1,006	999	1,001	981	983
R-squared	0.5022	0.3729	0.3236	0.5602	0.6571	0.3677	0.4082	0.3842
Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-11.8726*	0.0160	-3.4964	-0.9204	-0.2059	-0.000072	-1.1288	0.4567
No	1,008	994	1,000	1,006	999	1,001	981	983
R-squared	0.5029	0.3717	0.3253	0.5542	0.6587	0.367	0.4068	0.3817

This table shows the results of the sub-period analysis. First, the Andrews-Quandt (1993) and Bai-Perron (1998) tests suggest no significant structural breakpoints on the return of the Russell 3000 index from 1998 to 2020. This study then uses a graphical approach to determine the sub-periods, following Mullen and Berrill (2017) and O'Hagan-Luff and Berrill (2015). This study identifies five sub-period: 1998-2003, 2004-2007, 2008-2011, 2012-2019 and 2020. To save space, this study suppresses results for dependent variables and they are available in table A4-4 in the Appendix.

Although the results of the sub-period analysis are inconsistent with the main model, this study argues that may be because of a large number of 'unusual' financial events that occur during the sample period. This study further splits the sample period into pre-GFC (1998 to 2008) and post-GFC (2009 to 2020) and analyse the relationship in each sub-period. Table 4-13 shows that the ABHK model has significantly negative relationships with Div_6 and Div_8, while has a significantly positive relationship with Div_2, Div_3 and Div_7 before the GFC from 1998 to 2008. The percentage of foreign sales has significantly negative relationships with Div_5, Div_6 and Div_8, while has a significantly positive relationship with Div_1 and Div_3 before the GFC from 1998 to 2008. The percentage of foreign assets has a significantly positive relationship with Div_1 only before the GFC from 1998 to 2008.

All measures of multinationality do not have significant power in explaining the dividend policy after the GFC with the exception that the percentage of foreign sales has a significantly negative relationship with Div_7 after the GFC. These results may further support that the GFC changes the relationship between multinationality and dividend policy. During the GFC, due to sudden changes in macroeconomics, a large number of firms adjust their dividend policy (Balachandran & Nguyen, 2018).

According to Bliss et al. (2015), the financial/credit crisis driven by the GFC not only caused an increase in the cost of external funds but also a decrease in the supply of credit. They argue that firms tend to retain their operating cash flows in order to remain financially healthy by reducing dividend payouts.

Table 4-13 Pre and post-GFC analysis

Panel A 1998 - 2008								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	2.4070	0.3552	0.6726	0.2708	0.0199	0.000011	0.5643	2.7895
2	1.2703	1.1322**	1.5751***	0.1762	-0.0297	-0.000024*	0.7074***	-1.3208
3	3.2533**	1.4481***	1.8470***	0.1487	-0.0615**	-0.000022*	0.7246***	-1.6283*
4	1.6655	1.0385*	1.4797**	0.0118	-0.0820**	-0.000033**	0.6169**	-2.2708**
5	3.0020*	1.3655*	1.7308**	0.2329	-0.0449	-0.000024	0.8644**	-1.4336
6	-2.5350	1.0031	1.3883	-0.0121	-0.0977	-0.000055*	0.2474	-3.6487*
Firm Factors								
Stock Liquidity	0.0403	0.0860***	0.0556	0.0297***	0.0062***	-0.000001	0.0558***	-0.0455
Size	0.2303	0.1531	0.3363**	0.0338	-0.0263***	-0.000006**	0.0346	-0.3385*
Growth	0.0318***	0.0089**	0.0106**	0.0015*	0.0001	-0.000001*	0.0002	-0.0281***
Profitability	1.3173*	-0.4081	-0.7708**	0.1837***	0.0074	0.000014**	0.4474***	1.0138**
Cash	0.1981	-0.2115**	-0.3604***	-0.1143***	0.0130**	0.000002	0.0486	-0.3410*
Leverage	-0.3202	0.2090	0.2174	-0.0115	-0.0169**	-0.000009***	0.2203***	-0.2821
Lifecycle	0.2775	-0.0527	0.0418	0.0022	-0.0138**	-0.000004*	0.0461	0.0629
Risk (Beta)	-4.9680***	-0.8138***	-0.3867	-0.4464***	-0.1027***	-0.000071***	-0.3851***	-6.3382***
Tax	0.4651	-0.6567	0.1622	-0.0356	-0.0002	-0.000039**	-0.5959*	-3.2672***
No	6,133	6,100	6,091	6,092	6,072	6,090	6,119	6,074
R-squared	0.405	0.1526	0.1018	0.0827	0.0272	0.2403	0.1623	0.2252
Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	3.9499*	1.2501	1.6039*	0.1616	-0.0793*	-0.000034*	0.4486	-3.4876**
Firm Factors								
Stock Liquidity	-0.0115	0.0795***	0.0624**	0.0194***	0.0039**	-0.000001**	0.0470***	-0.0865*
Size	0.4511**	0.0496	0.1447	0.0703***	-0.0173***	-0.000003*	0.0345	-0.2891*
Growth	0.0160*	0.0082**	0.0093**	0.0016**	0.0001	-0.0000001*	-0.0004	-0.0252***
Profitability	1.3247**	-0.5266**	-0.8486***	0.1516***	0.0026	0.000008	0.3938***	0.5451
Cash	-0.0569	-0.1871**	-0.2636***	-0.1507***	0.0063	-0.000001	-0.0240	-0.2920**
Leverage	-0.5098*	0.2264**	0.2099*	-0.0215	-0.0102*	-0.000004	0.1987***	0.0389
Lifecycle	0.1697	-0.0135	0.0103	-0.0002	-0.0087*	-0.000002	0.1107***	0.1353
Risk (Beta)	-5.1277***	-0.7962***	-0.4828*	-0.4232***	-0.0848***	-0.000062***	-0.2369**	-5.8671***
Tax	0.5907	-1.0758**	-0.4660	-0.0876	0.0019	-0.000035***	-0.4385*	-2.7062***
No	6,159	6,126	6,116	6,118	6,098	6,116	6,145	6,100
R-squared	0.4176	0.1639	0.1129	0.136	0.0358	0.2623	0.1103	0.2567
Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	3.1316*	0.8395	1.0353	-0.0055	-0.0587	-0.000012	-0.1211	-1.3047
Firm Factors								
Stock Liquidity	0.0250	0.0667***	0.0512*	0.0181***	0.0041***	-0.000001*	0.0211*	-0.0865**
Size	0.1040	-0.0667	-0.0003	0.0287*	-0.0156***	-0.000004**	0.0069	-0.2877**
Growth	0.0146*	0.0048*	0.0057*	0.0014**	0.0001	-0.0000001*	-0.0006	-0.0229***
Profitability	1.2332***	-0.4218**	-0.6642***	0.1262***	0.0089	0.000008*	0.3449***	0.6221*
Cash	0.1796	-0.0772	-0.1251*	-0.1069***	0.0062*	0.000001	0.0166	-0.1813*
Leverage	-0.0918	0.2296**	0.2197**	-0.0016	-0.0032	-0.000002	0.2244***	0.2664*
Lifecycle	0.3613**	0.0280	0.0453	0.0138	-0.0023	-0.000001	0.1212***	0.1742*
Risk (Beta)	-4.9839***	-0.7555***	-0.5354**	-0.3946***	-0.0751***	-0.000055***	-0.3738***	-5.4413***
Tax	0.8805	-0.9913**	-0.5841	-0.0602	0.0006	-0.000027***	-0.3861*	-2.2141***
No	6,159	6,126	6,116	6,118	6,098	6,116	6,145	6,100
R-squared	0.425	0.1424	0.0999	0.1147	0.0435	0.2381	0.1359	0.2527

Panel B 2009 - 2020								
ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-0.9810	-2.6658**	-1.8342	-0.3548	-0.0389	-0.000026	-0.6275	0.4422
2	1.1890	-0.2090	-0.8016*	0.0017	0.0096	-0.000004	0.0237	1.1009
3	0.5931	-0.1913	-0.4994	-0.0338	0.0281	-0.000006	-0.5522*	0.4829
4	-0.9793	-0.0114	-0.3824	-0.1002	0.0226	-0.000006	-0.3011	0.5264
5	-1.5156	-0.0830	-0.2687	-0.0557	0.0182	0.000005	-0.5179	1.2509
6	-2.3884	-0.3290	-0.3986	-0.3806**	-0.0284	-0.000022	-1.1858**	-0.3548
Firm Factors								
Stock Liquidity	-0.0961	0.0247	0.0174	-0.0075	-0.0033*	0.000001	-0.0951***	0.0689
Size	-0.0772	-0.0560	-0.1234	-0.0257	-0.0087*	-0.000008***	-0.0954*	-0.6634***
Growth	0.0039	0.0055*	0.0062*	0.0013*	0.0008***	-0.000001	0.0051**	-0.0145**
Profitability	0.3016	-0.7612***	-0.9314***	0.0252	-0.0005	0.000001	-0.0230	-0.6343*
Cash	0.4997***	-0.0936*	-0.0959	-0.0445***	0.0099***	0.000001	0.1066**	0.0614
Leverage	-0.1184	0.2314**	0.3087***	-0.0001	-0.0020	0.000006***	0.2231***	0.8594***
Lifecycle	0.0664	-0.0226	0.0028	-0.0010	-0.0101***	-0.000002	0.0723*	0.1775*
Risk (Beta)	-3.8535***	-0.4048*	-0.3540	-0.3679***	-0.0895***	-0.000042***	-0.2366	-2.8339***
Tax	0.8531	-0.2212	-0.2304	-0.0413	0.0078	-0.000002	0.0927	-1.0613
No	12,305	12,215	12,226	12,240	12,230	12,251	12,200	12,245
R-squared	0.3239	0.038	0.0257	0.028	0.1044	0.0498	0.0826	0.0324
Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-0.2899	0.1670	-0.0252	-0.1486	0.0033	-0.000008	-0.7005*	0.0402
Firm Factors								
Stock Liquidity	-0.0648	0.0102	0.0167	-0.0056	-0.0031**	0.000001*	-0.0968***	0.1033**
Size	-0.0795	0.0041	-0.0524	-0.0077	-0.0105***	-0.000008***	-0.0541	-0.6778***
Growth	-0.0050	0.0053**	0.0049*	0.0011*	0.0006***	-0.0000001	0.0029	-0.0171***
Profitability	0.6230*	-0.7722***	-0.9976***	0.0510	0.0038	0.000003	0.0429	-0.3474
Cash	0.4378***	-0.1362***	-0.1291**	-0.0729***	0.0076***	0.0000004	0.0690*	-0.0318
Leverage	-0.0438	0.1378*	0.1916**	-0.0023	-0.0023	0.000006***	0.1792***	0.7726***
Lifecycle	0.2095*	0.0293	0.0421	0.0093	-0.0055**	-0.000001	0.0552*	0.1773**
Risk (Beta)	-4.2362***	-0.4207**	-0.4334*	-0.3729***	-0.0741***	-0.000044***	-0.3586**	-3.3141***
Tax	0.9222	-0.4728	-0.5665	-0.0470	-0.0119	-0.000005	0.0126	-1.3014*
No	12,331	12,241	12,252	12,266	12,256	12,277	12,226	12,271
R-squared	0.3124	0.0224	0.0148	0.022	0.0527	0.0433	0.0755	0.0347
Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-2.1053	0.0658	-0.0671	0.0414	0.0418	-0.000007	0.1900	-2.0035
Firm Factors								
Stock Liquidity	-0.0844*	0.0218	0.0135	-0.0032	-0.0018	0.000001**	-0.1012***	0.0951**
Size	-0.0693	-0.0301	-0.0687	0.0017	-0.0087***	-0.000008***	-0.0389	-0.7391***
Growth	0.0010	0.0047**	0.00433*	0.0014***	0.0006***	-0.0000001	0.0032*	-0.0206***
Profitability	0.7419**	-0.8356***	-1.0418***	0.0467	0.0056	0.000002	0.0698	-0.5124*
Cash	0.3907***	-0.1188***	-0.1132**	-0.0821***	0.0045*	0.0000004	0.0821***	0.0001
Leverage	0.1376	0.1391*	0.1901**	0.0047	-0.0028	0.000006***	0.1547***	0.7156***
Lifecycle	0.1642*	0.0298	0.0469	0.0136	-0.0055**	-0.0000003	0.0176	0.1750**
Risk (Beta)	-4.5755***	-0.5539***	-0.5331***	-0.3543***	-0.0704***	-0.000041***	-0.3622***	-3.0868***
Tax	0.5178	-0.3161	-0.3923	-0.0455	-0.0041	-0.000004	-0.0002	-1.0894*
No	12,331	12,241	12,252	12,266	12,256	12,277	12,226	12,271
R-squared	0.3225	0.02	0.0123	0.0181	0.0461	0.0353	0.0781	0.0275

This table shows the regression results of pre and post-GFC analysis. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

4.5.4 Alternative measures of multinationality

As a further robustness check, this study estimates the model using three alternative measures of multinationality: the Herfindahl concentration index (HHI), the Entropy measure and the number of geographic segments. These three measures have been widely used in existing studies (Keig et al., 2019; Kirca et al., 2011a; Qian et al., 2008). Results are reported in Table 4-14. All three multinationality measures have significant negative impacts on dividend policy. More specifically, the HHI has significant negative impacts on common cash dividends (Div_1), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8), while the Entropy and the number of geographic segments have a significant negative impact on dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend pay-out per share (Div_7) and dividend yield (Div_8). Along with the results of the control variables, the regression results using these alternative measures of multinationality are consistent with the main model in general. This study concludes that the findings are robust across alternative measures of multinationality.

Table 4-14 Additional measures of multinationality

Panel A - Using HHI as an additional measure of multinationality								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
1-HHI	-1.7416*	0.406	0.0185	-0.3045***	-0.1006***	-0.000071***	-3.0475***	-4.4427***
Stock Liquidity	-0.0454	0.0356*	0.0298	0.0032	-0.0017	-0.000002**	-0.1013***	-0.0875**
Size	-0.0909	0.0112	-0.0097	-0.0003	-0.0202***	-0.000011***	-0.1219***	-0.7744***
Growth	-0.002	0.0061***	0.0055**	0.0012**	0.0005***	-0.000001**	0.0031*	-0.0221***
Profitability	0.5949*	-0.7333***	-0.9949***	0.0568*	0.0014	-0.000001	-0.0493	-0.5084*
Cash	0.4801***	-0.1204***	-0.1175**	-0.0673***	0.0153***	0.000002**	0.1559***	0.060442
Leverage	-0.2733*	0.1146*	0.1423**	-0.0084	0.0003	0.000004***	0.2951***	0.7691***
Lifecycle	0.3558***	-0.0361	-0.0389	0.0035	-0.0014	-0.000001	0.1856***	0.1811**
Risk (Beta)	-5.3279***	-0.8929***	-0.9090***	-0.4955***	-0.0801***	-0.000061***	-0.5635***	-4.8931***
Tax	1.3906*	-0.1401	-0.0369	-0.0116	-0.013	-0.000016**	0.2294	-1.8118***
No	18,294	18,172	18,173	18,190	18,158	18,198	18,175	18,178
R-squared	0.3418	0.0958	0.085	0.118	0.0588	0.1066	0.1545	0.1187
Panel B - Using Entropy as an additional measure of multinationality								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
Entropy	-1.4609	0.6027	0.117	-0.3353***	-0.1057***	-0.000077***	-3.3319***	-5.2381***
Stock Liquidity	-0.0473	0.0386**	0.0331*	0.0021	-0.0018*	-0.000001**	-0.0981***	-0.0886**
Size	-0.0633	-0.0038	-0.0224	-0.004	-0.0203***	-0.000011***	-0.0998**	-0.7669***
Growth	-0.0051	0.0051**	0.0045*	0.0010**	0.0004***	-0.000001**	0.0026	-0.0227***
Profitability	0.5657*	-0.7224***	-0.9733***	0.0588*	0.0021	0.000002	-0.0245	-0.4001*
Cash	0.4917***	-0.0992**	-0.0974**	-0.0601***	0.0161***	0.000002**	0.1412***	0.054
Leverage	-0.3068*	0.1191*	0.1515**	-0.008	0.0004	0.000005***	0.2606***	0.7561***
Lifecycle	0.3231***	-0.0378	-0.036	0.0021	-0.0027	0.000006	0.1762***	0.1872***
Risk (Beta)	-5.2423***	-0.9054***	-0.9188***	-0.4833***	-0.0781***	-0.000057***	-0.4715***	-4.6928***
Tax	1.5856**	-0.1464	-0.0568	0.0144	-0.0011	-0.000015*	0.2177	-1.8832***
No	18,293	18,170	18,171	18,188	18,157	18,196	18,174	18,174
R-squared	0.343	0.0938	0.0854	0.1164	0.0528	0.1018	0.1521	0.1141
Panel C - Using the number of segments as an additional measure of multinationality								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
No Segments	-0.15	0.0076	-0.0234	-0.0285**	-0.0078**	-0.000006***	-0.2029***	-0.4163***
Stock Liquidity	-0.0392	0.0345*	0.0294	0.0024	-0.0016	-0.000001**	-0.0982***	-0.1021**
Size	-0.1602	-0.0341	-0.0458	-0.0078	-0.0212***	-0.000011***	-0.0975**	-0.7503***
Growth	-0.0113*	0.0036	0.003	0.0005	0.0002*	-0.000001**	0.001	-0.0227***
Profitability	0.5541	-0.7219***	-0.9921***	0.0681*	0.0056	0.000002	0.0241	-0.2819
Cash	0.5676***	-0.0754*	-0.0776	-0.0548***	0.0174***	0.000003**	0.1629***	0.0569
Leverage	-0.2909*	0.1311*	0.1629**	0.0015	0.0026	0.000005***	0.3047***	0.7755***
Lifecycle	0.2461**	-0.0443	-0.0373	0.0012	-0.0029	-0.000001	0.1831***	0.1227*
Risk (Beta)	-5.3741***	-0.9342***	-0.9576***	-0.4931***	-0.0802***	-0.000056***	-0.4121***	-4.6105***
Tax	1.8038*	-0.052	0.0598	0.044	-0.0017	-0.000014*	0.3652	-1.5428**
No	18,490	18,367	18,368	18,384	18,354	18,393	18,371	18,371
R-squared	0.3469	0.101	0.0924	0.1188	0.0588	0.1012	0.1561	0.1144

This table shows the regression results for alternative measures analysis. As a further robustness check, this study estimates the model using three alternative measures of multinationality: the Herfindahl concentration index (HHI_2), the Entropy (Entropy_2) measure and the number of geographic regions. The dependent variables are common cash dividends (Div_1), dividends to net income (Div_2), dividends to net income plus extraordinary items (Div_3), dividends to total cash flows (Div_4), dividends to sales (Div_5), dividends to equity (Div_6), dividend payout per share (Div_7) and dividend yield (Div_8). The control variables are as follows: Stock liquidity is measured as the stock turnover ratio. Firm size is measured as the natural logarithm of total assets. Growth opportunity is measured as the market-to-book ratio of equity. Profitability is measured as the return on assets. Free cash flow is measured as the natural logarithm of total cash. Leverage is the total debt to total assets. A firm's life-cycle is the retained earning to book value of assets. Risk is the beta of the stock. Tax is the average tax ratio. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. This study uses fixed effects regressions. *, **, and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

4.5.5 Endogeneity test

This study employs the Heckman (1979) two-stage model to estimate the impact of multinationality on dividend policy to correct for potential self-selection biases. In the first-stage selection model, this study calculates the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. Results (available in Table A4-5 in the Appendix) show that the inverse Mills ratio is statistically significant, which suggests that endogeneity may be less of a concern.

4.6 Conclusion

This Chapter investigates the relationship between multinationality and dividend policy using US data from 1998 to 2020. Previous research, almost exclusively using foreign sales or foreign asset ratios as the proxy of multinationality, finds mixed results in this relationship. This study extends previous research by applying a new classification scheme – the ABHK model – as a proxy of multinationality. This research is unaware of existing studies to test whether and how dividend policy is influenced by the geographic expansion of foreign sales. This study then compares the results with the commonly used total multinationality measures'.

This study finds a negative relationship between dividend policy and multinationality. It is found that the percentage of foreign sales has the strongest effect on dividend policy compared to the ABHK score and percentage of foreign assets. Moreover, this study finds that the negative relationship between dividend policy and the ABHK score does not increase gradually. This indicates that along with the increase in geographic sales, firms do not necessarily pay lower dividends. More specifically, this study finds that firms that have foreign sales only from one region pay the lowest dividends, while firms that have foreign sales from two regions pay the highest dividends. This study tests the

robustness of the results to alternative industrial, size, sub-period conditions, and additional measures of multinationality and endogeneity. The main result that multinationality is negatively related to dividend policy remains consistent across the robustness tests.

The results have important implications for both investors and firms. Given the adverse impact of the Covid-19 pandemic on cash flows and the tightening of global stock liquidity (Nicola et al., 2020), a strong and stable dividend payment is becoming ever more important to investors. Investors may achieve this by targeting domestic firms which may not easily be affected by foreign risks.

Chapter 5 Conclusions

5.1 Introduction

The Multinational Company (MNC) is one of the most important concepts across many business research domains. Multinational companies (MNCs) and domestic companies (DCs) have a significant difference in risk exposure, operational activities and financial activities. Despite the multinational companies (MNCs) prevalence in Business research, few studies consider their impact on other business domains while distinguishing between MNCs and DCs. Moreover, previous studies related to multinationality often produce conflicting results in many areas such as stock liquidity, capital structure and dividend payments. One explanation for the lack of consistency within the literature may be the difficulties arising from defining and measuring multinationality (Marshall et al., 2020). Although the percentage of foreign sales and the percentage of foreign assets have commonly been used as proxies of multinationality, there is no consistency within the literature (Aggarwal et al., 2011a).

The main contribution of this thesis is to use a more robust measurement of multinationality and investigate its impact on three financial subjects. The ABHK model that captures the breadth of multinationality differs from the percentage of foreign sales or assets which focuses on the total degree of multinationality. The three financial subjects are stock liquidity, capital structure and dividend policy which are major concepts in the finance research domain. Moreover, this thesis provides an alternative perspective on these three subjects by considering the LOF. This thesis contributes to a stronger integration of research on International Business and Finance and enriches the theoretical understanding of relevant phenomena in both domains. The remainder of this Chapter is organized as follows. Section 5.2 outlines the major findings of each topic on a chapter-by-chapter basis. Section 5.3 provides a summary of

the thesis's main findings. Section 5.4 describes the contributions and implications. Section 5.5 discusses the limitations of the thesis and provides some possible starting points for future research. Finally, Section 5.5 concludes.

5.2 Major findings

Chapter 2 finds a positive relationship between stock liquidity and total multinationality (measured using the percentage of foreign sales), while the relationship between stock liquidity and the breadth of multinationality (measured using the ABHK score) produces mixed results. More specifically, Chapter 2 finds a negative relationship between bid-ask spreads and the ABHK score, while price impact factors and trading volume are positively related to the ABHK score. Moreover, Chapter 2 finds that the positive relationship between stock liquidity and the ABHK score does not increase gradually but presents as an inverted horizontal-S-shaped trend. Chapter 2 finds an increase in stock liquidity at low and high levels of ABHK score, while a decrease at moderate levels. With mixed levels of significance, the results show that the industry analysis, size effect analysis, sub-period analysis, and alternative measures of multinationality and endogeneity are robust and consistent with the main findings. Finally, Chapter 2 finds that the multinationality-stock liquidity relationship has changed dramatically over time from a weak and insignificant relationship to a strong positive relationship.

Chapter 3 finds a positive relationship between capital structure and multinationality. More specifically, Chapter 3 finds that the ABHK score and the foreign sales ratio have a significant positive impact on short-term debt, while the foreign assets ratio has a significant positive impact on long-term and total debt. Chapter 3 finds that the relationship between the breadth of multinationality (the ABHK score) and capital structure is not linear. Chapter 3 further finds evidence that product diversification is an

important determinant of capital structure. With mixed levels of significance, the results are consistent across firms from different industries and sizes. Finally, this Chapter shows that the relationship between multinationality and firms' long-term and total debt has changed significantly since the global financial crisis (GFC) of 2008. The ABHK score and the foreign sales ratio are positively related to both long-term and total debt before the GFC, while they become negatively related to the long-term and total debt after the GFC. This suggests that there is a non-linear relationship between multinationality (the ABHK score and the foreign sales ratio) and capital structure (long-term and total debt). This Chapter provides evidence that using foreign sales and foreign asset ratios as a proxy for multinationality leads to differing results; and the ABHK model provides a more comprehensive and in-depth analysis of this relationship. Chapter 4 finds a negative relationship between dividend policy and multinationality. Moreover, it finds that this negative relationship between dividend policy-multinationality becomes more significant for medium and large firms based on the analysis. Chapter 4 finds that the percentage of foreign sales has the strongest effect on dividend policy compared to the ABHK score and percentage of foreign assets. Furthermore, Chapter 4 finds that the negative relationship between dividend policy and the ABHK score does not increase gradually. This indicates that as the breadth of geographic sales increases, firms do not necessarily reduce dividend payments. More specifically, Chapter 4 finds that firms that have foreign sales only in one region pay the lowest dividends, while firms that have foreign sales from two regions pay the highest dividends. With mixed levels of significance, results show that the industry analysis, size effect analysis, sub-period analysis, alternative measures of multinationality and endogeneity are robust and consistent with the main findings.

5.3 Contributions and Implications

5.3.1 Empirical contribution

The empirical contributions of this thesis are as follows: First, this thesis extends the literature on the relationship between multinationality – stock liquidity, multinationality – capital structure and multinationality – dividend policy by taking a more IB perspective, most notably in the approach to measuring multinationality. Second, in addition to the commonly used measures of total multinationality in the existing literature, such as the percentage of foreign sales or assets, this thesis applies the ABHK model which can capture the full geographic diversification benefits. Moreover, compared to the percentage of foreign sales or assets, the HHI and Entropy measures of multinationality and the number of geographic segments, the ABHK score is an ordinal variable and this thesis argues that it can provide a more in-depth analysis of these relationships. In particular, the ABHK score allows for identifying which level of geographic expansion of sales has the greatest impact on the stock liquidity, capital structure or dividend policy. This is important because it provides a more holistic view of the mechanism of this relationship. Third, with a broad set of multinationality proxies and independent variables, this thesis investigates which measures of multinationality have the strongest impact on stock liquidity, capital structure or dividend policy. Finally, this thesis finds that the GFC has had a significant and lasting impact on many relationships in Finance. For example, it changes the relationship between multinationality and capital structure from a positive relationship before the GFC to a negative one after the GFC. Moreover, multinationality has a significantly negative relationship with dividend payments before the GFC while this relationship becomes insignificant after the GFC. These findings complement and extend those of several recent papers, such as Bliss et al. (2015).

5.3.2 Theoretical contribution

While there have been significant theoretical developments in multinationality research, the impact of firm internationalization on financial subjects, such as stock liquidity, capital structure and dividend policy, has mainly been discussed within the finance domain. For instance, traditional finance theories, such as the bonding theory, the trade-off theory, the pecking order theory and the signalling theory, have been a major theoretical lens through which researchers investigate the impact of multinationality on financial subjects. For example, the key elements for previous literature that hypothesise the relationship between multinationality and dividend payments rests primarily on the bonding theory. Whether legal/regulatory bonding involves cross-listed firms being subject to more stringent laws and thus, providing their shareholders with better protection and stronger rights to pressure the managers to pay out dividends.

This thesis, therefore, contributes to the existing theory by re-articulating the theoretical foundations of internalization by integrating the liabilities of foreignness theory in the context of multinationality. This encourages researchers to employ from an International Business perspective in terms of costs and benefits associated with firm multinationality. For example, based on agency theory, the additional costs driven by the LOF may cause greater agency costs because it becomes more difficult to monitor managers in international markets (Reeb et al., 2001). For example, it is complex and costly for firms to provide multi-country financial statements and hire multi-country auditors (Reeb et al., 2001). Poor disclosure of a firm's earnings or poor earnings quality can result in differentially informed investors and thereby enhance the information asymmetry in financial markets as investors differ in their ability to process earnings-related information (Bhattacharya et al., 2013). This will widen the bid-ask spread and lower the stock liquidity (Attig et al., 2006). Moreover, the LOF are likely to

increase related costs such as transaction costs and costs associated with information collection, processing and dissemination (Chao & Kumar, 2010) which ultimately increases MNCs' default risk. Therefore, MNCs may have higher debt ratios to mitigate these higher information asymmetry and agency costs (Aggarwal & Kyaw, 2010). Furthermore, these additional costs may lower their retained earnings and reduce dividend payments (Balachandran et al., 2019). This thesis also answers the call of Puck and Filatotchev (2018) for future research on the overlap of finance and IB and cross-border contributions.

5.3.3 Implications for managers and investors

This thesis has important implications for both corporate managers and investors. First, as increasing stock liquidity is a primary motivation for managers' decisions to pursue internationalization (Chipunza & McCullough, 2018a), Chapter 2 is strongly related to the managerial decision-making process and provides empirical evidence that corporate managers could achieve this goal (increased stock liquidity) by expanding sales geographically. Second, consistent with Custódio et al. (2013) and Brockman et al. (2010), Chapter 3 provides empirical evidence that US multinationals usually hold more short-term debt and short-term debt has been used as a mechanism to discipline managers that reduces agency conflicts between managers and shareholders. Third, Chapter 4 provides empirical evidence that managers of US multinational firms are more likely to offer lower dividend payments to their shareholders. This is important for managers of multinational firms as multinationals are usually well-established firms with high free cash flow and limited investment opportunities, where dividends can be used to reduce the conflicts of interest between managers and stockholders (John et al., 2011). Fourth, firms selling abroad will face additional costs that come from the differences originating in cultural and political institutions (LOF). Managerial decisions,

from entering specific countries, the sequence of market entry, and the choice of entry mode to cross-border knowledge transfer and international human resource management, are critical in order to perform well in the international environment. Finally, by going through such process mentioned above, managers could gain international experience. For example, Nummela et al. (2004) find a positive relationship between the degree of internationalization and a managerial global mindset (i.e., proactive and visionary behaviour).

5.4 Limitations and Future Research

5.4.1 Limitations

There are some limitations to this thesis. First, this thesis does not apply the full version of the ABHK model. It solely measures the geographic spreads of sales. The full version of the ABHK model requires additional data on the geographical spread of subsidiaries in foreign countries. However, this data must be hand-collected annually and individually for each firm. This task is beyond the scope of this original investigation. This thesis, instead, used foreign assets as a proxy for subsidiaries. Second, Chapter 2 applies low-frequency stock liquidity proxies using daily data that may not fully reflect the stock liquidity measured using high-frequency intraday data. Stock liquidity can be measured using standard methods of cost dimension, quantity and time dimensions based on intraday trade and quotation data (Holden & Jacobsen, 2014). However, most standard measures of stock liquidity are difficult to compute as they require intraday data which is large and grows exponentially over time. The similar annual growth rate of trade and quotation data (32.8 percent per year for 37 exchanges) (Fang et al., 2014) and the computer's central processing unit performance (31 percent per year) (Hennessy & Patterson, 2012) make it difficult to compute standard measures of stock liquidity from intraday data (Holden et al., 2014). Hence, recent literature

proposes the use of low-frequency stock liquidity proxies calculated using daily data in order to save computational time compared to intraday data (Fong et al., 2017). Future research may consider higher-frequency data to test the robustness of our analysis.

Third, in Chapter 4, the regression results of some of the control variables are inconsistent with the majority of existing studies. For example, it is found that firm size is negative and statistically significant in explaining some dividend proxies. These results may imply that larger firms prefer to pay fewer dividends. However, previous papers such as Brockman et al. (2014) and Rangvid et al. (2014) all find a positive relationship as larger firms usually have more resources to distribute to their shareholders (Akhtar, 2018a; H. K. Baker et al., 2008). Similarly, it is found that overall firms with high growth opportunities pay high dividends. Although the pecking order theory predicts that firms with high growth opportunities should retain more earnings for future investments and pay fewer dividends (Aggarwal & Kyaw, 2010), these results are consistent with Herron and Platt (2021) who also find a positive coefficient but small in magnitude. Future research will investigate this relationship further. Next, according to the pecking order theory proposed by Myers and Majiuf (1984), firms finance new investments first with retained earnings, then with debt and finally with equity. With the increase in the breadth of multinationality, MNCs should have additional free cash flows that come from sales in other countries. Therefore, it is reasonable to inform that leverage decreases with the increase of the breadth of multinationality as MNCs should have enough cash on hand to finance new investments. However, the study in Chapter 3 finds a positive relationship between leverage and the breadth of multinationality. This may be of interest to future research investigating the impact of pecking order theory on this relationship. Similarly, according to the agency theory proposed by Jensen and Meckling (1976), the availability of free cash flow

creates an agency problem between managers and shareholders since managers can use some of the free cash available for their benefit, such as overinvestment. Paying dividends could help to control the agency costs of overinvestment if there are conflicts of interest between managers and stockholders (Aggarwal & Kyaw, 2010). Thus, given that firms' free cash flow increases with the breadth of multinationality, the agency theory predicts that there should be a positive relation between the breadth of multinationality and dividend payments. However, the study in Chapter 4 finds a negative relationship. Future research could further investigate this inconsistency. Finally, one possible explanation of the above issue could be that corporate capital structure is determined simultaneously with its dividend policy. Aggarwal and Kyaw (2010) propose that studies that examine the impact of multinationality on capital structure should also account for the impact of dividend policy. They argue that firm's dividend payment determines its retained earnings which link to the firm's financing decision thus, its capital structure. Future research can use simultaneous equation models (such as a two-stage least square (2SLS) or a three- stage least square (3SLS)) to do further investigation.

5.4.2 Recommendation for future research

While the thesis has examined the impact of multinationality on three financial subjects from a more International Business view, there is still a need for further research to continue on these topics. First, future research could apply the full version of the ABHK model which contains both the geographic spreads of sales data and the geographical spread of subsidiaries data. It may provide a more detailed investigation into the three topics or beyond. Second, future research could involve a larger dataset, such as a global dataset looking at European and Asia markets. Third, future research may investigate a method to measure stock liquidity based on intraday data which will

provide an alternative and possibly more robust analysis of this topic. Moreover, future research may investigate this relationship using data from other markets as the US market is quote-driven and only displays the bid and ask offers for security from designated market makers, dealers, or specialists. This differs from the order-driven market. For example, the UK market is order-driven where buyers and sellers can place orders for securities they wish to purchase or sell. Fourth, Chapter 4 of this thesis finds a negative relationship between dividend payments and multinationality. This result may show strong support for the substitution hypothesis proposed by La Porta et al. (2000) which argues that the strong legal protection, given that US shareholders are highly protected from corporate expropriation, may substitute for higher dividend payments. Alternatively, La Porta et al. (2000) and Akhtar (2018a) propose that this may negative relationship be because most large corporations, in the United States, the U.K., Canada, and Australia, have their ownership largely dispersed and are to a significant extent controlled by their managers. Future research can investigate whether such a decrease in dividend payments could be due to the strong legal protection to shareholders, dispersed ownership or a combination of both. Therefore, it would be interesting to investigate the possible sources of the decrease in dividend payments. Furthermore, there may be a possibility of splitting the data and comparing this relationship between US firms and firms from other countries that cross-list in the US. Although this study uses the constituents of the Russell 3000 as the sample, it includes firms from other countries that cross-list in the US market. Firms from other countries cross-list into the US market may have an alternative dividend policy. For example, firms that cross-list in higher reputational and/or legal/regulatory countries pay higher dividends as they provide their shareholders with better protection and stronger rights to influence corporate management to pay higher dividends, according to the bonding

theory (Huang et al., 2016). As another example, based on the substitution hypothesis proposed by La Porta et al. (2000), firms cross-listed in a more developed market may pay lower dividends as the strong legal protection for shareholders may substitute for higher dividend payments. Therefore, it may be worth splitting the data and comparing this relationship between US firms and firms from other countries. Another possibility may be to split the data based on firms' dividend type. A firm can have a stable dividend payment that pays a fixed amount of dividends regularly or has a residual dividend payment which distributes dividends only after fulfilling their financial obligations and investment requirements or maintains a consistent dividend payout relative to the company's earnings or pays no dividends. It may be of interest to compare this relationship between different types of dividend payments. Finally, it may be of interest to future research on several avenues in relation to multinationality, such as the relationship between multinationality and the gender composition of corporate boards, multinationality and firms' cash holdings and multinationality and the composition of firms' ownership.

5.5 Conclusions

This Chapter draws together the main findings, contributions, implications, limitations and possible areas for future research from the thesis. The primary conclusion to emerge from the thesis is that more consistency is required in the measurement of multinationality.

This thesis applies a more consistent measure of multinationality to three existing works of literature where conflicting results existed both theoretically and empirically.

Chapter 2 analyses the relationship between multinationality and stock liquidity;

Chapter 3 analyses the relationship between multinationality and capital structure;

Chapter 4 analyses the relationship between multinationality and dividend policy.

Furthermore, the LOF provides theoretical support for the integration of research from the International Business and Finance area. By offering a more IB-relevant model and theory, this thesis provides a more in-depth analysis attempting to resolve the conflicting arguments on these three topics and intends to contribute to a stronger integration of research on International Business and Finance.

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APPENDIX

Table A2-1 The ABHK and stock liquidity determinants across four stock liquidity measurements - Interaction terms

	CPQS	Illiquidity	Amivest	Volume
Interaction terms				
ABHK*Volatility				
1	0.1974	-0.0013	6.2455	3.3882174
2	-0.5248*	-0.0007	-1.7425	4.1925***
3	-0.8646***	-0.0013	-1.8760	1.6546*
4	-0.3797	0.0008	-4.5339	4.2458***
5	-0.7400*	-0.0021	-9.3098**	2.1571*
6	-1.9981**	-0.0051	-7.3514	7.1968***
ABHK*Turnover				
1	-1.8151**	0.0011	-15.2538*	-9.0371***
2	0.4589	0.0018	-3.6484	-7.5087***
3	0.4506	0.0046**	-3.0598	-6.9033***
4	0.0571	0.0046*	-1.5466	-6.5881***
5	0.2933	0.0033	-4.9164	-3.7737**
6	2.2417**	-0.0031	2.4804	-2.6054
ABHK*Assets				
1	0.0178	0.0000	-0.0408	-0.0397
2	0.0042	0.0001***	-0.3528***	-0.2113***
3	0.0091	0.0001***	-0.3824***	-0.2260***
4	-0.0059	0.0002***	-0.3289***	-0.2933***
5	-0.0177	0.0001**	-0.3203**	-0.2445***
6	-0.02979518*	0.0002*	-0.3923*	-0.3221***
ABHK*Growth				
1	-0.0029	0.0000	0.0243	-0.0040
2	-0.0024***	0.0000	0.0060	-0.0087***
3	-0.0014	0.0000	-0.0015	0.0045
4	-0.0015	0.0000	0.0067	-0.0031
5	-0.0004	0.0000	-0.0202	-0.0203***
6	-0.0001	0.0000	-0.0244	-0.0182***
ABHK*Leverage				
1	-0.0893*	0.0002	-0.2362	0.1762
2	-0.0100	-0.0001	0.0393	0.1236*
3	-0.0063	-0.0001	0.2606	0.1255*
4	-0.0351*	-0.0002	0.0908	0.2421***
5	-0.0813***	-0.0003	0.1412	0.2398**
6	-0.1156**	-0.0005*	0.2754	0.56403***
ABHK*Analyst				
1	0.0002	0.0000	0.0117	-0.0061
2	-0.0017**	0.0000	0.0151**	0.0058**
3	-0.0032***	0.0000	0.0100	0.0009
4	-0.0031***	0.0000	0.0010	0.0040
5	-0.0017*	0.0000	-0.0007	-0.0028
6	-0.0002	0.0000	0.0144	-0.0023

Table A2-2 Percentage of Foreign Sales and stock liquidity determinants across four stock liquidity measurements – Interaction terms

	CPQS	Illiquidity	Amivest	Volume
Interaction terms				
FS*Volatility	-1.0063***	0.0014	-5.0135	4.3592***
FS*Turnover	0.5921	0.0101***	-2.1210	-3.9544**
FS*Assets	0.0002	0.0004***	-0.4723***	-0.4784***
FS*Growth	-0.0022*	0.0000	-0.0115	-0.0081*
FS*Leverage	-0.0749***	-0.0005***	0.7500***	0.3841***
FS*Analyst	-0.0023**	0.00001*	0.0026	0.0037

Table A2-3 Industry analysis – Service Firms

Panel A The ABHK and stock liquidity determinants across four liquidity measurements - Service Firms				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.0119	-0.0013	1.9658	2.1877*
2	-0.1852*	-0.0001	4.1304***	2.4686***
3	-0.2022*	-0.0007	3.2210***	2.8468***
4	-0.0676	-0.0011**	3.4510***	3.9380***
5	0.1957	-0.0006	2.1259	2.9974***
6	0.3073	-0.0012	4.9703*	3.8220***
Firm Factors				
Volatility	0.5128**	-0.0020*	-9.5399***	9.9646***
Turnover	-1.6170***	-0.0093***	35.4844***	49.7552***
Assets	-0.0055	-0.0003***	0.8367***	1.0620***
Growth	0.0018***	-0.000006*	0.0099	0.0131***
Leverage	0.0136	0.000058	-0.2061	-0.3198***
Analyst	0.0032***	-0.000005	0.0191**	0.0008
R-squared	0.2198	0.0501	0.3877	0.6412
Number of obs	11,000	11,049	10,924	11,040
Panel B The FS and stock liquidity determinants across four liquidity measurements - Service Firms				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.2661*	-0.0023***	4.9912***	6.4821***
Volatility	-0.6512***	-0.0027***	-8.8456***	11.5247***
Turnover	-0.9584***	-0.0085***	31.2483***	39.7841***
Assets	-0.0068	-0.0003***	0.7674***	1.0107***
Growth	0.0012**	-0.000007**	0.0159***	0.0141***
Leverage	0.0372***	0.000076	-0.4212***	-0.3010***
Analyst	0.0017***	-0.000009***	0.0148**	-0.0009
R-squared	0.2594	0.0495	0.4529	0.6199
Number of obs	10,537	10,586	10,435	10,566

This table shows the regress results of industry analysis for Service firms. This study categorises firms using the Global Industry Classification Standard (GICS) as compiled by Standard & Poor. This study excludes financial firms and further classifies firms from communication services, health care, information technology and real estate industries as service firms. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented.

Table A2-4 Industry analysis – Non-Service Firms

Panel A The ABHK and stock liquidity determinants across four liquidity measurements - NON-Service Firms				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.0056	-0.0013	-0.9611	-0.6772
2	0.1871*	-0.0027***	2.5266**	0.9523***
3	0.3073***	-0.0025***	3.8547***	1.2590***
4	0.3586***	-0.0031***	3.1717**	1.2376***
5	0.47388***	-0.0032***	3.8403**	1.2965**
6	0.5252**	-0.0031*	2.8445	0.9464
Firm Factors				
Volatility	1.1266***	-0.0095***	-8.3993***	13.6751***
Turnover	-1.3911***	-0.0155***	26.3958***	36.8282***
Assets	0.0175*	-0.0008***	0.8166***	0.8467***
Growth	-0.0008	-0.000017***	0.0093	0.0142***
Leverage	0.1091***	0.000727***	-0.5444***	-0.6147***
Analyst	0.0005	-0.000002	0.0151**	0.0184***
R-squared	0.5049	0.096	0.4331	0.7189
Number of obs	14,690	14,710	14,754	14,961
Panel B The FS and stock liquidity determinants across four liquidity measurements - Non-Service Firms				
	CPQS	Illiquidity	Amivest	Volume
FS	0.5539***	-0.0075***	3.8232**	1.5921**
Volatility	0.1314	-0.0071***	-16.1038***	11.2440***
Turnover	-1.1133***	-0.0148***	17.4805***	28.9807***
Assets	0.0249***	-0.0007***	0.5803***	0.8003***
Growth	-0.0010*	-0.000016***	0.0133**	0.0085***
Leverage	0.1003***	0.000701***	-0.2495*	-0.4443***
Analyst	-0.0004	-0.000005	0.0342***	0.0198***
R-squared	0.5083	0.0929	0.4772	0.7187
Number of obs	14,100	14,105	14,096	14,344

This table shows the regress results of industry analysis for Non-Service Firms. This study categorises firms using the Global Industry Classification Standard (GICS) as compiled by Standard & Poor. This study excludes financial firms and further classifies firms from communication services, health care, information technology and real estate industries as service firms. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented.

Table A2-5 Size analysis – Small-sized firms

Panel A - The ABHK and stock liquidity determinants across four liquidity measurements - Small-size firms

	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.3586	0.0007	2.8948	2.4321
2	-0.3374*	-0.0004	4.1114**	3.5642***
3	-0.3530*	-0.0024	0.6198	3.5874***
4	-0.0414	-0.0021	2.2507	3.4625***
5	0.0648	-0.003	2.1756	4.0100***
6	0.6895	-0.0026	6.3959	7.8811***
Firm Factors				
Volatility	1.1290***	-0.0047*	-5.6279**	10.8128***
Turnover	-1.3705***	-0.0202***	37.8324***	54.3505***
Assets	-0.0227*	-0.0004***	0.7447***	1.0701***
Growth	0.0005	-0.000008	0.00858	0.0149***
Leverage	0.0099	0.0003*	-0.0861	-0.2236***
Analyst	0.0027***	-0.000014*	0.0387***	0.0181***
R-squared	0.088	0.0657	0.315	0.56
Number of obs	8167	8076	8138	8248

Panel B - The FS and stock liquidity determinants across four liquidity measurements - Small-size firms

	CPQS	Illiquidity	Amivest	Volume
FS	-0.5448**	-0.0039*	4.1449*	4.8592***
Volatility	0.0961	-0.0061***	-6.3065***	11.3551***
Turnover	-0.8111***	-0.0171***	31.9045***	43.7353***
Assets	-0.0202*	-0.0004***	0.8195***	1.0054***
Growth	0.0002	-0.00001*	0.0195***	0.0163***
Leverage	0.0111	0.0003**	-0.0863	-0.1407**
Analyst	0.0012*	-0.000018**	0.0367***	0.0251***
R-squared	0.1392	0.0765	0.3305	0.5403
Number of obs	7,881	7,797	7,815	7,954

This table shows the regression results of small-sized firms. This study segregates the sample into three groups based on annual sales figures. This study analyses the stock liquidity-multinationality relationship for large, medium and small firms. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding.

Table A2-6 Size analysis – Medium-sized firms

Panel A - The ABHK and stock liquidity determinants across four liquidity measurements - Medium size firms				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	1.1789**	-0.0094***	1.0712	2.332346
2	-0.0332	-0.0012	1.8195	1.5793**
3	-0.1569	-0.0017	2.7869	1.4359**
4	-0.3146	-0.0042***	3.1401	4.5573***
5	0.325	-0.0043*	-0.267	3.6946***
6	0.044	-0.0037	12.6941**	4.3192***
Firm Factors				
Volatility	0.4799*	-0.0016	-10.3532***	11.2826***
Turnover	-1.2717***	-0.0094***	26.6010***	39.8681***
Assets	0.0133	-0.0006***	0.8301***	0.8098***
Growth	-0.0018*	-0.000007	0.0055	0.0121***
Leverage	0.0711***	0.0003*	-0.5432**	-0.4828***
Analyst	-0.0001	-0.000002	0.0063	0.0235***
R-squared	0.4712	0.0701	0.2915	0.6051
Number of obs	8904	8956	8903	9046
Panel B - The FS and stock liquidity determinants across four liquidity measurements - Medium size firms				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.1594	-0.0048**	0.9896	6.5855***
Volatility	-0.2358	-0.0027*	-13.3910***	11.6004***
Turnover	-0.7176**	-0.0108***	20.2290***	29.9880***
Assets	0.0175	-0.0005***	0.6084***	0.8062***
Growth	-0.0011	-0.000008	0.0058	0.0095***
Leverage	0.0882***	0.0004***	-0.4374**	-0.4645***
Analyst	-0.0001	-0.000005	0.0279***	0.0231***
R-squared	0.4776	0.0741	0.3197	0.5749
Number of obs	8,518	8,554	8,493	8,636

This table shows the regression results of medium-sized firms. This study segregates the sample into three groups based on annual sales figures. This study analyses the stock liquidity-multinationality relationship for large, medium and small firms. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding.

Table A2-7 Size analysis – Large-size firms

Panel A - The ABHK and stock liquidity determinants across four liquidity measurements - Large-size firms				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.2236	-0.0003	-1.5182	-0.2161
2	-0.1994	-0.0008*	3.9009**	2.3524***
3	-0.2011	-0.0011**	4.1323**	3.3323***
4	-0.5148***	-0.0007	2.8601	3.0679***
5	-0.7655***	-0.0023***	4.6203**	4.3072***
6	-0.7493***	-0.0021**	4.2445	4.6843***
Firm Factors				
Volatility	0.6206*	0.0006	-6.9983*	13.5756***
Turnover	-1.1008***	-0.0058***	22.9694***	28.7819***
Assets	-0.0368***	-0.0002***	0.6626***	0.7229***
Growth	0.0012	-0.000001	0.0068	0.0054
Leverage	0.1350***	0.0001	-0.7398**	-0.8705***
Analyst	0.0016**	-0.000005**	-0.0003	0.0011
R-squared	0.6341	0.0397	0.3465	0.415
Number of obs	8381	8493	8401	8472
Panel B - The FS and stock liquidity determinants across four liquidity measurements - Large-size firms				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.7681***	-0.0031***	4.5399*	5.3531***
Volatility	-0.6748**	0.0005	-4.4263	10.6650***
Turnover	-0.9308***	-0.0059***	17.1673***	24.9114***
Assets	-0.0247*	-0.0002***	0.4799***	0.6117***
Growth	-0.00001	0.0000002	0.0098	0.0019
Leverage	0.1392***	0.0002***	-0.6490***	-0.7286***
Analyst	0.0001	-0.000006***	0.0143**	0.0032*
R-squared	0.6255	0.0364	0.3628	0.402
Number of obs	8,017	8,121	8,004	8,102

This table shows the regression results of large-sized firms. This study segregates the sample into three groups based on annual sales figures. This study analyses the stock liquidity-multinationality relationship for large, medium and small firms. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding.

Table A2-8 Subperiod analysis

Panel A - Subperiod 1: 1998 - 2003

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	-0.3108	-0.0061	-4.1065	-3.8754*
2	0.1732	-0.0018	-2.0597	0.2048
3	-1.0647*	0.000032	-1.2989	-0.9102
4	-0.0629	-0.0063*	-3.695	-0.6557
5	0.0865	0.0005	1.3509	-0.7685
6	1.0879	-0.0067	8.6795	-0.9003
Firm Factors				
Volatility	5.3243***	-0.0129**	-19.0922***	9.1563***
Turnover	0.4862	-0.0072	16.5622***	13.4143***
Assets	-0.0959*	-0.0012***	0.1812	0.8846***
Growth	0.0177***	-0.000007	0.0134	0.0122*
Leverage	-0.2020*	0.0008	-0.4395	-0.4553**
Analyst	-0.0044	-0.000011	-0.0046	0.0205***
R-squared	0.1433	0.0973	0.2565	0.667
Number of obs	3,574	3,647	3,716	3,748
FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-1.8458	-0.0207**	31.7326***	-1.5385
Volatility	4.2065***	-0.0116*	-3.4999	13.1362***
Turnover	0.4008	-0.0106**	13.7045***	12.1088***
Assets	-0.1403**	-0.0016***	1.0191***	0.9508***
Growth	0.0141***	-0.00002	0.0481**	0.0092*
Leverage	-0.1758*	0.0015**	-1.3667**	-0.4415***
Analyst	-0.0003	-0.00001	0.0198	0.0245***
R-squared	0.1299	0.1177	0.0477	0.6821
Number of obs	3,284	3,352	3,411	3,442

Panel B - Subperiod 2: 2004 - 2007

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.8081	-0.0013	12.1718	-0.1859
2	0.1916	-0.0024	7.3196*	1.2658*
3	0.2258	-0.0015	11.0344***	0.1729
4	0.1121	-0.0024	13.8671***	2.4085***
5	-0.071	-0.0021	17.5638***	2.2369**
6	0.707	-0.0037	16.4433*	1.4477
Firm Factors				
Volatility	-4.4735***	-0.0174***	19.9385*	22.5284***
Turnover	-1.9464*	-0.0136***	23.8883***	32.5210***
Assets	0.0035	-0.0002	1.6719***	1.0350***
Growth	-0.0029	-0.00002**	0.0324	0.0241***
Leverage	0.1177*	0.0002	-0.8844	-0.6392***
Analyst	0.0007	-0.00001**	0.0324*	0.0113***
R-squared	0.3004	0.0408	0.2826	0.728
Number of obs	4,251	4,336	4,217	4,321
FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.3801	-0.0046*	24.2014***	3.5598***
Volatility	-2.7370***	-0.0056*	-21.7564***	8.3143***
Turnover	-3.2883***	-0.0136***	36.2775***	33.0660***
Assets	0.0315	-0.0002	1.6123***	0.9837***
Growth	-0.0001	-0.00001*	0.0354*	0.0221***
Leverage	0.0901	0.0002	-1.4526***	-0.7101***
Analyst	0.0009	-0.00001	-0.0111	0.0056*
R-squared	0.2833	0.0439	0.352	0.7336
Number of obs	3,827	3,898	3,792	3,884

Panel C - Subperiod 3: 2008 - 2011

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	0.1384	0.0023	0.866	1.0157
2	-0.0129	0.0003	3.2572	0.2266
3	-0.081	0	-0.4997	0.8432
4	-0.1819	0.0001	-5.6024*	0.8783
5	-0.1489	0	-1.8252	0.3294
6	-0.2413	-0.0005	1.3307	1.1777
Firm Factors				
Volatility	0.5464**	0.0041**	-14.5162***	-0.071
Turnover	-1.1368***	-0.0128***	28.3818***	44.8026***
Assets	-0.0006	-0.0003***	0.7777**	0.7071***
Growth	-0.0004	-0.000004	0.0044	0.0051
Leverage	0.027	0.0002	0.1852	-0.2244**
Analyst	0.0006	-0.000007	0.0778***	0.0153***
R-squared	0.0379	0.0391	0.4767	0.7434
Number of obs	5,799	5,732	5,691	5,760
FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	0.0788	0.001	4.3386	1.9092
Volatility	0.3835**	-0.0009	-16.3701***	4.4287***
Turnover	-0.2432	-0.0030*	-7.4641*	8.6260***
Assets	0.0259*	-0.0002**	0.6185*	0.7083***
Growth	-0.0001	-0.000002	0.0149	-0.0045
Leverage	0.018	0.0003**	0.2241	0.0151
Analyst	-0.0001	-0.00001***	0.0844***	0.0192***
R-squared	0.0146	0.0401	0.4461	0.6899
Number of obs	5,482	5,419	5,372	5,443

Panel D - Subperiod 4: 2012 - 2018

ABHK model				
	CPQS	Illiquidity	Amivest	Volume
ABHK				
1	-0.033	0.0004	2.1207	0.4423
2	-0.0385*	-0.0004	3.0387*	1.1008***
3	-0.0531**	-0.0013*	2.9118	1.2606***
4	-0.0523**	-0.0009	3.7619*	1.6032***
5	-0.0571*	-0.0012	0.2971	2.1021***
6	-0.0431	-0.0015	-1.5297	2.5291***
Firm Factors				
Volatility	0.1278**	0.0004	-8.5245*	11.2181***
Turnover	-0.2275***	-0.0111***	31.6475***	52.8388***
Assets	-0.0022	-0.0002***	0.7753***	0.9032***
Growth	0.0001	-0.000006**	0.0005	0.0081***
Leverage	0.0048*	0.000092	-0.0681	-0.1677***
Analyst	0.00002	-0.000001	0.0182*	0.0111***
R-squared	0.1836	0.043	0.3412	0.6953
Number of obs	12,066	12,044	12,054	12,172
FS model				
	CPQS	Illiquidity	Amivest	Volume
FS	-0.0615**	-0.0018**	-2.6023	2.2081***
Volatility	0.0981**	0.0007	-16.5165***	7.6338***
Turnover	-0.1926***	-0.0136***	35.8185***	54.2013***
Assets	-0.0027*	-0.0002***	0.4143***	0.8526***
Growth	0.00004	-0.000005**	0.0068	0.0082***
Leverage	0.0056**	0.0001	0.0265	-0.2078***
Analyst	-0.000005	-0.000001	0.0317***	0.0073***
R-squared	0.2171	0.047	0.513	0.6998
Number of obs	12,044	12,022	11,956	12,141

This table shows the full results of subperiod tests. This study uses a graphical approach to determine the sub-periods. This study identifies four distinct sub-periods: 1998-2003, 2004-2007, 2008-2011, 2012-2018. The fixed effects regression is conducted using an unbalanced panel data set. The dependent variable "stock liquidity" takes four different stock liquidity measurements, which are Closing Percentage Quoted Spread (CPQS), Trading volume, Illiquidity and Amivest's liquidity. The independent variables are as follows: breadth of multinationality - this effect is measured using the ABHK score from 0 to 6. With the increase of the ABHK score, the degree of a company's breadth of multinationality increases. Analyst coverage is the total number of EPS one-year estimates on the company. The company's growth opportunity is proxied by the company's market-to-book ratio. Leverage is the ratio of total liabilities to total assets at the end of the year. Company size is measured as the natural log logarithm of the company's total assets. Risk is estimated as the standard deviation of the company's daily stock return over a year. Turnover is measured as trading volume divided by shares outstanding. This model also controls the industry effect using the GICS sector dummy and the Time effect using the year dummy. The Hausman tests suggest the use of a fixed-effects approach. Following Bris et al. (2012) and Deng et al. (2018), this study uses annual fixed effects regressions. Robust t-statistics values and the significant level are represented.

Table A2-9 Heckman test

Panel A - ABHK model					
		CPQS	Illiquidity	Amivest	Volume
Inverse Mills Ratio (IMR)					
Lambda	Coef	0.2781	0.0039	-8.9305	-0.8021
	Std. Err	0.0395	0.001	1.8491	0.146
	Z	7.04	3.74	-4.83	-5.49
	P > Z	0	0	0	0
rho		1	1	-1	-1
Sigma		0.2781	0.0039	8.9305	0.8021
Number of Obv		26,201	26,201	26,201	26,201
Selected Obv		25,690	25,759	25,678	26,001
Prob > Chi2		0	0	0	0
Panel B - FS model					
		CPQS	Illiquidity	Amivest	Volume
Inverse Mills Ratio (IMR)					
Lambda	Coef	0.4778	0.0021	-9.997	-0.8825
	Std. Err	0.0805	0.0007	2.6691	0.1562
	Z	5.93	2.81	-3.7	-5.27
	P > Z	0	0.005	0	0
rho		1	1	-1	-1
Sigma		0.4778	0.0021	9.997	0.8825
Number of Obv		25,107	25,107	25,107	25,107
Selected Obv		24,637	24,691	24,531	24,901
Prob > Chi2		0	0	0	0

This table shows the results of Heckman tests for the ABHK and FS models. This study employed the Heckman (1979) two-stage model to estimate the impact of the ABHK scores on stock liquidity to correct for the potential self-selection biases. In the first-stage selection model, this study calculated the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. The selection equation contains a new variable - stock price - that is not in the main model. The stock price is measured as the natural log of a firm's stock price.

Table A2-10 Hausman tests

Panel A - ABHK model				
	CPQS	Illiquidity	Amivest	Volume
Obv	25,690	25,759	25,678	26,001
R-squared (Fixed effects)	0.4055	0.0755	0.4152	0.6974
R-squared (Random effects)	0.435	0.1104	0.4526	0.7424
Chi2	443.27	152.22	480.97	1072.47
Prob > Chi2	0	0	0	0
Panel B - FS model				
	CPQS	Illiquidity	Amivest	Volume
Obv	24,637	24,691	24,531	24,910
R-squared (Fixed effects)	0.4172	0.0756	0.4685	0.6843
R-squared (Random effects)	0.4341	0.109	0.5144	0.7288
Chi2	33.56	180.41	733.94	825.59
Prob > Chi2	0.44	0	0	0

This table shows the results of the Hausman tests of the ABHK and FS models. This study uses the Hausman test to choose between a fixed effects model or a random effects model. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects. If the p-value is small (less than 0.05), reject the null hypothesis. The results show that the Hausman tests suggest using the fixed effects model.

Table A3-1 Panel regressions for capital structure using ABHK as the explanatory variable – Interaction terms

Panel A 1 - HHI is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK * HHI							
1	0.0064	0.0229	0.0253	-0.0023	-0.0347	-0.0432	0.0060
2	-0.0030	0.0198	0.0097	-0.0039*	-0.0069	-0.0152	0.0176
3	-0.0107	0.0123	-0.0089	-0.0044*	-0.0140	-0.0239**	-0.0038
4	-0.0122	0.0076	-0.0143	-0.0037	-0.0042	-0.0144	-0.0169
5	-0.0134	0.0103	-0.0079	-0.0067**	-0.0106	-0.0194	0.0032
6	-0.0346*	-0.0090	-0.0567	-0.0053	0.0046	-0.0010	-0.0309
ABHK * Size							
1	0.0150	-0.0603	-0.0591	0.0005	0.0250	0.0163	-0.0374
2	-0.0338***	-0.0661***	-0.1072***	-0.0006	-0.0408***	-0.0403***	-0.0598***
3	-0.0223**	0.0062	-0.0165	0.0020	-0.0103	-0.0027	0.0144
4	-0.0163	-0.0046	-0.0205	0.0010	-0.0022	0.0019	-0.0064
5	-0.0233*	-0.0318	-0.0515*	-0.0011	0.0135	0.0106	-0.0775**
6	-0.0451*	-0.0488	-0.0813*	0.0030	0.0014	0.0163	-0.0663
ABHK * Growth							
1	-0.0001	0.0053	0.0057	-0.0002	-0.0001	-0.0010	0.0074
2	-0.0010	0.0011	0.0004	0.0001	-0.0009	-0.0009	0.0011
3	0.0005	0.0018	0.0018	0.0002	0.0004	0.0005	0.0033*
4	0.0005	0.0032*	0.0031*	0.0002	0.0015*	0.0017*	0.0044**
5	-0.0002	0.0015	0.0016	0.0001	0.0011	0.0015	0.0030
6	0.0034*	0.0025	0.0046	0.0007*	0.0026	0.0036**	0.0038
ABHK * Profitability							
1	-0.1038	0.2758	-0.0170	-0.0211	0.1712*	0.1231	0.3161*
2	-0.0260	-0.0323	-0.0685	-0.0078	-0.0445	-0.0691**	-0.0562
3	0.0453	-0.1663**	-0.1054*	-0.0033	-0.0284	-0.0156	-0.1576**
4	-0.0058	-0.0732	-0.0854	-0.0089	-0.0749**	-0.0688**	-0.0407
5	0.0273	-0.0491	-0.0531	-0.0068	-0.0938*	-0.1017**	0.0101
6	-0.1422*	-0.2637*	-0.3967**	0.0010	-0.1608**	-0.1579**	-0.2399*
ABHK * Tangibility							
1	0.0289	0.9985	0.9616	0.0061	0.5810	0.4387	0.6019
2	-0.0168	0.1026	0.0278	-0.0186	0.0708	0.0162	-0.0534
3	-0.1622	0.2051	0.0009	-0.0414	-0.0085	-0.0881	-0.0854
4	-0.1450	0.2819	0.0492	-0.0269	0.1810	0.0584	-0.0973
5	-0.0475	-0.1595	-0.0905	-0.0110	-0.0630	0.0579	-0.2391
6	0.0574	0.0304	0.0991	0.0327	-0.3349	-0.4046	-0.2307
ABHK * Liquidity							
1	-0.0216	0.0418	0.0213	-0.0008	-0.0265	-0.0170	0.0491
2	0.0010	0.0391**	0.04301***	0.0004	0.0231***	0.0259***	0.0410**
3	-0.0034	0.0026	0.0022	-0.0018	-0.0051	-0.0079	0.0001
4	-0.0206**	0.0121	-0.0102	-0.0047***	-0.0062	-0.0094	0.0123
5	-0.0234*	0.0581**	0.0348	-0.0056**	-0.0063	-0.0056	0.0752***
6	-0.0045	0.0872*	0.0762*	-0.0095**	-0.0076	-0.0233	0.1001**
ABHK * Non-debt tax shield							
1	-0.0294	-0.3427	-0.2424	-0.0170	-0.1858	-0.1192	-0.4109
2	0.0481	0.1801*	0.2130*	-0.0078	0.1563***	0.1610***	0.1906*
3	0.0437	0.2133*	0.2567**	-0.0104	0.1901***	0.1784***	0.1558
4	0.1226*	0.1008	0.2156	0.0102	0.1594**	0.1717***	0.1344
5	0.0912	0.1354	0.2148	0.0163	0.0404	0.0333	0.2181
6	0.0430	-0.4734*	-0.4561*	-0.0058	0.0571	0.0729	-0.3861

Panel B Entropy index is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK * Entropy							
1	0.0191	-0.0374	-0.0106	0.0012	-0.0814*	-0.0984**	-0.0881
2	0.0019	-0.0097	-0.0161	-0.0032	-0.0187	-0.0283*	-0.0049
3	-0.0101	-0.0371	-0.0548	-0.0033	-0.0280*	-0.0374**	-0.0510
4	-0.0109	-0.0334	-0.0516	-0.0031	-0.0168	-0.0291*	-0.0629*
5	-0.0273	0.0074	-0.0204	-0.0071	-0.0092	-0.0214	-0.0117
6	-0.0444	-0.0334	-0.0898	-0.0057	-0.0117	-0.0197	-0.0764
ABHK * Size							
1	0.0137	-0.0499	-0.0519	-0.0001	0.0281	0.0198	-0.0233
2	-0.0349***	-0.0615***	-0.1038***	-0.0009	-0.0394***	-0.0391***	-0.0564**
3	-0.0231**	0.0127	-0.0115	0.0017	-0.0091	-0.0021	0.0198
4	-0.0173	0.0005	-0.0170	0.0008	-0.0007	0.0032	-0.0019
5	-0.0225	-0.0328	-0.0522*	-0.0014	0.0123	0.0094	-0.0767**
6	-0.0435*	-0.0461	-0.0775	0.0030	0.0025	0.0172	-0.0612
ABHK * Growth							
1	-0.0001	0.0054	0.0058	-0.0002	0.0000	-0.0008	0.0077
2	-0.0010	0.0011	0.0004	0.0001	-0.0009	-0.0009	0.0011
3	0.0005	0.0017	0.0018	0.0002	0.0004	0.0005	0.0032*
4	0.0006	0.0032*	0.0031*	0.0002	0.0015*	0.0017*	0.0044**
5	-0.0002	0.0014	0.0015	0.0001	0.0011	0.0015	0.0030
6	0.0034*	0.0025	0.0045	0.0007*	0.0026	0.0036**	0.0037
ABHK * Profitability							
1	-0.1054	0.2808	-0.0145	-0.0213	0.1760**	0.1286	0.3237*
2	-0.0257	-0.0345	-0.0703	-0.0077	-0.0450	-0.0694**	-0.0582
3	0.0452	-0.1708**	-0.1096*	-0.0031	-0.0285	-0.0151	-0.1611**
4	-0.0042	-0.0788	-0.0887	-0.0086	-0.0765**	-0.0699**	-0.0443
5	0.0243	-0.0442	-0.0506	-0.0068	-0.0912*	-0.0992**	0.0128
6	-0.1387*	-0.2623*	-0.3907**	0.0016	-0.1621**	-0.1594**	-0.2371
ABHK * Tangibility							
1	0.0257	1.0347	0.9823	0.0030	0.5899	0.4489	0.6447
2	-0.0159	0.1017	0.0266	-0.0187	0.0692	0.0149	-0.0562
3	-0.1682	0.2259	0.0128	-0.0428	-0.0040	-0.0857	-0.0696
4	-0.1520	0.2953	0.0541	-0.0277	0.1866	0.0635	-0.0893
5	-0.0509	-0.1590	-0.0976	-0.0116	-0.0630	0.0574	-0.2435
6	0.0672	0.0388	0.1198	0.0331	-0.3328	-0.4035	-0.2093
ABHK * Liquidity							
1	-0.0211	0.0364	0.0174	-0.0005	-0.0276	-0.0184	0.0413
2	0.0015	0.0376**	0.0421**	0.0005	0.0225***	0.0254***	0.0397**
3	-0.0028	0.0005	0.0009	-0.0017	-0.0055	-0.0081	-0.0015
4	-0.0201**	0.0105	-0.0111	-0.0046***	-0.0068	-0.0100	0.0111
5	-0.0235*	0.0584**	0.0352	-0.0054**	-0.0059	-0.0052	0.0748***
6	-0.0057	0.0858*	0.0738*	-0.0095**	-0.0080	-0.0237	0.0973**
ABHK * Non-debt tax shield							
1	-0.0284	-0.3459	-0.2442	-0.0166	-0.1917	-0.1262	-0.4188
2	0.0496	0.1770	0.2097*	-0.0076	0.1552***	0.1599***	0.1899*
3	0.0436	0.1996*	0.2439*	-0.0099	0.1887***	0.1786***	0.1445
4	0.1283*	0.0882	0.2095	0.0106	0.1534**	0.1664**	0.1263
5	0.0831	0.1526	0.2250	0.0166	0.0493	0.0413	0.2273
6	0.0514	-0.4705*	-0.4425*	-0.0044	0.0495	0.0648	-0.3855

Panel C the number of segments is used as a proxy for product diversification							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK * Segments							
1	0.0040	-0.0116	-0.0072	0.0005	-0.0126**	-0.0149**	-0.0195
2	0.0012	0.0010	-0.0002	-0.0003	-0.0011	-0.0014	0.0035
3	-0.0015	-0.0024	-0.0052	-0.0005	-0.0011	-0.0015	-0.0039
4	-0.0018	-0.0023	-0.0058	-0.0007	-0.0004	-0.0016	-0.0066
5	-0.0056*	0.0023	-0.0041	-0.0009*	0.0014	0.0001	-0.0015
6	-0.0056	-0.0001	-0.0074	-0.0002	0.0000	0.0001	-0.0031
ABHK * Size							
1	0.0129	-0.0457	-0.0477	-0.0002	0.0269	0.0182	-0.0191
2	-0.0364***	-0.0633***	-0.1055***	-0.0010	-0.0397***	-0.0403***	-0.0607***
3	-0.0235**	0.0114	-0.0132	0.0017	-0.0105	-0.0041	0.0181
4	-0.0174*	-0.0004	-0.0175	0.0011	-0.0010	0.0029	-0.0023
5	-0.0201	-0.0326	-0.0492*	-0.0015	0.0105	0.0077	-0.0744**
6	-0.0444*	-0.0485	-0.0810*	0.0023	0.0023	0.0161	-0.0654
ABHK * Growth							
1	-0.0001	0.0055	0.0058	-0.0002	0.0000	-0.0009	0.0077
2	-0.0010	0.0011	0.0003	0.0001	-0.0009	-0.0009	0.0011
3	0.0005	0.0018	0.0018	0.0002	0.0004	0.0005	0.0032*
4	0.0005	0.0032*	0.0031*	0.0002	0.0015*	0.0017**	0.0044**
5	-0.0001	0.0014	0.0015	0.0001	0.0010	0.0015	0.0030
6	0.0034*	0.0025	0.0045	0.0007*	0.0026	0.0036**	0.0038
ABHK * Profitability							
1	-0.1070	0.2866	-0.0103	-0.0216	0.1797**	0.1327	0.3320*
2	-0.0257	-0.0352	-0.0705	-0.0075	-0.0452*	-0.0696**	-0.0595
3	0.0444	-0.1687**	-0.1082*	-0.0032	-0.0274	-0.0135	-0.1589**
4	-0.0028	-0.0778	-0.0859	-0.0086	-0.0771**	-0.0699**	-0.0418
5	0.0218	-0.0433	-0.0521	-0.0066	-0.0896*	-0.0974**	0.0129
6	-0.1374*	-0.2638*	-0.3909**	0.0020	-0.1617**	-0.1585**	-0.2376
ABHK * Tangibility							
1	0.0375	1.0263	0.9838	0.0030	0.5567	0.4105	0.6253
2	-0.0188	0.0967	0.0209	-0.0191	0.0658	0.0103	-0.0664
3	-0.1695	0.2236	0.0076	-0.0429	-0.0085	-0.0913	-0.0721
4	-0.1540	0.2952	0.0537	-0.0265	0.1860	0.0636	-0.0865
5	-0.0463	-0.1667	-0.1034	-0.0102	-0.0738	0.0476	-0.2506
6	0.0781	0.0183	0.1128	0.0303	-0.3338	-0.4119	-0.2444
ABHK * Liquidity							
1	-0.0209	0.0343	0.0153	-0.0004	-0.0267	-0.0173	0.0388
2	0.0021	0.0378**	0.0426**	0.0006	0.0228***	0.0259***	0.0406**
3	-0.0022	0.0006	0.0019	-0.0016	-0.0051	-0.0076	-0.0011
4	-0.0196**	0.0105	-0.0106	-0.0046***	-0.0068	-0.0100	0.0112
5	-0.0240**	0.0580**	0.0341	-0.0054**	-0.0053	-0.0046	0.0738***
6	-0.0050	0.0869*	0.0757*	-0.0091**	-0.0083	-0.0235	0.0993**
ABHK * Non-debt tax shield							
1	-0.0257	-0.3542	-0.2506	-0.0163	-0.1943*	-0.1291	-0.4251*
2	0.0535	0.1781	0.2121*	-0.0072	0.1544***	0.1605***	0.1963*
3	0.0426	0.2037*	0.2474*	-0.0103	0.1929***	0.1839***	0.1490
4	0.1328*	0.0874	0.2137	0.0102	0.1512**	0.1642**	0.1272
5	0.0825	0.1409	0.2131	0.0178	0.0494	0.0411	0.2111
6	0.0577	-0.4725*	-0.4364*	-0.0025	0.0495	0.0656	-0.3810

Table A3-2 Panel regressions for capital structure using %FS as the explanatory variable – Interaction terms

Panel A 1 - HHI is used as a proxy for product diversification							
Interaction terms							
FS * HHI	-0.0381**	0.0096	-0.0391	-0.0088***	0.0097	-0.0070	-0.0533*
FS * Size	-0.0191	-0.0059	-0.0201	-0.0017	-0.0267*	-0.0267*	-0.0041
FS * Growth	0.0004	0.0044**	0.0041*	0.0003	0.0014*	0.0017*	0.0068***
FS * Profitability	0.0037	-0.2715***	-0.2193**	-0.0052	-0.1112***	-0.0928**	-0.2392***
FS * Tangibility	-0.0601	-0.0251	-0.1167	0.0038	0.1678	0.1187	-0.3534
FS * Liquidity	-0.0244**	0.0350	0.0059	-0.0031	0.0171*	0.0155	0.0263
FS * Non-debt tax shield	0.1883**	0.1579	0.3616*	0.0161	0.2074***	0.2501***	0.2303
Panel B Entropy index is used as a proxy for product diversification							
Interaction terms							
FS * Entropy	-0.0401*	-0.0553	-0.0997**	-0.0083*	-0.0160	-0.0342*	-0.1300***
FS * Size	-0.0218	0.0041	-0.0140	-0.0024	-0.0222*	-0.0233*	0.0027
FS * Growth	0.0004	0.0044**	0.0041*	0.0003	0.0014*	0.0017*	0.0068***
FS * Profitability	0.0060	-0.2794***	-0.2235***	-0.0045	-0.1145***	-0.0949**	-0.2432***
FS * Tangibility	-0.0730	-0.0009	-0.1114	0.0009	0.1796	0.1261	-0.3468
FS * Liquidity	-0.0229**	0.0322	0.0050	-0.0028	0.0155	0.0143	0.0251
FS * Non-debt tax shield	0.1960**	0.1396	0.3547*	0.0176	0.1988**	0.2435***	0.2214
Panel C the number of segments is used as a proxy for product diversification							
Interaction terms							
FS * Segments	-0.0051*	-0.0062	-0.0120*	-0.0009*	-0.0011	-0.0028	-0.0152**
FS * Size	-0.0228*	0.0033	-0.0160	-0.0026	-0.0221*	-0.0239*	0.0002
FS * Growth	0.0005	0.0044**	0.0041*	0.0003	0.0014*	0.0017*	0.0068***
FS * Profitability	0.0070	-0.2768***	-0.2199**	-0.0042	-0.1142***	-0.0935**	-0.2376***
FS * Tangibility	-0.0778	-0.0096	-0.1250	-0.0002	0.1773	0.1208	-0.3662
FS * Liquidity	-0.0221**	0.0325	0.0063	-0.0027	0.0154	0.0144	0.0262
FS * Non-debt tax shield	0.1990**	0.1396	0.3595*	0.0181	0.1981**	0.2438***	0.2243

Table A3-3 Panel regressions for capital structure using %FA as the explanatory variable – Interaction terms

Panel A 1 - HHI is used as a proxy for product diversification							
Interaction terms							
FA * HHI	-0.0521**	-0.0022	-0.0637	-0.0085*	-0.0012	-0.0142	-0.0303
FA * Size	0.0690***	-0.0649	0.0185	0.0115***	-0.0472**	-0.0388*	-0.0392
FA * Growth	0.0035**	-0.0034	0.0008	0.0007**	-0.0026*	-0.0023	-0.0004
FA * Profitability	0.0031	0.0008	0.0254	-0.0094	-0.1053	-0.1072*	0.0375
FA * Tangibility	-0.0101	0.1518	0.0986	0.0051	0.4456	0.4088	0.0638
FA * Liquidity	-0.0660***	0.0108	-0.0785**	-0.0085**	0.0036	-0.0036	-0.0106
FA * Non-debt tax shield	0.1021	0.0982	0.1865	0.0143	0.0668	0.0961	0.1585
Panel B Entropy index is used as a proxy for product diversification							
Interaction terms							
FA * Entropy	-0.0452	-0.0371	-0.0900	-0.0080	-0.0058	-0.0203	-0.0577
FA * Size	0.0661***	-0.0602	0.0199	0.0111***	-0.0469**	-0.0388*	-0.0367
FA * Growth	0.0036**	-0.0034	0.0008	0.0007**	-0.0026*	-0.0023	-0.0004
FA * Profitability	0.0101	-0.0038	0.0279	-0.0086	-0.1062*	-0.1067*	0.0377
FA * Tangibility	-0.0222	0.1669	0.0968	0.0037	0.4480	0.4090	0.0670
FA * Liquidity	-0.0650***	0.0101	-0.0780**	-0.0084**	0.0036	-0.0035	-0.0108
FA * Non-debt tax shield	0.1171	0.0810	0.1884	0.0161	0.0623	0.0930	0.1508
Panel C the number of segments is used as a proxy for product diversification							
Interaction terms							
FA * Segments	-0.0055	-0.0019	-0.0089	-0.0013*	-0.0004	-0.0023	-0.0050
FA * Size	0.0653***	-0.0629	0.0170	0.0115***	-0.0467**	-0.0385*	-0.0389
FA * Growth	0.0036**	-0.0034	0.0008	0.0007**	-0.0026*	-0.0022*	-0.0004
FA * Profitability	0.0133	-0.0017	0.0333	-0.0083	-0.1092*	-0.1091*	0.0408
FA * Tangibility	-0.0204	0.1588	0.0926	0.0051	0.4521	0.4135	0.0609
FA * Liquidity	-0.0645***	0.0108	-0.0768**	-0.0083**	0.0040	-0.0030	-0.0100
FA * Non-debt tax shield	0.1211	0.0870	0.1993	0.0158	0.0620	0.0928	0.1563

Table A3-4 Sub-period analysis

Panel A - 1998-2003 - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.122	-0.0699	0.0084	-0.0527	0.066	0.0773	0.2194
2	0.4809**	-0.2381	0.2512	0.0692	0.0813	0.1524	0.0394
3	0.3935*	-0.442	-0.0216	0.0583	-0.0195	0.028	-0.2751
4	0.6731***	-0.4012	0.3144	0.1172**	-0.0605	0.0392	-0.1141
5	0.6147**	-0.3749	0.2704	0.1193*	0.0894	0.2029	-0.1043
6	0.5336	-0.9093	-0.313	0.1192	0.1373	0.2073	-0.9208*
Firm Factors							
Herfindahl	-0.0379	0.0245	-0.0193	-0.0036	0.0048	-0.0074	0.0000
Size	0.0936**	0.2011***	0.2941***	0.0314***	0.1754***	0.2071***	0.2514***
Growth	0.0018	-0.0029	-0.0012	0.0009*	-0.0009	0.0006	0.0003
Profitability	-0.0977	0.0887	-0.0113	-0.0378**	-0.0509	-0.1215**	-0.1443
Tangibility	0.1231	-0.3995	-0.2129	0.0443	-0.0136	0.1351	0.0632
Liquidity	0.0071	-0.0426	-0.0413*	-0.0026	-0.0359***	-0.0431***	-0.0482**
Non-debt tax shield	-0.1094	0.1353	0.0253	-0.0397	0.0888	0.0557	-0.0729
No	3,904	3,922	3,925	3,896	3,933	3,932	3,930
R-squared	0.0099	0.1259	0.1999	0.0426	0.1545	0.2007	0.2043
Panel B - 1998-2003 - Foreign Assets							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.3931	-0.4654	-0.0245	0.1074	0.1275	0.2244	-0.5902
Herfindahl	-0.0370*	0.0179	-0.0226	-0.0031	0.0181	0.0123	0.0048
Size	0.0467*	0.2447***	0.2846***	0.0236***	0.1725***	0.1996***	0.2595***
Growth	0.0006	-0.0012	-0.0009	0.0003	-0.0008	0.0001	0.0002
Profitability	-0.0028	0.0000	0.0210	-0.0244**	-0.0856**	-0.1321***	-0.0957
Tangibility	-0.0023	-0.2253	-0.2012	0.0176	-0.0090	0.0531	-0.0339
Liquidity	-0.0014	-0.0379*	-0.0420**	-0.0027	-0.0362***	-0.0456***	-0.0548***
Non-debt tax shield	-0.0412	0.1252	0.0875	-0.0385*	0.0739	0.0380	-0.0926
No	3,932	3,950	3,953	3,924	3,961	3,960	3,958
R-squared	0.0185	0.1413	0.1921	0.0492	0.1603	0.2025	0.2088
Panel C - 1998-2003 - Foreign Sales model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.6616*	-0.5853	0.1253	0.1390*	0.009	0.2259	-0.2317
Herfindahl	-0.0142	0.0136	-0.0066	-0.0035	0.0103	0.0011	-0.0012
Size	0.0585*	0.2404***	0.2945***	0.0276***	0.1784***	0.2121***	0.2666***
Growth	0.0008	-0.0022	-0.0019	0.0005	-0.0021*	-0.0009	-0.0003
Profitability	-0.0277	0.0100	-0.0343	-0.0243*	-0.0707*	-0.1208***	-0.1251*
Tangibility	-0.0736	-0.2669	-0.3086	0.0116	-0.0048	0.0628	-0.0752
Liquidity	0.0042	-0.0471*	-0.0441*	-0.0035	-0.0432***	-0.0530***	-0.0614***
Non-debt tax shield	-0.1139	0.0805	-0.0392	-0.0465*	0.0625	0.0253	-0.1411
No	3,932	3,950	3,953	3,924	3,961	3,960	3,958
R-squared	0.0048	0.1376	0.1963	0.0298	0.1548	0.2006	0.2076

Panel D - 2004-2007 - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	0.0718	2.1882	2.4382	0.1687	1.2502	1.2007	1.0216
2	-0.2051	1.2313**	0.8278*	-0.0568	0.6846***	0.3596**	0.2382
3	-0.4171*	1.0573**	0.4197	-0.0825*	0.6171***	0.3782**	0.2532
4	-0.2818	0.5914	0.1309	-0.0463	0.5172***	0.3445**	-0.0031
5	-0.4166	0.8329	0.2528	-0.0833	0.5648***	0.3740*	0.4345
6	-0.7179	1.4039	0.4957	-0.1620*	0.7264**	0.3032	0.1253
Firm Factors							
Herfindahl	-0.0190	0.0545	0.0115	-0.0069	0.0277	0.0015	-0.0021
Size	-0.0443	0.3511***	0.3367***	-0.0007	0.2682***	0.2565***	0.2596***
Growth	0.0004	0.0017	0.0026	0.0002	0.0023**	0.0030***	0.0019
Profitability	0.0305	-0.2486*	-0.2518*	-0.0140	-0.2285***	-0.2096***	-0.1977*
Tangibility	-0.1688	0.0663	-0.0756	-0.0383	-0.0947	-0.1466	-0.2952
Liquidity	-0.0139	-0.0856**	-0.1021***	-0.0009	-0.0376***	-0.0398***	-0.0966***
Non-debt tax shield	0.0647	0.1863	0.1210	-0.0272	-0.0095	0.0328	0.3057
No	3,588	3,637	3,639	3,577	3,625	3,623	3,636
R-squared	0.0032	0.1671	0.1989	0.043	0.2019	0.2076	0.1868
Panel E - 2004-2007 - Foreign Assets model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0563	0.4869	0.3911	-0.0285	0.0599	0.0528	0.512
Herfindahl	0.0278	-0.0487	-0.0207	0.0050	0.0007	-0.0045	-0.0582
Size	-0.0373	0.2637***	0.2813***	0.0031	0.2039***	0.2123***	0.2400***
Growth	0.0000	0.0011	0.0021	0.0002	0.0014*	0.0025***	0.0021
Profitability	-0.0134	-0.2506**	-0.3184***	-0.0192*	-0.2079***	-0.1904***	-0.1714*
Tangibility	-0.1996	-0.0232	-0.1688	-0.0340	-0.1025	-0.1084	-0.3674
Liquidity	0.0076	-0.0707**	-0.0674**	0.0007	-0.0354***	-0.0385***	-0.0813***
Non-debt tax shield	0.0607	0.4096*	0.2941	-0.0292	0.1264	0.1156	0.4852**
No	3,598	3,648	3,650	3,587	3,636	3,634	3,647
R-squared	0.0018	0.1944	0.2013	0.0278	0.1483	0.1691	0.2146
Panel F - 2004-2007 - Foreign Sales model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	-0.3511	-0.0004	-0.578	-0.0721	0.1918	0.1544	-0.4129
Herfindahl	-0.0082	-0.0074	-0.0127	-0.0012	0.0135	-0.0003	-0.0201
Size	-0.0498	0.2578***	0.2534***	0.0008	0.2151***	0.2222***	0.2167***
Growth	-0.0001	0.0011	0.0020	0.0001	0.0017*	0.0027***	0.0016
Profitability	0.0047	-0.1464	-0.2043*	-0.0166	-0.1659***	-0.1569***	-0.0814
Tangibility	-0.1486	0.1857	0.0478	-0.0356	-0.0154	-0.0793	-0.1505
Liquidity	0.0099	-0.0776**	-0.0691**	0.0013	-0.0409***	-0.0429***	-0.0866***
Non-debt tax shield	0.0389	0.3674	0.2530	-0.0344	0.0675	0.0644	0.4596*
No	3,598	3,648	3,650	3,587	3,636	3,634	3,647
R-squared	0.0002	0.2016	0.2037	0.0324	0.1782	0.1957	0.2059

Panel G - 2008-2011 - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0446	1.7903**	1.7950**	-0.0079	0.5888**	0.3028	1.2715*
2	-0.1629	0.2938	0.0897	-0.0708*	0.2027	0.1494	0.3435
3	0.0621	0.2244	0.0816	-0.0422	0.1361	0.0878	0.2401
4	0.0366	0.1977	0.0819	-0.016	0.08	0.0207	-0.0422
5	0.0981	-0.0254	-0.3311	-0.0321	0.1395	0.0939	0.0973
6	0.8845**	0.245	0.4799	0.029	0.0846	-0.0081	0.5805
Firm Factors							
Herfindahl	-0.0198	-0.0282	0.00004	0.0072	0.0300	0.0383*	-0.0112
Size	0.0171	0.2194***	0.2137***	0.0073	0.2265***	0.2408***	0.2133***
Growth	-0.0010	0.0044*	0.0027	-0.0003	0.0033***	0.0031***	0.0034
Profitability	-0.0039	-0.1207	-0.1017	0.0006	-0.0747***	-0.0967***	-0.1276*
Tangibility	-0.0763	0.1892	0.0811	-0.0161	0.0630	0.0447	0.2434
Liquidity	-0.0043	-0.0567*	-0.0471	-0.0028	-0.0549***	-0.0601***	-0.0588*
Non-debt tax shield	-0.0153	-0.0316	-0.0444	-0.0030	-0.0151	-0.0219	0.0210
No	4,697	4,712	4,724	4,709	4,734	4,732	4,708
R-squared	0.0009	0.1745	0.1871	0.013	0.1565	0.1627	0.1976
Panel H - 2008-2011 - Foreign Assets model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	-0.0149	0.1354	0.0382	-0.0184	0.1679	0.1185	-0.0274
Herfindahl	0.0110	-0.0223	0.0152	0.0015	0.0303*	0.0394***	-0.0084
Size	0.0027	0.2072***	0.2111***	0.0103*	0.2135***	0.2339***	0.2124***
Growth	-0.0006	0.0036*	0.0022	0.0002	0.0021***	0.0023***	0.0035*
Profitability	0.0137	-0.1106*	-0.0854	-0.0026	-0.0790***	-0.0980***	-0.1272**
Tangibility	-0.1164	0.3191	0.0319	-0.0407	0.1008	0.0255	0.2613
Liquidity	0.0035	-0.0612**	-0.0527**	-0.0028	-0.0519***	-0.0593***	-0.0696***
Non-debt tax shield	-0.0421	-0.0558	-0.0819	-0.0153	0.0365	0.0247	-0.0922
No	4,709	4,724	4,736	4,721	4,746	4,744	4,720
R-squared	0.0077	0.234	0.2298	0.0133	0.1764	0.1779	0.2428
Panel I - 2008-2011 - Foreign Sales model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0075	0.6847	0.6342	-0.0033	0.3901*	0.2696	0.2664
Herfindahl	0.0133	-0.0652	-0.0157	0.0044	0.0178	0.0262	-0.0369
Size	0.0185	0.2279***	0.2418***	0.0121*	0.2265***	0.2439***	0.2155***
Growth	-0.0008	0.0038	0.0025	0.0000	0.0028***	0.0030***	0.0031
Profitability	0.0018	-0.1179*	-0.1055*	-0.0028	-0.0734***	-0.0941***	-0.1351**
Tangibility	-0.1368	0.2534	0.0701	-0.0329	0.0805	0.0275	0.1570
Liquidity	-0.0147	-0.0515*	-0.0556*	-0.0059*	-0.0520***	-0.0612***	-0.0595**
Non-debt tax shield	-0.0273	-0.0653	-0.0924	-0.0095	0.0187	0.0151	-0.0506
No	4,709	4,724	4,736	4,721	4,746	4,744	4,720
R-squared	0.0071	0.2344	0.2297	0.0217	0.1871	0.179	0.2347

Panel J - 2012 - 2019 - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.0074	-0.3015	-0.2732	0.0103	-0.3030*	-0.2487*	-0.4154
2	0.1286*	-0.118	0.0686	0.0097	-0.1757**	-0.1718**	-0.0787
3	0.0499	-0.2705	-0.138	0.0042	-0.1863**	-0.1851**	-0.1696
4	0.091	-0.4289*	-0.2064	0.0159	-0.2850***	-0.2690***	-0.3085
5	0.1582*	-0.0731	0.1211	0.0266*	-0.2547**	-0.2383**	0.1916
6	0.0812	-0.4396	-0.3012	0.0101	-0.3429**	-0.3053**	-0.2846
Firm Factors							
Herfindahl	0.0000	0.0000	0.0085	0.0001	0.0167	0.0213*	0.0044
Size	-0.0038	0.2964***	0.2889***	0.0034*	0.1471***	0.1592***	0.3250***
Growth	0.0000	0.0038***	0.0036***	0.0001	0.0030***	0.0032***	0.0039***
Profitability	-0.0017	-0.1185**	-0.1118**	-0.0046	-0.1071***	-0.1289***	-0.1560***
Tangibility	-0.0309	-0.2029	-0.2474	-0.0084	-0.0164	-0.0409	-0.1014
Liquidity	-0.0017	-0.0758***	-0.0772***	-0.0028**	-0.0431***	-0.0545***	-0.1202***
Non-debt tax shield	-0.0092	0.0144	0.0062	-0.0039	0.0289	0.0091	0.0121
No	11,523	11,546	11,598	11,527	11,549	11,556	11,575
R-squared	0.0009	0.1966	0.1975	0.0022	0.1684	0.1819	0.228
Panel - K - 2012-2019 - Foreign Assets model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.1895	-0.0664	0.2289	0.0324	0.0448	0.0663	0.0667
Herfindahl	0.0055	0.0304	0.0388*	0.0002	0.0106	0.0139*	0.0453**
Size	-0.0159*	0.3109***	0.2838***	0.0012	0.1657***	0.1732***	0.3162***
Growth	0.0000	0.0044***	0.0042***	0.0001	0.0028***	0.0032***	0.0048***
Profitability	0.0016	-0.1517***	-0.1574***	-0.0049*	-0.1291***	-0.1528***	-0.1616***
Tangibility	-0.0384	-0.0241	-0.0875	-0.0110	-0.0298	-0.0408	0.0471
Liquidity	0.0046	-0.0722***	-0.0643***	-0.0012	-0.0415***	-0.0491***	-0.1021***
Non-debt tax shield	-0.0100	0.0331	0.0228	-0.0054	0.0441	0.0270	0.0302
No	11,548	11,570	11,622	11,552	11,574	11,581	11,600
R-squared	0.0001	0.2097	0.2118	0.0013	0.1903	0.1989	0.2396
Panel L - 2012-2019 - Foreign Sales model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0426	-0.3714	-0.2694	-0.0051	-0.1669*	-0.1949*	-0.2814
Herfindahl	0.0093	0.0098	0.0241	0.0011	0.0085	0.0142	0.0301
Size	-0.0171*	0.3128***	0.2881***	0.0014	0.1613***	0.1692***	0.3228***
Growth	0.0001	0.0045***	0.0043***	0.0001	0.0024***	0.0027***	0.0045***
Profitability	0.0011	-0.1251**	-0.1278***	-0.0056*	-0.1124***	-0.1378***	-0.1488***
Tangibility	-0.0445	-0.1032	-0.1689	-0.0150	-0.0392	-0.0497	0.0303
Liquidity	0.0052	-0.0862***	-0.0795***	-0.0018*	-0.0439***	-0.0526***	-0.1182***
Non-debt tax shield	-0.0125	0.0255	0.0118	-0.0057	0.0310	0.0070	0.0021
No	11,548	11,570	11,622	11,552	11,574	11,581	11,600
R-squared	0	0.2011	0.2039	0.0002	0.1916	0.2048	0.2355

Panel M - 2020 - ABHK model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
ABHK							
1	-0.1373	1.3783*	1.1749*	-0.0013	0.1856	0.0658	1.3062*
2	-0.0184	0.3313	0.3150	-0.0156	0.1204	0.0806	0.2571
3	0.0749	0.1107	0.2271	0.0107	0.2229	0.1661	-0.0993
4	0.0514	-0.0594	0.0209	0.0099	0.1114	0.0700	-0.1531
5	0.0391	1.1016**	1.1314**	-0.0043	0.4813*	0.3801	0.9888*
6	-0.0455	1.0173	0.9366	-0.1079*	0.5828	0.3483	0.6936
Firm Factors							
1 - HHI	-0.0088	0.0300	0.0269	0.0032	0.0248	0.0182	0.0284
Size	0.0225	0.3488***	0.3616***	0.0022	0.2167***	0.2439***	0.3953***
Growth	0.0001	-0.0031	-0.0036	0.0000	0.0015	0.0019	-0.0032
Profitability	-0.0065	0.1854*	0.1791*	-0.0066	0.0048	0.0201	0.2130*
Tangibility	0.0423	-0.4939	-0.1177	-0.0198	0.1777	0.2598	0.0248
Liquidity	-0.0262**	-0.1393***	-0.1613***	-0.0025	-0.1029***	-0.1289***	-0.1935***
Non-debt tax shield	-0.1402***	0.1980	0.0507	-0.0193*	0.2156***	0.1746**	0.0385
No	1,515	1,515	1,525	1,511	1,522	1,524	1,525
R-squared	0.0558	0.2747	0.2811	0.0581	0.3186	0.3199	0.304
Panel N - 2020 - Foreign Assets model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FA	0.1149	0.6359	0.7313	-0.0261	-0.3013	-0.3735	0.7368
1 - HHI	-0.0029	0.0644*	0.0616*	0.0030	0.0128	0.0072	0.0697*
Size	0.0265**	0.3204***	0.3311***	0.0026	0.2056***	0.2315***	0.3796***
Growth	0.0004	-0.0012	-0.0016	-0.0001	0.0031***	0.0033***	-0.0013
Profitability	-0.0235	0.0320	0.0224	-0.0092	-0.0085	0.0030	0.0398
Tangibility	-0.0796	-0.0978	-0.0484	-0.0236	0.2392	0.3572	0.0610
Liquidity	-0.0300***	-0.1361***	-0.1562***	-0.0023	-0.1172***	-0.1382***	-0.1904***
Non-debt tax shield	-0.1432***	0.1678	0.0204	-0.0236***	0.2918***	0.2552***	0.0061
No	1,518	1,517	1,527	1,514	1,525	1,527	1,528
R-squared	0.0396	0.2493	0.2547	0.0435	0.2917	0.2961	0.2792
Panel O - 2020 - Foreign Sales model							
	STD 1	LTD 1	TD 1	STD 2	LTD 2	TD 2	LTD 3
FS	0.0508	0.2754	0.4197	-0.0067	0.2176	0.1559	0.0099
1 - HHI	-0.0048	0.0556	0.0553	0.0029	0.0196	0.0148	0.0602
Size	0.0184	0.3414***	0.3513***	0.0020	0.2135***	0.2381***	0.3875***
Growth	-0.0005	-0.0020	-0.0031	-0.0001	0.0025*	0.0025*	-0.0020
Profitability	-0.0142	0.0473	0.0333	-0.0067	-0.0137	-0.0039	0.0693
Tangibility	-0.0349	-0.2182	-0.0609	-0.0257	0.1321	0.2813	0.1667
Liquidity	-0.0223*	-0.1466***	-0.1633***	-0.0021	-0.1100***	-0.1311***	-0.1998***
Non-debt tax shield	-0.1372***	0.1409	-0.0045	-0.0196**	0.2456***	0.2047***	-0.0201
No	1,518	1,517	1,527	1,514	1,525	1,527	1,528
R-squared	0.0427	0.2514	0.2602	0.0435	0.2943	0.2974	0.28

Table A3-5 Heckman tests

Panel A - ABHK model								
		STD_1	LTD_1	TD_1	STD_2	LTD_2	TD_2	LTD_3
Inverse Mills Ratio (IMR)								
Lambda	Coef	0.3725	-0.6098	-0.4393	0.0802	0.683	0.747	-0.3946
	Std. Err	0.105	0.125	0.12	0.0241	0.0771	0.0858	0.0562
	Z	3.55	-4.88	-3.66	3.33	8.85	8.7	-7.01
	P > Z	0	0	0	0.001	0	0	0
rho		1	-1	-1	1	1	1	-1
Sigma		0.3725	0.6098	0.4393	0.0802	0.683	0.747	0.3946
Number of Obv		23,126	23,126	23,126	23,126	23,126	23,126	23,126
Selected Obv		22,814	22,918	22,982	22,806	22,931	22,939	22,957
Prob > Chi2		0	0	0	0	0	0	0
Panel B - FS model								
		STD_1	LTD_1	TD_1	STD_2	LTD_2	TD_2	LTD_3
Inverse Mills Ratio (IMR)								
Lambda	Coef	0.6192	-0.83	-0.667	0.1184	0.7386	0.8816	-0.4251
	Std. Err	0.2451	0.1906	0.2062	0.0405	0.0828	0.092	0.0616
	Z	2.53	-4.35	-3.28	2.92	8.91	8.82	-6.89
	P > Z	0.012	0	0.001	0.004	0	0	0
rho		1	-1	-1	1	1	1	-1
Sigma		0.6192	0.83	0.667	0.1184	0.7386	0.8816	0.4251
Number of Obv		23,202	23,202	23,202	23,202	23,202	23,202	23,202
Selected Obv		22,889	22,992	23,056	22,881	23,007	23,015	23,033
Prob > Chi2		0.052	0	0	0	0	0	0
Panel C - FA model								
		STD_1	LTD_1	TD_1	STD_2	LTD_2	TD_2	LTD_3
Inverse Mills Ratio (IMR)								
Lambda	Coef	0.8099	-0.7911	-0.7011	0.1103	0.6862	0.7648	-0.3895
	Std. Err	0.3378	0.1821	0.2166	0.0395	0.0741	0.0843	0.0559
	Z	2.14	-4.34	-3.24	2.79	9.25	9.07	-7.01
	P > Z	0.032	0	0.001	0.005	0	0	0
rho		1	-1	-1	1	1	1	-1
Sigma		0.8099	0.7911	0.7011	0.1103	0.6862	0.7648	0.3895
Number of Obv		23,202	23,202	23,202	23,202	23,202	23,202	23,202
Selected Obv		22,889	22,992	23,056	22,881	23,007	23,015	23,033
Prob > Chi2		0	0	0	0	0	0	0

This table shows the results of Heckman tests for the ABHK, FS and FA models. This study employs the Heckman (1979) two-stage model to estimate the impact of the ABHK scores on stock liquidity to correct for the potential self-selection biases. In the first-stage selection model, this study calculates the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. The selection equation contains a new variable - asset liquidity - that is not in the main model. Asset liquidity is measured as current assets/ current liabilities.

Table A4-1 Panel regressions for dividend policy using ABHK as the explanatory variable – Interaction terms

	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK * Stock liquidity								
1	-0.0760	-0.0025	0.0308	0.0098	0.0017	0.000003	-0.0545	0.1779
2	-0.0178	0.0178	0.0497	-0.0003	0.0029	0.000001*	0.0361	0.0811
3	0.0070	-0.0289	-0.0111	-0.0061	0.0014	0.000002	0.0124	0.0760
4	0.0054	-0.0579*	-0.0419	-0.0109	-0.0005	0.000001	-0.0050	-0.0105
5	-0.0577	0.0120	0.0362	-0.0063	-0.0004	0.000001	0.0018	0.1193
6	-0.3345*	-0.1048	-0.1233	-0.0352*	-0.0092*	0.000002	-0.1284*	0.1980
ABHK * Size								
1	-0.8596	0.1564	0.1903	0.0208	0.0044	-0.000001	0.2074	-0.1829
2	0.1257	-0.0408	0.0549	0.0489**	0.0083*	0.000003	0.2443***	0.2128
3	-0.2324	-0.0771	-0.0832	0.0120	0.0128**	0.000004*	0.2448***	0.2857*
4	0.3756	-0.0715	-0.0642	0.0875***	0.0169***	0.000005**	0.3223***	0.3892**
5	0.2998	-0.1146	-0.1328	0.0292	0.0116*	0.000004	0.3108***	0.1748
6	0.7330	-0.1092	-0.0552	0.1647***	0.0202*	0.000007	0.3333**	0.2969
ABHK * Growth								
1	-0.0411	-0.0087	-0.0106	-0.0025	-0.0011	-0.0000004	-0.0079	-0.0271
2	-0.0239**	-0.0075**	-0.0101**	-0.0016*	-0.0007***	0.0000001	0.0003	0.0054
3	0.0102	-0.0014	-0.0019	0.0001	-0.0003	0.0000001	0.0019	0.0079
4	-0.0075	-0.0021	-0.0033	-0.0005	-0.0005*	-0.0000001	0.0008	-0.0016
5	-0.0040	-0.0073	-0.0070	-0.0012	-0.0004	-0.0000002	-0.0020	-0.0105
6	0.0208	-0.0060	-0.0064	0.0020	0.0000	-0.0000003	-0.0028	-0.0182
ABHK * Profitability								
1	-2.6926	0.7583	0.7403	0.1701	0.0019	0.000015	-0.0239	1.4793
2	1.7648***	0.1120	0.3089	0.0437	0.0192	-0.000001	0.5327**	0.5748
3	0.1992	-0.0426	0.0099	-0.0060	0.0122	0.000002	0.1878	0.4688
4	1.1273*	-0.1929	-0.0408	0.1223*	-0.0005	-0.000001	0.1971	0.1800
5	1.7287*	-0.3731	-0.2027	0.0620	0.0198	-0.000010	0.2840	-0.8998
6	2.4157*	-0.1745	0.1439	0.1304	0.0762**	0.000005	0.6087	-0.2834
ABHK * Cash								
1	1.2989**	-0.0179	-0.0570	-0.0027	0.0024	0.000005	0.1223	0.3119
2	-0.2867	-0.0240	-0.1026	-0.0605***	-0.0143***	-0.000002	-0.1759***	-0.2515*
3	0.0506	0.0532	0.0782	-0.0081	-0.0167***	-0.000003	-0.0629	-0.2090
4	-0.3813*	0.0724	0.0944	-0.0747***	-0.0181***	-0.000002	-0.1020	-0.1037
5	-0.1725	0.0268	0.0585	-0.0269	-0.0140**	-0.000002	-0.0961	-0.0715
6	-0.3246	0.2020	0.1945	-0.1167***	-0.0104	-0.000003	0.0752	-0.1425
ABHK * Leverage								
1	1.4205*	-0.0533	-0.2010	0.0709	-0.0082	0.000003	0.0926	0.1934
2	0.3079	-0.0024	-0.0431	0.0330	0.0047	-0.000001	-0.1273	-0.3599*
3	0.6884**	-0.1039	-0.1040	0.0104	-0.0031	-0.0000004	-0.1274	-0.2408
4	0.7432**	-0.0753	-0.0828	0.0233	-0.0038	0.000001	-0.2162**	-0.3888*
5	0.9107**	0.1055	0.1057	0.0803**	0.0030	0.000007*	0.1046	0.3174
6	-0.0786	0.2828	0.3068	0.0222	0.0232*	0.000005	0.2348	0.0908
ABHK * Lifecycle								
1	0.2062	0.0838	0.0275	-0.0396	0.0017	-0.000001	-0.1784	-0.1369
2	-0.2447*	0.0631	0.0809	0.0095	0.0040	0.000002*	-0.1886***	-0.0259
3	-0.0892	0.0582	0.0749	0.0053	0.0024	0.000001	-0.1518***	0.0157
4	-0.1035	0.0363	0.0271	0.0084	0.0021	0.000001	-0.1629***	-0.0858
5	0.0335	0.1581*	0.1358	0.0428**	0.0083*	0.000003*	-0.0204	0.1054
6	-0.5269	-0.0363	-0.0516	-0.0368	-0.0196**	-0.000003	-0.1923*	-0.1659
ABHK * Risk (Beta)								
1	-1.6060	0.5157	-0.1961	0.0792	0.0226	0.000024	0.2225	1.7721
2	-1.2965**	-0.6280***	-0.7243***	-0.0686	0.0005	0.0000105*	-0.1733	-0.2869
3	-0.4487	-0.1160	-0.1351	0.1313**	0.0221*	0.000018***	0.5775***	0.8575*
4	0.4033	-0.0595	-0.1354	0.1874***	0.0322**	0.000024***	0.5498***	1.6119***
5	-1.0298	-0.1750	-0.2440	0.1068	0.0241	0.000016*	0.2881	0.3518
6	-1.4712	-0.7086	-0.5928	0.0042	0.0238	0.000006	-0.4315	-0.2711
ABHK * Tax								
1	2.8474	-3.1715*	-5.3915***	-0.3462	0.0016	-0.000015	2.9208*	-1.1344
2	-2.5340*	-1.3028**	-1.6639**	-0.0797	-0.0232	-0.000004	-0.3203	0.6211
3	-2.0143	-0.6327	-0.7190	-0.0976	0.0099	-0.000004	-0.1961	0.2551
4	-1.2757	-0.0782	-0.3005	-0.1013	0.0569*	0.000012	-0.0881	1.4071
5	-1.1436	-0.3325	-0.4712	-0.1734	0.0076	0.000020	-0.1840	0.2422
6	-0.3572	-0.4453	-0.8302	0.7203**	0.1599**	0.000039	-0.0598	2.0340

Table A4-2 Panel regressions for dividend policy using %FS as the explanatory variable – Interaction terms

Interaction terms								
FS * Stock liquidity	0.1178	0.0024	-0.0048	0.0042	0.0046*	0.000002*	-0.0073	0.0863
FS * Size	0.0551	-0.2116*	-0.1130	0.0151	0.0169**	0.000005*	0.3513***	0.4166*
FS * Growth	0.0179	-0.0070	-0.0069	-0.0009	-0.0004	-0.0000001	0.0043	0.0014
FS * Profitability	1.6266*	-0.0825	0.3316	0.0611	0.0321*	-0.000001	0.5317*	0.1398
FS * Cash	0.0231	0.1896**	0.1209	0.0148	-0.0150***	-0.000001	-0.0169	0.0103
FS * Leverage	1.1131***	0.0805	0.0853	0.0677*	0.0105	0.0000003	-0.0594	-0.3572
FS * Lifecycle	-0.2288	0.0307	0.0529	0.0197	-0.0008	0.000002	-0.1525**	-0.0121
FS * Risk	0.0047	-0.1783	-0.1096	0.1761***	0.0077	0.000035***	0.4695*	2.2066***
FS * Tax	-2.3246	0.1563	-0.1522	0.0243	.07568143*	0.000028*	-0.0594	2.1217*

Table A4-3 Panel regressions for dividend policy using %FA as the explanatory variable – Interaction terms

Interaction terms								
FA * Stock liquidity	0.2547	-0.0140	0.0407	0.0017	0.0002	0.000001	0.0704	0.2130*
FA * Size	-0.2533	-0.2140	-0.0991	0.0086	0.0091	0.000004	0.1442	0.3042
FA * Growth	0.0118	-0.0058	-0.0065	-0.0020	-0.0007*	-0.0000001	0.0033	0.0078
FA * Profitability	1.2075	-0.9248*	-0.2471	0.0389	0.0153	-0.000014	0.2280	-0.9968
FA * Cash	0.2095	0.2288*	0.0703	0.0078	-0.0074	0.000000	-0.0321	-0.0712
FA * Leverage	0.6991	0.2824	0.3305	0.0330	0.0026	-0.000003	0.0065	-0.3687
FA * Lifecycle	0.1396	0.1160	0.1333	0.0324	0.0051	0.000003	-0.0030	0.2087
FA * Risk	-0.9544	-0.2082	-0.2631	0.1745*	0.0274	0.000012	0.5495*	0.6318
FA * Tax	-0.1625	0.0029	-0.6682	0.1669	0.1728**	0.000033	0.1604	2.9760

Table A4-4 Sub-period analysis

Panel A - 1998 - 2003 - ABHK model								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	7.9899*	-0.0553	-0.4144	0.7044	0.0269	0.000033	0.7437	2.3013
2	0.2827	-1.7421*	-1.844	0.1472	0.0027	0.000008	0.1793	-0.4055
3	0.4645	-1.8950*	-2.0661*	0.1759	-0.0199	0.000022	0.0726	-0.3209
4	-0.7273	-1.8195	-2.087	-0.1066	-0.0419	0.000025	0.0101	0.224
5	2.7848	-1.325	-1.6698	0.1765	-0.0146	0.000008	0.2233	-0.5313
6	-2.2407	-3.0171	-3.147	-0.0308	-0.0116	-0.000074	-0.0947	-5.4911
Firm Factors								
Stock Liquidity	-0.0701	0.0105	-0.0519	0.0249**	0.0064**	0.000001	0.0657***	0.0190
Size	0.4029	-0.6009**	-0.4536*	0.1153**	-0.0175	0.000001	-0.0248	-0.1995
Growth	0.0469***	0.0128*	0.0141*	0.0032**	0.0000	0.0000001	0.0048	0.0090
Profitability	0.7124	-3.0998***	-3.8085***	0.3960***	0.0209	0.000043**	0.64718**	1.0064
Cash	0.2810	0.3177*	0.1878	-0.1639***	0.0152	-0.0000004	0.0711	-0.1732
Leverage	-0.2832	0.0845	-0.0212	0.0326	0.0102	-0.000006	0.3265***	0.1493
Lifecycle	0.1720	-0.2927*	-0.2365	-0.0280	-0.0284***	-0.000013***	0.1269*	-0.0006
Risk (Beta)	-5.9935***	-1.6807***	-1.3964*	-0.6633***	-0.1628***	-0.000052***	-2.4234***	-5.1550***
Tax	-1.2477	1.2693	2.5951*	-0.3907	-0.0241	-0.000096***	-0.9506**	-1.9541
No	2,494	2,485	2,481	2,489	2,475	2,463	2,489	2,436
R-squared	0.5058	0.1903	0.1546	0.2601	0.2504	0.2723	0.2734	0.2494
Panel B - 1998 - 2003 - Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	5.2629*	-1.2946	-1.5988	0.1297	0.000012	0.00001	-0.3392	-1.031
Firm Factors								
Stock Liquidity	-0.1245	0.0070	-0.0250	0.0173*	0.0041*	-0.000001	0.0298*	-0.1030
Size	0.8537**	-0.3001*	-0.2396	0.1626***	-0.0127	-0.000001	-0.0316	-0.1257
Growth	0.0471***	0.0158**	0.0171**	0.0041***	0.0002	0.0000001	0.0019	-0.0002
Profitability	2.0152**	-1.4300***	-2.0897***	0.3221***	0.0134	0.000028**	0.3920**	1.1640
Cash	0.0517	0.0895	0.0587	-0.2235***	0.0118*	0.000001	0.0537	-0.1024
Leverage	0.2983	0.2578	0.2132	0.0330	0.0097	-0.000001	0.2992***	0.5541
Lifecycle	0.3061	-0.1067	-0.0542	0.0022	-0.0195**	-0.000008**	0.1273**	0.2127
Risk (Beta)	-5.5475***	-0.9885*	-0.7492	-0.5541***	-0.1239***	-0.000032***	-1.7933***	-3.7530***
Tax	-3.4594*	-1.1195	-0.1716	-0.3538*	-0.0498	-0.000095***	-0.8552**	-4.1872**
No	2,509	2,500	2,496	2,504	2,490	2,478	2,504	2,451
R-squared	0.5085	0.2028	0.1602	0.3043	0.2577	0.2961	0.2503	0.2892
Panel C - 1998 - 2003 -Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	4.7793	0.4706	0.5863	0.1603	0.0099	0.000031	-0.4253	1.69
Firm Factors								
Stock Liquidity	-0.0318	0.0262	0.0024	0.0187**	0.0039*	-0.0000002	0.0367**	-0.0637
Size	0.4694*	-0.2166	-0.1551	0.1215***	-0.0103	-0.0000002	-0.0344	-0.0200
Growth	0.0413***	0.0109*	0.0119*	0.0032***	0.0003	0.0000001	0.0015	-0.0014
Profitability	0.8859	-0.7147*	-1.1056***	0.2729***	-0.0001	0.000024***	0.2713*	1.3291**
Cash	0.3239	0.0208	-0.0030	-0.1798***	0.0088	-0.000001	0.0608	-0.1901
Leverage	0.3376	0.2524	0.2044	0.0397	0.0098	0.000003	0.2409***	0.6067*
Lifecycle	0.3202	-0.0523	-0.0098	0.0142	-0.0101*	-0.000004*	0.0752*	0.1850
Risk (Beta)	-5.7511***	-0.9038**	-0.7159	-0.4723***	-0.1002***	-0.000034***	-1.7355***	-3.6428***
Tax	-1.4007	-0.7938	-0.1483	-0.3089*	-0.0113	-0.000074***	-0.6151**	-3.7179***
No	2,509	2,500	2,496	2,504	2,490	2,478	2,504	2,451
R-squared	0.5198	0.1681	0.1339	0.2879	0.1682	0.3165	0.2411	0.3044

Panel D - 2004 - 2007 - ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-3.4519	-5.1449	-5.4156	-0.845	-0.0667	-0.000119	-0.282	0.129
2	1.4302	0.3622	0.219	-0.2117	-0.1186	-0.000068**	0.6906	-6.5725***
3	1.2908	0.2576	-0.1116	-0.094	-0.1725**	-0.000071**	0.5496	-5.729***
4	0.4304	0.4594	0.2111	-0.0971	-0.1664**	-0.000064*	0.5313	-6.4062***
5	0.6811	1.2412	0.4458	-0.2674	-0.1201	-0.000039	-0.0159	-5.3557**
6	-8.3358	0.6628	0.1849	-0.1144	-0.1769	-0.000049	-0.5844	-6.5488*
Firm Factors								
Stock Liquidity	0.0523	0.0555	0.0700	0.0130	0.0012	-0.000001	-0.0070	0.0903
Size	-0.1933	-0.2284	0.0465	-0.0079	-0.0545***	-0.000011**	0.0838	-0.4227
Growth	0.0143	0.0033	0.0033	0.0022	0.0006*	0.0000001	-0.0006	-0.0056
Profitability	0.7004	-0.7601	-1.4528**	0.0728	-0.0291	-0.000007	0.2912	-0.4522
Cash	0.0909	-0.1148	-0.6075**	-0.1292***	0.0235**	-0.000002	-0.1075	-1.0357***
Leverage	0.3000	0.0313	0.0379	0.0359	0.0101	0.000001	0.0808	-0.0660
Lifecycle	0.0836	0.0152	0.1535	-0.0160	-0.0122	-0.000007	-0.0111	-0.2561
Risk (Beta)	-2.3386*	-1.0348	-0.6647	-0.2172	-0.0756**	-0.000088***	0.5725*	-6.8283***
Tax	-0.7495	-0.8040	0.5184	0.0893	0.0221	-0.000011	-0.1511	-0.4628
No	2,886	2,869	2,864	2,857	2,852	2,879	2,880	2,890
R-squared	0.0868	0.014	0.0039	0.0009	0.0002	0.2191	0.0148	0.186
Panel E - 2004 - 2007 - Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	2.8484	0.2446	0.0635	0.079	-0.104	-0.000049	0.5728	-6.1959**
Firm Factors								
Stock Liquidity	0.0722	0.0448	0.0414	0.0068	0.0016	-0.000001	0.0064	0.0810
Size	-0.0759	-0.3039*	-0.2019	0.0140	-0.0405***	-0.000007*	0.0769	-0.4823**
Growth	0.0060	0.0030	0.0027	0.0013	0.0003	-0.000001	-0.0008	-0.0051
Profitability	0.1027	-1.4850***	-1.9726***	-0.0927	-0.0501**	-0.000018*	0.1749	-1.0009*
Cash	0.0326	-0.0596	-0.2460*	-0.1167***	0.0179***	-0.000001	-0.1304**	-0.5571***
Leverage	-0.0583	0.1976	0.2573	-0.0029	0.0127	0.0000004	0.0978	0.1664
Lifecycle	0.2236	0.0233	0.0802	-0.0051	-0.0083	-0.000004	0.0290	-0.1697
Risk (Beta)	-2.0873*	-0.3640	0.0180	-0.1445	-0.0467*	-0.000071***	0.5770**	-5.3561***
Tax	0.6179	-1.0465	-0.2547	0.0444	0.0415	-0.000001	0.0144	-0.1460
No	2,895	2,878	2,872	2,866	2,861	2,888	2,889	2,899
R-squared	0.197	0.0049	0.0012	0	0.0026	0.1933	0.0521	0.1676
Panel F - 2004 - 2007 - Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	1.8079	2.0609	1.5063	0.1973	-0.0037	0.000008	-0.1381	-1.9114
Firm Factors								
Stock Liquidity	0.0424	0.0203	0.0125	0.0040	0.0017	-0.0000004	-0.0176	0.0268
Size	-0.3596	-0.3767**	-0.3430*	-0.0022	-0.0288***	-0.000007**	-0.0424	-0.4966**
Growth	0.0113	0.0018	0.0015	0.0012	0.0004	-0.0000001	-0.0003	-0.0048
Profitability	0.3359	-1.2266***	-1.6215***	0.0001	-0.0116	-0.000010	0.1708	-0.5016
Cash	0.2672	0.0693	-0.0225	-0.0911***	0.0101*	0.000001	0.0026	-0.2317*
Leverage	0.2022	0.2102	0.2822	0.0214	0.0101	0.000001	0.1510**	0.2639
Lifecycle	0.2277	0.0694	0.1179	0.0015	-0.0044	-0.000001	0.0521	-0.0045
Risk (Beta)	-1.9012*	-0.1411	0.1526	-0.1576*	-0.0366	-0.000059***	0.4088**	-4.6720***
Tax	0.6636	-1.2470*	-0.8874	-0.0417	-0.0055	-0.000010	-0.1805	-0.8620
No	2,895	2,878	2,872	2,866	2,861	2,888	2,889	2,899
R-squared	0.2317	0.0014	0.0002	0.002	0.0011	0.1891	0.0379	0.173

Panel G - 2008 - 2011 - ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-3.1108	-4.71	-4.3658	-0.7867	-0.1077	-0.000102	-1.676	-8.1507
2	1.6055	1.5953	1.9374	0.033	-0.0575	-0.000028	-1.5746***	-2.1631
3	0.8277	2.1988*	2.4114*	0.1499	-0.0239	-0.000007	-1.7293***	-2.6455
4	1.9131	2.8701**	3.7651**	0.2499	-0.0102	0.000003	-1.3474**	-0.7758
5	3.9377	3.6844**	4.7636***	0.4034	-0.0067	0.000015	-1.5204**	-0.1885
6	-1.3025	1.8899	2.689	0.2524	-0.0694	-0.000004	-0.9551	-2.7712
Firm Factors								
Stock Liquidity	-0.1208	-0.0056	-0.0337	-0.0169	-0.0072**	0.000003**	-0.0497**	-0.0327
Size	-0.3707	0.3144	0.5120**	0.0435	-0.0145	-0.000006	-0.2056**	-0.6260
Growth	0.0016	0.0021	0.0003	0.0006	0.0007	-0.0000001	-0.0024	-0.0242
Profitability	-0.2263	-0.2998	-0.4182	-0.0006	0.0023	0.0000005	-0.0481	-1.0494*
Cash	0.5641*	-0.2215*	-0.1796	-0.0508*	0.0083	0.000002	0.1175*	0.3004
Leverage	0.7020	0.2958	0.1963	0.0417	0.0123	0.000012*	0.3706***	0.9940**
Lifecycle	0.2133	-0.1139	-0.1135	-0.0087	0.0001	0.000005	0.0328	0.5009*
Risk (Beta)	-3.4798**	-1.8573***	-1.2567*	-0.2962*	-0.0715*	-0.000059***	-1.4501***	-5.1201***
Tax	1.0682	-0.7980	-0.9493	0.1081	-0.0312	0.000001	-0.1249	0.5235
No	3,568	3,539	3,538	3,547	3,545	3,543	3,565	3,539
R-squared	0.1866	0.0957	0.0741	0.06	0.0297	0.1416	0.223	0.1504
Panel H - 2008 - 2011 - Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	2.191	0.4642	0.5471	0.0954	0.0032	0.000018	-1.0091	0.9162
Firm Factors								
Stock Liquidity	-0.2631**	-0.0276	-0.0396	-0.0155	-0.0066**	0.000003**	-0.0455**	0.0508
Size	-0.1213	0.1921	0.3231*	0.0530	-0.0096	-0.000003	-0.0379	-0.2119
Growth	-0.0069	0.0037	0.0023	0.0002	0.0004	-0.000001	-0.0003	-0.0091
Profitability	0.3880	-0.3185	-0.3944	0.0208	0.0017	0.000003	-0.0215	-0.5509
Cash	0.4311*	-0.3010***	-0.2538**	-0.0751***	0.0058	0.000001	0.0598	-0.0734
Leverage	0.2461	0.2140	0.1631	0.0271	0.0073	0.000009*	0.1843*	0.7713*
Lifecycle	0.0741	-0.0488	-0.0647	-0.0172	-0.0050	0.000002	0.0130	0.5380*
Risk (Beta)	-4.4426***	-1.9169***	-1.4037**	-0.3640***	-0.0705**	-0.000058***	-1.0958***	-4.3596***
Tax	-0.6730	-1.2821*	-1.6086*	-0.0243	-0.0240	-0.000006	-0.0133	0.6965
No	3,579	3,550	3,549	3,558	3,556	3,554	3,576	3,550
R-squared	0.1921	0.1536	0.161	0.1079	0.0319	0.1713	0.259	0.1515
Panel I - 2008 - 2011 - Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-0.5343	-1.4399	-1.4502	-0.1563	-0.0208	-0.000001	-1.1876**	-1.8406
Firm Factors								
Stock Liquidity	-0.1864**	0.0029	-0.0308	-0.0085	-0.0028	0.000002***	-0.0379**	0.0856
Size	-0.2515	0.0076	0.1686	0.0227	-0.0139*	-0.000004	-0.0129	-0.3283
Growth	-0.0043	0.0048	0.0054	0.0009	0.0005	-0.000001	0.0027	-0.0096
Profitability	0.2449	-0.3265*	-0.4378*	0.0050	0.0007	0.000003	-0.0297	-0.3924
Cash	0.2748	-0.1951**	-0.1702*	-0.0593***	0.0035	0.000001	0.0456	-0.0517
Leverage	0.1888	0.1632	0.0668	0.0175	0.0062	0.000008*	0.1379*	0.7932**
Lifecycle	0.1043	0.0073	0.0119	-0.0050	-0.0037	0.000002	0.0023	0.4494**
Risk (Beta)	-3.5111***	-1.7664***	-1.0939**	-0.3075***	-0.0521*	-0.000050***	-1.0604***	-4.2263***
Tax	-0.3656	-1.0670*	-1.4378**	-0.0278	-0.0245	-0.000006	0.0197	-0.3429
No	3,579	3,550	3,549	3,558	3,556	3,554	3,576	3,550
R-squared	0.2443	0.1241	0.1073	0.0881	0.0095	0.1701	0.2594	0.1663

Panel J - 2012 - 2019 - ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	-1.7512	-1.2982	1.0288	-0.0202	0.0411	0.000002	-0.5714	0.1136
2	1.1307	0.4926	0.7116	0.0874	0.0191	-0.000005	0.1512	-0.6302
3	-0.3909	0.5241	0.5845	0.0323	0.0208	0.000005	-0.2705	-0.8345
4	-1.56	0.6629	0.7007	-0.0211	0.0305	0.000003	0.136	-0.602
5	-1.8083	0.5937	0.6836	0.1322	0.0359	0.000005	0.0082	-0.5525
6	-0.543	0.7853	0.7689	-0.198	-0.01	-0.000015	-1.3575**	-1.925
Firm Factors								
Stock Liquidity	0.0176	0.0213	0.0268	0.0050	0.0006	0.0000002	-0.0255	0.0837
Size	0.1822	0.0547	0.0314	-0.0071	-0.0039	-0.000006***	-0.0366	-0.4814***
Growth	-0.0038	0.0038	0.0043	0.0003	0.0007***	0.000001	0.0022	-0.0176***
Profitability	-0.0687	-1.1507***	-1.3087***	-0.0018	-0.0076	-0.000004	-0.0150	-0.4598
Cash	0.3014*	-0.0556	-0.0445	-0.0720***	0.0039	0.000001	0.0688	-0.1089
Leverage	-0.5557*	0.1002	0.1074	-0.0194	0.0003	0.000001	0.1815**	0.7259***
Lifecycle	0.0562	0.0219	0.0379	0.0000	-0.0060	-0.000002*	0.0192	0.1052
Risk (Beta)	-2.8944***	0.0647	0.1018	-0.2923***	-0.0750***	-0.000025***	-0.7533***	-2.9809***
Tax	0.8342	0.2046	0.2975	-0.0403	0.0258	-0.000006	0.0676	-0.7385
No	8,484	8,430	8,436	8,435	8,433	8,457	8,406	8,473
R-squared	0.3063	0.0226	0.0219	0.0071	0.1245	0.0184	0.1513	0.0539
Panel K - 2012 - 2019 -Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FS	-0.3953	0.6302	0.7851	-0.0491	-0.0138	-0.00001	-0.5717	-0.2396
Firm Factors								
Stock Liquidity	0.0314	0.0051	0.0171	0.0016	0.0002	0.0000003	-0.0444**	0.0923*
Size	0.1829	0.0432	0.0226	0.0078	-0.0072*	-0.000006***	-0.0295	-0.4580***
Growth	-0.0107	0.0023	0.0022	0.0002	0.0005***	0.000001	-0.0002	-0.0191***
Profitability	0.0562	-1.0872***	-1.2328***	0.0309	-0.0009	-0.000002	-0.0342	-0.5487*
Cash	0.2969**	-0.0623	-0.0747	-0.0911***	0.0039	0.000001	0.0635*	-0.0668
Leverage	-0.4757**	0.0021	0.0616	-0.0233	-0.0028	0.000002	0.1354*	0.5291***
Lifecycle	0.1701	0.0391	0.0601	0.0058	-0.0032	-0.000002	0.0172	0.0634
Risk (Beta)	-3.6460***	-0.1048	-0.1694	-0.3284***	-0.0631***	-0.000031***	-0.8023***	-3.0182***
Tax	1.4186	-0.2908	-0.2712	-0.0197	-0.0007	-0.000004	0.1816	-0.3550
No	9,575	9,518	9,523	9,522	9,519	9,548	9,497	9,564
R-squared	0.3108	0.0072	0.0068	0.0074	0.0521	0.0177	0.1036	0.0241
Panel L - 2012 - 2019 - Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-5.2017**	0.7769	0.8683	-0.1536	0.0181	-0.000021	0.1195	-3.1324*
Firm Factors								
Stock Liquidity	0.0021	0.0187	0.0283	0.0030	0.0006	0.000001	-0.0533***	0.0634
Size	0.2190	0.0250	0.0066	0.0202	-0.0058	-0.000006***	0.0053	-0.4796***
Growth	-0.0024	0.0020	0.0019	0.0006	0.0005***	-0.000001	0.0008	-0.0175***
Profitability	0.5995*	-1.1461***	-1.2755***	0.0415	0.0034	-0.000001	0.0493	-0.5868**
Cash	0.1698*	-0.0821*	-0.1015*	-0.1123***	0.0013	-0.000002	0.0474	-0.0763
Leverage	-0.1075	0.0473	0.1070	-0.0044	-0.0009	0.000003	0.1392**	0.5083***
Lifecycle	0.1653	0.0303	0.0487	0.0115	-0.0021	-0.000001	-0.0064	0.0645
Risk (Beta)	-4.2914***	-0.2798	-0.3573	-0.3513***	-0.0590***	-0.000032***	-0.7673***	-2.9122***
Tax	0.8245	-0.1614	-0.1664	-0.0129	-0.0088	-0.000004	0.0777	-0.3180
No	8,499	8,445	8,451	8,450	8,448	8,472	8,421	8,488
R-squared	0.331	0.0093	0.0105	0.0061	0.0559	0.0138	0.154	0.0391

Panel M - 2020 - ABHK								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
ABHK								
1	7.0951	0.7760	0.8557	0.2353	-0.0780	0.000090	0.7506	7.2772
2	1.7082	-0.3760	-1.0080	-0.1816	-0.0770	-0.000002	0.6945	-0.6629
3	-2.0708	-1.3310	-0.4757	-0.6687**	-0.1222	-0.000036	-0.1120	-2.7239
4	0.7312	0.4464	0.6122	-0.1169	0.0391	0.000022	1.8691	1.0516
5	3.1620	-0.4919	-0.1883	-0.4482	-0.1549	-0.000004	0.4786	-1.3761
6	26.5896*	4.5483	4.9207	0.8756	0.1397	0.000119	-0.6911	7.9670
Firm Factors								
Stock Liquidity	0.0947	0.0480	0.1070	0.0461*	0.0127*	0.000001	-0.1911*	0.2150
Size	0.1469	-0.0193	-0.0356	-0.0860*	-0.0216	-0.000002	0.1364	-0.3279
Growth	-0.0025	0.0017	-0.0031	0.0006	0.0007	0.000000	0.0109	-0.0228
Profitability	0.4677	-0.2750	-0.5389	0.0686	-0.0027	0.000002	0.1092	-0.1456
Cash	0.6653	-0.1202	-0.0921	0.0304	0.0130	0.000002	0.4102**	0.1432
Leverage	-0.0143	0.2750	0.2210	0.0260	0.0207	0.000008	0.1117	0.2616
Lifecycle	-0.1481	-0.0526	-0.1673	-0.0243	-0.0188*	-0.000002	-0.2039	-0.2137
Risk (Beta)	-11.3389***	-2.0353***	-2.1131***	-0.8557***	-0.2802***	-0.000049***	-2.6859***	-5.7061***
Tax	12.6801**	1.0421	1.2686	0.5317	0.0966	0.000075	2.4158	4.9054
No	1,006	992	998	1,004	997	999	979	981
R-squared	0.5332	0.4019	0.3474	0.5875	0.6773	0.4289	0.4514	0.4276
Panel N - 2020 - Percentage Foreign Sales								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
P_FS	-0.8862	-0.6137	-1.2435	-0.5322*	-0.0182	-0.000043	1.4941	-3.3577
Firm Factors								
Stock Liquidity	0.1594	0.0583	0.1347	0.0492**	0.0085	0.000001	-0.1631*	0.2901
Size	0.0742	-0.0261	-0.1308	-0.0585*	-0.0137	-0.000006	0.2266	-0.5434
Growth	-0.0079	0.0042	0.0001	0.0015	0.0007	-0.0000003	0.0086	-0.0228
Profitability	0.0679	-0.1778	-0.7432	0.0851	-0.0014	0.000002	0.1781	0.0181
Cash	0.5807	-0.1037	-0.0267	0.0008	0.0082	0.000004	0.2802*	0.2235
Leverage	0.2419	0.3162*	0.3624*	0.0328	0.0170	0.000009*	0.1238	0.5884
Lifecycle	0.0274	-0.0350	-0.0868	-0.0233	-0.0120	-0.000002	-0.1581	-0.0970
Risk (Beta)	-12.0847***	-2.1841***	-2.466***	-0.8896***	-0.2132***	-0.000061***	-2.9982***	-6.4013***
Tax	13.6171***	0.7457	1.0366	0.6387*	0.1080	0.000079*	3.4086**	6.2084*
No	1,008	994	1,000	1,006	999	1,001	981	983
R-squared	0.5022	0.3729	0.3236	0.5602	0.6571	0.3677	0.4082	0.3842
Panel O - 2020 - Percentage Foreign Assets								
	Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
FA	-11.8726*	0.0160	-3.4964	-0.9204	-0.2059	-0.000072	-1.1288	0.4567
Firm Factors								
Stock Liquidity	0.0277	0.0165	0.0768	0.0359**	0.0085	0.000001	-0.1829**	0.2197
Size	-0.0671	0.0095	-0.1348	-0.0377	-0.0154	-0.000005	0.1474	-0.4957
Growth	-0.0155	0.0040	0.0000	0.0013	0.0006	-0.0000003**	0.0057	-0.0319**
Profitability	0.3702	-0.0554	-0.6252	0.1106	0.0157	0.000003	0.1287	0.0851
Cash	0.8517**	-0.0674	0.0655	0.0103	0.0102	0.000005*	0.3237**	0.4431
Leverage	0.2482	0.2158	0.2776	0.0269	0.0188	0.000008	0.1286	0.6731
Lifecycle	-0.0518	-0.0375	-0.0865	-0.0146	-0.0124*	-0.000001	-0.1162	0.0062
Risk (Beta)	-12.1764***	-2.0772***	-2.2930***	-0.8571***	-0.2157***	-0.000055***	-2.9431***	-5.7190***
Tax	8.0944**	0.1077	0.1226	0.3413	0.1460	0.000052	1.9352	3.4270
No	1,008	994	1,000	1,006	999	1,001	981	983
R-squared	0.5029	0.3717	0.3253	0.5542	0.6587	0.367	0.4068	0.3817

Table A4-5 Heckman tests

Panel A - ABHK model									
		Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
Inverse Mills Ratio (IMR)									
Lambda	Coef	46.8612	1.9422	2.28	0.216	0.1581	0.00002	1.5387	2.1134
	Std. Err	5959.596	0.596	0.6743	0.0609	0.0275	0.000007	0.2009	0.3449
	Z	0.01	3.26	3.38	3.54	5.75	3.34	7.66	6.13
	P > Z	0.994	0.001	0.001	0	0	0.001	0	0
rho		1	1	1	1	1	1	1	1
Sigma		46.8612	1.9422	2.28	0.216	0.1581	0.00002	1.5387	2.1134
Number of Obv		17,763	17,763	17,763	17,763	17,763	17,763	17,763	17,763
Selected Obv		17,731	17,608	17,605	17,623	17,586	17,637	17,602	17,608
Prob > Chi2		1	0	0	0	0	0	0	0
Panel B - FS model									
		Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
Inverse Mills Ratio (IMR)									
Lambda	Coef	2.1014	2.7217	3.3556	0.3117	0.1588	0.00003	1.3996	2.3123
	Std. Err	0.7635	0.9892	1.1979	0.0991	0.0299	0.00001	0.1691	0.4047
	Z	2.75	2.75	2.8	3.14	5.3	2.89	8.28	5.71
	P > Z	0.006	0.006	0.005	0.002	0	0.004	0	0
rho		1	1	1	1	1	1	1	1
Sigma		2.1014	2.7217	3.3556	0.3117	0.1588	0.00003	1.3996	2.3123
Number of Obv		17,815	17,815	17,815	17,815	17,815	17,815	17,815	17,815
Selected Obv		17,783	17,660	17,656	17,675	17,638	17,689	17,654	17,660
Prob > Chi2		0	0	0.0051	0	0	0	0	0
Panel C - FA model									
		Div_1	Div_2	Div_3	Div_4	Div_5	Div_6	Div_7	Div_8
Inverse Mills Ratio (IMR)									
Lambda	Coef	1.8614	2.5928	3.3775	0.363	0.1813	0.00004	1.6064	2.5327
	Std. Err	0.582	0.9554	1.2446	0.1156	0.0348	0.00001	0.2045	0.4486
	Z	3.2	2.71	2.71	3.14	5.21	2.91	7.85	5.65
	P > Z	0.001	0.007	0.007	0.002	0	0.004	0	0
rho		1	1	1	1	1	1	1	1
Sigma		1.8614	2.5928	3.3775	0.363	0.1813	0.00004	1.6064	2.5327
Number of Obv		17,815	17,815	17,815	17,815	17,815	17,815	17,815	17,815
Selected Obv		17,783	17,660	17,656	17,675	17,638	17,689	17,654	17,660
Prob > Chi2		0	0	0.0075	0	0	0	0	0

This table shows the results of Heckman tests for the ABHK, FS and FA model. This study employs the Heckman (1979) two-stage model to estimate the impact of the ABHK scores on stock liquidity to correct for the potential self-selection biases. In the first-stage selection model, this study calculates the inverse Mills ratio based on the results of the probit model of firms' multinationality behaviours and included it as a regressor in the second-stage models. The selection equation contain a new variable -ownership - that is not in the main model. Ownership is measured as (Number of Closely Held Shares / Common Shares Outstanding).