



Corporate International Diversification: Empirical Evidence from Japanese Firms

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博士論文

**Corporate International
Diversification:
Empirical Evidence from
Japanese Firms**

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1. Introduction

1.1. Background and Purpose of the Research

Corporate international diversification, defined as the process of expansion of company's business activities into foreign countries, has become quite common for many firms all over the world. Firms diversify their operations internationally through various forms of overseas activities which include exporting, licensing, joint venture, foreign direct investment, cross-border mergers and acquisitions. Regarding the international diversification of corporate business, whether it is beneficial to the firm has been a salient issue among the international business literature. Although many studies have examined the effect of corporate international diversification on various outcomes of the firm (e.g., financial performance, firm risk, and market value), the issue is still controversial.

Theories of the motivation of international expansion assume that firms can get benefit from their overseas investments. For example, the classical trade theory (Smith, 1776; Ricardo, 1817), based on the concept of cost advantage, explains that countries export goods and services in which they have an economic advantage and import them in which they have an economic disadvantage. The market imperfection theory suggests that some firms have competitive advantages such as lower-cost factors, know-how skills, distributional and marketing advantages, and expertise in product differentiation due to imperfections of products, factors of production, and financial assets. Therefore, the firms invest overseas to capitalize on their competitive advantages which are not shared by competitors in foreign countries (Hymer, 1970). In the context of the internalization theory (Buckley and Casson, 1976), firms create their own internal market across national boundaries to increase profits and reduce costs, transaction costs with external markets are greater than the costs to develop the internal markets. Therefore, international diversification can be an effective strategy for firm to obtain greater growth opportunities, higher profitability, and cost reduction.

However, contrary to these theoretical arguments, empirical studies do not

always provide evidences of positive impact of corporate international diversification on business outcomes. For example, previous literature on the relation between overseas business activities and financial performance suggests various relations: positive linear, negative linear and curvilinear relation (Grant, 1987; Michel and Shaked, 1986; Contractor et al., 2003). Empirical evidences of various relations imply that international operations involve negative aspects as well as positive aspects. Some costs of foreign expansion like currency risk, political risk, and an increase in agency costs would be considered as the negative aspects. Studies examining how overseas operations influence risk of the firm also suggest conflicting results. Hughes et al. (1975) suggest that international business activities reduce firm risk because of diversification benefits, while Reeb et al. (1998) and Olibe et al. (2008) show that international diversification increases risk. In addition, the results of previous studies on the effect of foreign expansion on market value of the firm are inconsistent. Regarding the relations between international operations and Tobin's Q, both positive and negative relations are observed by empirical studies (Morck and Yeung, 1991; Click and Harrison, 2000). Thus, the question whether corporate international diversification is beneficial to the firm remains unanswered.

To clarify this question, I investigate the effect of corporate international diversification on business outcomes using a sample of listed Japanese firms. Only few studies explore the financial impact of overseas expansion by Japanese firms, compared to studies on that of American or European firms. While some literature finds a positive (Yamamoto, 1999) or curvilinear relation (Lu and Beamish, 2004) between overseas activities of Japanese firms and financial performance, there is little evidence on how international operations of Japanese firms influence on risk or other business outcomes. Therefore, further empirical evidences for their overseas expansion are needed for Japanese firms.



Figure 1.1 Trends of the ratio of companies that have overseas subsidiaries in Japan

Source: Basic Survey of Japanese Business Structure and Activities (2015), Ministry of Economy, Trade and Industry

Japanese firms have aggressively expanded their business into foreign markets by increasing their international activities. Figure 1.1 illustrates the trends of the ratio of Japanese companies that have overseas subsidiaries from 2005 to 2014. This indicates that the ratio of companies having overseas subsidiaries has been increased in three major industries: manufacturing, wholesale trade, and retail trade. Figure 1.2 shows the change in the ratio of overseas production, sales and income of Japanese manufacturing companies from 2001 to 2015. As shown in the figure, the ratios are in an upward trend. According to the result of survey by JBIC (Japan Bank for International Cooperation)¹ in 2016, the ratio of companies which have plans to strengthen and expand their overseas operations in the medium-term is 76.6 %.

¹ The Japan Bank for International Cooperation (JBIC) releases the results of an annual survey on Japanese manufacturers' overseas business operations titled as "Survey Report on Overseas Business Operations by Japanese Manufacturing Companies".

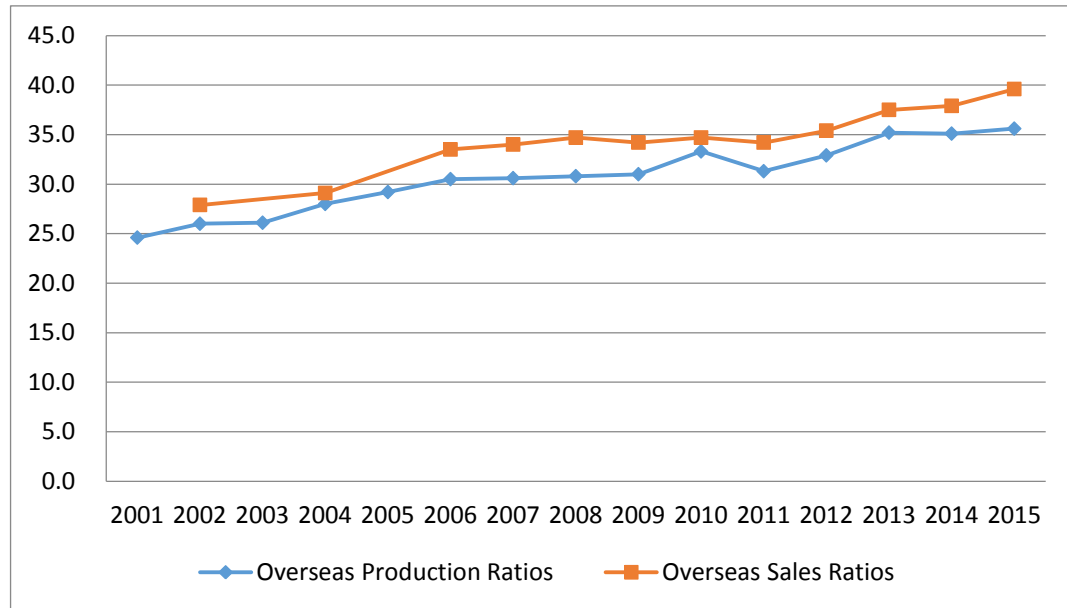


Figure 1.2 the change in the ratio of overseas production and sales of Japanese manufacturing companies

Source: Basic Survey Report on Overseas Business Operations by Japanese Manufacturing Companies (2016), Japan Bank for International Cooperation (JBIC)

Owing to consistently growing overseas business activities, it may become more critical for Japanese firms to scrutinize how foreign expansion influences their business outcomes. Based on the theoretical arguments and the review of previous research, I introduce how various advantages and disadvantages of international activities are associated with the effect on business outcomes. In addition, this study aims to identify the relation between international diversification of Japanese firms and business outcomes by empirical analysis. I focus on four types of the outcomes in the empirical analysis. The first outcome is financial performance, since profitability is one of the key factors that influence business decisions. Second, I examine firm risk which is also one of the important factors in investment decision making. Third, I investigate the accuracy of management earnings forecasts to confirm the predictability of earnings from overseas operations. Finally, stock liquidity, unexplored in the international business literature despite an importance in terms of firm value, is considered. The results of empirical analysis are expected to provide evidences of the return and risk of international activities of Japanese firms, and to contribute to understanding whether overseas expansion is beneficial to

them.

1.2. Outline

The reminder of this study is organized as follow.

Chapter 2 examines the effect of corporate international diversification on financial performance. Firms' overseas expansion involves both various benefits and costs. The relation between international operations and performance would be determined by the balance of the benefits and costs. Unfortunately, the results of previous studies suggest mixed results of linear (positive and negative) and curvilinear (U-shaped, inverted U-shaped, and S-shaped) relation. In the results of empirical analysis using a sample of listed Japanese firms, the relation between international diversification and financial performance is the S-shaped, which is negative in the first and third stage of internationalization, but, positive in the second stage. This implies that the balance between the benefits and the costs of overseas expansion varies in the phases of internationalization, and finding the optimal level of international diversification is important for multinational firms to secure the profitability of their business activities.

In Chapter 3, I investigate the relation between international diversification and firm risk. Diversification benefits obtained by operating in multiple markets which are not perfectly correlated can decrease risk, according to portfolio theory. However, additional risk factors of foreign expansion including currency risk, political risk, and greater agency costs may increase risks of multinational firms. Previous studies also report conflicting results, risk-increasing and risk-decreasing. The results of this chapter present that corporate international diversification increases systematic, idiosyncratic, and total risk. This indicates that shareholders consider overseas expansion of Japanese firms as risk-increasing and the cost of capital of Japanese multinationals becomes higher because of the increase in risk.

Chapter 4 explores the relation between corporate international diversification and the accuracy of management earnings forecasts of Japanese firms. If multinational operations can reduce the firm's earnings volatility because of the

diversification benefits, it may make it less difficult to forecast future earnings, thereby enhancing the accuracy of management earnings forecasts. On the other hand, an increasing effect of various risk factors of overseas activities on earnings volatility and the greater complexity of informational environment of multinational may increase the difficulty of forecasting tasks. The result indicates that international diversification is associated with less accurate management forecasts. This finding also implies that forecasting task of a manager becomes more difficult as the firm becomes more diversified internationally due to the greater uncertainty and complexity of foreign activities.

In Chapter 5, I provide an evidence for the relationship between corporate international diversification and stock liquidity. The relation depends on whether international activities increase informational efficiency of stock price of the firm, since an improvement in the informational efficiency results in an increased stock liquidity. Overseas expansion may improve the informational efficiency of stock price of the firm owing to greater monitoring by investors and analysts worldwide and more detailed disclosure than domestic firms, while an increase in operational complexity and greater agency costs of multinational firms decrease the informational efficiency. The result in this chapter shows that corporate international diversification is associated with greater stock liquidity. In addition, the positive relationship remains unchanged, after controlling for the other determinants of stock liquidity. This result indicates that firms can enhance the liquidity of their stocks by diversifying their operations internationally.

In chapter 6, I conclude that corporate international diversification is not necessarily beneficial to Japanese firms, based on empirical results from chapter 2 to 5. Financial performance is improved only at the optimal level of internationalization. In addition, international business activities of Japanese firms increase risk and decrease the accuracy of their management earnings forecasts. This implies that firms would be exposed to greater uncertainty and complexity of their operations if they expand their business overseas. However, overseas operations of Japanese firms increase their stock liquidity. Regarding the results, I

infer that increase in stock return or transparency between insiders and outside investors may be the reason for the greater stock liquidity of Japanese multinationals.

2. The Effect of Corporate International Diversification on Financial Performance

2.1. Introduction

How corporate international diversification influence financial performance is an important issue in international business, because profitability is valuable information owing to its importance on decision making process (Lin et al., 2011). According to general assumption, the firms expand their operations internationally to pursuit better performance. However, overseas expansion involves costs, as well as benefits. The relation between corporate international diversification and performance is expected to depend on whether the benefits dominate the costs or not. While considerable studies have investigated the relation, the results among these have no consensus.

Some previous studies find international activities have a positive effect on performance of the firm (e.g., Grant, 1987; Tallman and Li, 1996; Delios and Beamish, 1999). On the contrary, some studies show that multinational firms have lower performance compared to domestic firms (e.g., Michel and Shaked, 1986; Click and Harrison, 2000). In addition to the linear relation, some studies suggest a curvilinear relation between corporate international diversification and financial performance, such as U-shaped, (e.g., Ruigrok and Wagner, 2003), inverted U-shaped (e.g., Gomes and Ramaswamy, 1999), and S-Shaped (e.g., Contractor et al., 2003, Lu and Beamish, 2004). Regarding the result of S-shaped relation, Contractor et al. (2003) explain that financial performance is decreased because of greater costs of initial expansion in the first stage of internationalization, while performance is improved in the second stage since the benefits of international diversification prevail over the costs. Finally, in the third stage, performance declines again due to over-internationalization. Thus, the curvilinear relations imply that the net effect of the benefits and costs of foreign expansion varies with the different phases of international diversification.

Regarding the reason for inconsistent results of previous studies, I infer that that

the relation between corporate international diversification may vary with the characteristics of the sample, because the net effect of the benefits and costs of overseas business activities varies with those of different samples. Given this inference, I examine how corporate international diversification influences financial performance with a sample of listed Japanese firms in this chapter. While many studies use a sample of American or European firms, very few of studies analyze Japanese firms (Yamamoto, 1999; Lu and Beamish, 2004). Further, these studies provide old-fashioned evidences and use the different measures of international diversification². I use the ratio of foreign sales and assets used in previous studies generally to measure the degree of international diversification.

I find that corporate international diversification has the S-shaped relations with financial performance measured by ROS, ROE, and ROA. In the regression results, the linear and cubic terms of international diversification measure are negatively associated with the performance measures, while the quadric terms are positively associated with the performance measures. The relation indicates the relation between corporate international diversification and financial performance is changed by the phases of internationalization. This provides implications for Japanese firms that they should consider the optimal level of international diversification to make a greater profit by their foreign expansion.

In addition, I provide additional implication by dividing the sample into two groups in terms of foreign sales ratio or foreign assets ratio, higher and lower level of these. Corporate international diversification has the S-shaped relation with performance of firms with the high-level of internationalization and the firms are likely to have greater growth opportunities and size. However, international diversification decreases performance of firms in the low-level group and the firms are likely to have less growth opportunities and small size. Thus, foreign expansion of these firms may be over-investment.

This study has some contributions. First, this study is one of few studies to

² Yamamoto (1999) uses the entropy index based on sales ratio as the measure of international diversification. Lu and Beamish (2004) measure the degree of international diversification with information of overseas subsidiaries.

examine how international diversification of Japanese firms influences their financial performance. This study identifies the curvilinear relation between overseas activities of Japanese firms and their performance. Second, this study extends the result of Lu and Beamish (2004) which reports the S-shaped relation between multinationality and performance with a sample of Japanese firms. The sample of this study includes more recent information compared to that of Lu and Beamish (2004), thereby providing better insight about the recent condition of Japanese multinational firms. Finally, this study provides an additional implication by comparing the divided samples of high level and low level of international diversification. The finding from additional analysis suggest that firms with greater growth opportunities and larger size can make a profit at the moderate level of internationalization, while firms with less growth opportunities and small size are likely to have lower profitability with their foreign expansion.

The remainder of this thesis is organized as follows. Section 2 introduces the benefits and costs of international diversification. Then, section 3 reviews the literature and establishes hypothesis. Section 4 describes the sample, the variables and method for empirical analysis and section 5 presents the results of regression. Section 6 draws conclusions.

2.2. Benefits and Costs of Corporate International Diversification

Corporate international diversification involves several benefits and costs. The balance of the benefits and costs determines the effects of the international diversification on performance.

A firm can obtain some benefits by diversifying their operations internationally. First, multinational firms can get the effects of economies of scale and scope that decrease the costs of production (Ghoshal, 1987). They are also likely to have greater market power owing to their large size and developed expertise (Grant, 1987). Second, they may take advantage of arbitrage opportunities in factor costs such as price of resources, wages, and the cost of capital, because these differ in the scale of economies of each country. They can also make use of national

differences related to output markets, such as customer tastes and preferences, distribution systems, government regulations, and the effectiveness of different promotion strategies and other marketing techniques (Ghoshal, 1987). Third, International diversification is expected to have the opportunity to exploit firm's intangible assets including technological know-how, ownership of brand name, and various managerial and organizational skills (Grant, 1987). More accessibility to multinational information and investment opportunities are the benefits of international diversification as well. Finally, international diversification allows firms to diversify risk by cash flows in different countries (Shapiro, 1978).

However, multinational firms face various costs of foreign expansion. First, they are exposed to greater currency risk that indicates the sensitivity of firms' value to exchange rate movements (Reeb et al., 1998). Second, the political factors of host countries, such as government appropriation, control of fund remittance, differences in cultural practices and governmental regulations including tax and accounting rule, are also considered as the costs of international diversification (Burgman, 1996). Third, international diversification reduces the ability to monitor managers in foreign agent because of geographical constraints, cultural differences and timing issues (Lee and Kwok, 1988). As the number of foreign subsidiaries and host countries increases, governance costs and coordination costs increase as well. Fourth, foreign expansion accompanies the liabilities of foreignness and newness indicating that mistakes in various business decision related operation are more likely to appear with expansion into new market (Hymer, 1976). Finally, firms with overseas expansion may have different sources and availability of information with competitors of host countries. This lack of information about foreign markets decreases the firm's profitability owing to an increase in uncertainty and probability of making a poor investment (Reeb et al., 1998).

2.3. Literature Review and Hypotheses Development

Early research reports the positive relation between corporate international diversification and financial performance. Grant (1987) finds that the ratio of

overseas subsidiaries sales is positively related to profitability in the sample of British manufacturing firms. Tallman and Li (1996) suggest that the larger foreign sales ratio of American multinational firms increases ROS (return on sales). Yamamoto (1999), which examines Japanese companies, shows that the degree of international diversification measured by sales ratio based entropy index³ has a positive effect on ROA (return on assets). The positive relation implies that overseas activities accompany various benefits.

On the other hand, some studies argue that international diversification decreases performance of the firm. Michel and Shaked (1986) find that multinational firms have lower performance in individual firm level and portfolio level compared to domestic firms. Click and Harrison (2000) also report that the degree of internationalization is negatively related to profitability of the firm. Decrease in performance by international diversification suggests that the greater costs of foreign expansion dominate benefits.

As well as linear relations, more recent studies suggest a curvilinear relation between corporate international diversification and financial performance. The curvilinear relation indicates that whether the benefits of international diversification are dominant to the costs or not is changed by the different phases of internationalization. Figure 2.1 describes the function of the curvilinear relations.

Ruigrok and Wagner (2003) report the U-shaped relation between the sales ratio of foreign subsidiaries and ROA. This implies that performance declines in early stage of international diversification and beyond threshold profit reverses and increases. However, Gomes and Ramaswamy (1999) find the inverted U-shaped relation between overseas activities and profitability. While internationalization in moderate level enhances performance, performance is deteriorated beyond the certain level.

³ Entropy measure is calculated by the number of countries where a firm has its subsidiaries of regional market and the weight given to each global market region. This considers both the number of regions in which a firm operates and the relative importance of each region to all market regions (Qian et al., 2008).

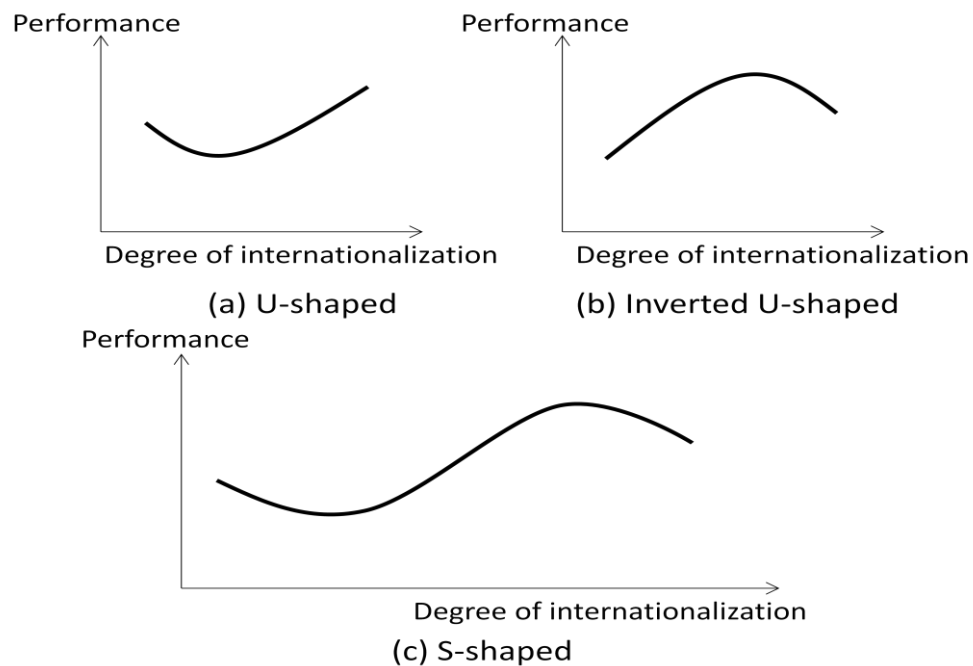


Figure 2.1 Curvilinear relations between international diversification and performance

In addition, some studies provide the evidences of the S-shaped relation which is more sophisticated model compared to models discussed above. Contractor et al. (2003) suggest the three-stage theory of internationalization with a finding of the S-shaped relation between foreign expansion and performance. The theory argues that the relation between foreign expansion and performance is negative in first stage of internationalization due to higher costs and barriers to initial expansion such as liabilities of foreignness, initial learning costs, and insufficient economies of scale. However, in second stage, the relation becomes positive, because incremental benefits of further international diversification become greater than the incremental costs. In final stage, the relation becomes negative again due to over expansion beyond an optimal threshold. Lu and Beamish (2004) also provide evidence of the S-shaped relation between foreign expansion through overseas subsidiaries and performance using a sample of Japanese firms.

Table 2.1 Previous studies on the relation between corporate international diversification and performance

Author(s) and year	Measurements ^a	Performance indicators	Empirical findings
(a) Linear			
Michel and Shaked (1986)	FSTS	Risk-adjusted return	Negative
Grant (1987)	FSTS	ROA, ROE, ROS	Positive
Buhner (1987)	FSTS	Market return	Positive
Morch and Yeung (1991)	NNS, NFS	Market value	Positive
Tallman and Li (1996)	FSTS	ROS	Positive
Delios and Beamish (1999)	FDI	ROA, ROE, ROS	Positive
Yamamoto (1999)	Entropy measure	ROA	Positive
Click and Harrison (2000)	FATA	Tobin's Q	Negative
(b) Curvilinear			
Hitt et al. (1997)	Entropy measure	ROA	Inverted U-shaped
Ahmed (1998)	FRTR	ROA	S-shaped
Gomes and Ramaswamy (1999)	FSTS, FATA, NNS	Cost of sales/total sales, ROA	Inverted U-shaped
Lu and Beamish (2001)	Export revenue /total sales, FDI	ROA, ROS	U-shaped
Ruigrok and Wagner (2003)	FSTS	ROA	U-shaped
Contractor et al. (2003)	Sum of FSTS, FETN and FOTO	ROA, ROS	U-shaped/S-shaped
Lu and Beamish (2004)	FDI	ROA, Tobin's Q	S-shaped
Contractor et al. (2007)	FSTS	ROA, ROE, ROS	U-shaped
Qian et al. (2008)	Entropy measure	ROA, ROS	Inverted U-shaped

^aFSTS, foreign sales/total sales; FATA, foreign assets/total assets; FETN, number of foreign employees/total number of employees; FETE, foreign earnings/total earnings; FRTR, foreign revenue/total revenue; NNS, number of nations in which firm has foreign subsidiaries; NFS, number of subsidiaries abroad; FDI, foreign direct investment

As discussed above, previous studies on the relation between corporate international diversification and financial performance suggest the mixed results: linear positive, negative, and the curvilinear relation. Table 2.1 presents the list of related previous studies. I infer that overseas expansion of Japanese firms may have curvilinear relation with financial performance. Contractor et al. (2003) argue that the scale of benefits and costs of international diversification varies with the different phases of internationalization. This seems reasonable because some benefits and costs, such as the effects of economies of scale and scope, market power, currency risk, and agency costs, may change depending on the extent of the firm's involvement in foreign markets. If the scale of benefits and costs varies with different phases of internationalization, the relation between overseas activities and performance would vary with them as well.

Thus, I hypothesize the relation between international diversification of Japanese firms and financial performance as follows:

H1. The relation between international diversification of Japanese firms and performance is curvilinear, not linear.

I also examine whether the relation between corporate international diversification and performance is consistent among the firms in different levels of internationalization. Higher level of international diversification is considered as a relatively aggressive foreign expansion. The aggressive expansion may reflect an expectation of firms to better performance. Then, the effect of foreign expansion on performance would vary with firms in different levels of international diversification.

Therefore, I establish hypothesis as follows:

H2. The relation between corporate international diversification and performance differs between firms with high and low levels of internationalization.

2.4. Data and Methodology

1) Sample selection

The sample of this study consists of Japanese firms listed on the Tokyo Stock Exchange (TSE) with fiscal year ended on 31, March excluding financials. Financial information of sample firms is collected from Nikkei NEEDs Financial Quest which provides corporate information of all publicly listed Japanese firms. Since information of foreign assets has been disclosed from 1999, I collect the data from 1999 to 2012. If the firm did not provide a positive foreign sales ratio or foreign asset ratio in each year, the observations of the firm in the year are excluded. The observations with missing value of variables are also excluded. Then I winsorize all the variables at the 1% level to minimize the effects of outliers. The final dataset consists of 628 firms and 6,449 firm-year observations for foreign sales ratio, and 473 firms and 4,270 firm-year observations for foreign assets ratio.

2) Performance measures

I use three types of performance measures as follows.

(1) *ROS* (Return on Sales), also known as operation profit margin, is a measure of a company's operational efficiency. It is calculated as the ratio of net income to total sales.

(2) *ROE* (Return on Equity) is a measure of return on the money invested by shareholders. It is calculated as the ratio of net income to shareholder's equity.

(3) *ROA* (Return on Assets) is an indicator of how profitable a company is relative to its total assets. It is calculated as the ratio of net income to total assets.

3) Corporate international diversification measures

The ratio of Foreign Sales to Total Sales (*FSTS*) and the ratio of Foreign Assets

to Total Assets (*FATA*), used in previous studies usually (e.g., Michel and Shaked, 1986; Gomes and Ramaswamy, 1999; Ruigrok and Wagner, 2003), are included as the measure of international diversification. Each measure reflects different facets of international diversification. The ratio of foreign sales to total sales is a measure of a firm's dependence on its foreign markets in terms of sales revenues, while the ratio of foreign assets to total assets can be regarded as a proxy for a firm's dependence on foreign production. While the ratio of foreign sales cannot fully capture geographical economic activities of firms, the ratio of foreign assets alleviate the problem of mixed export and foreign subsidiary sales and captures geographic structural information (Reeb et al., 1998; Olibe et al., 2008). Therefore, I employ both measures, the ratio of foreign sales and foreign assets, as the proxies for international diversification.

4) Control variables

Based on previous studies, I include control variables to control other determinants of financial performance. I include the measure of R&D intensity (*R&D*) computed as the ratio of R&D expenditure to total sales. R&D intensity is expected to have a positive effect on performance, since it is a proxy for firm's unique assets like technological know-how and patents. Market-to-book ratio (*MTB*) is included as the measure of growth opportunities. It is calculated as the ratio of market capitalization to book value of equity. Firms with greater growth opportunities are expected to have better performance. Firm leverage (*LEV*) is added as control variable because the debt ratio is likely to be related to lower performance. Finally, I include firm size defined as the natural logarithm of total sales. In general, larger firms are expected to have higher profitability.

5) Method

To investigate the effect of corporate international diversification on financial performance, I use panel data composed of various cross-sectional units. Pooled

cross-section and time-series analysis are used. As mentioned in previous studies (Lu and Beamish, 2006; Chen and Han, 2012), the causal relation between the international diversification measures and performance measures may be inverse. In other words, firm performance can influence the degree of international diversification considering inverse causality effects. In that case, the results may be distorted if the causality effects are not controlled. Thus, I use the fixed effects model and a two-stage least squares procedure (2SLS). I use the 1 year lagged international diversification measures as instrumental variables. The estimated regression model is as follows:

$$PERFORMANCE_{it} = \beta_0 + \beta_1 ID_{it} + \beta_2 R\&A_{it} + \beta_3 MTB_{it} + \beta_4 SIZE_{it} + \delta_y YEAR_y + u_i + \varepsilon_{it} \quad (2.1)$$

where $PERFORMANCE_{it}$ is the performance measures of firm i in year t (ROS , ROE , ROA), ID_{it} is the international diversification measures ($FSTS$, $FATA$), $R\&A_{it}$ is R&D intensity, MTB_{it} is market to book ratio, and $SIZE_{it}$ is firm size. As well as these variables, I also include a set of year dummy variables to control for time-variant effects.

Following previous studies (Contractor et al., 2003, Qian et al., 2008, Lin et al., 2011), I also include the quadratic and cubic terms of the international diversification measures to investigate the curvilinear relation. If the coefficients of the linear, quadratic and cubic terms have different signs and statistical significance, this would support the curvilinear relation between corporate international diversification and financial performance. The extended regression model is as follows:

$$PERFORMANCE_{it} = \beta_0 + \beta_1 ID_{it} + \beta_2 ID_{it}^2 + \beta_3 ID_{it}^3 + \beta_4 R\&A_{it} + \beta_5 MTB_{it} + \beta_6 SIZE_{it} + \delta_y YEAR_y + u_i + \varepsilon_{it} \quad (2.2)$$

where ID_{it}^2 is the quadric terms of international diversification measures, and ID_{it}^3

is the cubic terms of international diversification measures.

6) Descriptive statistics

Table 2.2 Descriptive statistics

Panel A Summary statistics

Variables	Observations	Mean	Median	Std Dev
ROS	6565	2.199	2.270	5.145
ROE	6565	3.728	4.830	11.177
ROA	6565	2.068	2.160	3.917
FSTS	6449	0.339	0.302	0.209
FATA	4270	0.240	0.217	0.135
R&D	6565	0.034	0.027	0.031
MTB	6565	1.300	1.05	0.917
LEV	6565	0.513	0.52	0.195
SIZE	6565	11.824	11.689	1.437

Note: ROS = return on sales; ROE = return on equity; ROA = return on assets; FSTS = foreign sales/total sales; FATA =foreign assets/total assets; R&D = R&D expenditure/total sales; MTB = market-to-book ratio, market capitalization/book value of equity; LEV = total debts/total asset; SIZE = the natural logarithm of total sales.

Panel A of Table 2.2 presents summary of statistics of the sample: the sample size, mean, median, and standard deviation of variables used in estimating the regression equations. Mean of *ROS*, *ROE*, and *ROA* are 2.20, 3.73, and 2.07, respectively. Average of foreign sales ratio (*FSTS*) and foreign assets ratio (*FATA*) are 0.34 and 0.24, respectively.

Panel B of Table 2.2 shows the correlation coefficients between all the variables. The correlation coefficients between the performance measures (*ROS*, *ROE*, *ROA*) are considerably positive. Both international diversification measures (*FSTS* and *FATA*) are positively correlated with all the performance measures. Most of other control variables show significant correlation with dependent variables.

Table 2.2 Descriptive statistics

Panel B Correlation matrix

	1	2	3	4	5	6	7	8	9
1 ROS	1								
2 ROE	0.743***	1							
3 ROA	0.924***	0.837***	1						
4 FSTS	0.068***	0.064***	0.093***	1					
5 FATA	0.068***	0.075***	0.110***	0.634***	1				
6 R&D	0.113***	-0.021*	0.045***	0.204***	0.104***	1			
7 MTB	0.291***	0.240***	0.340***	0.177***	0.087***	0.114***	1		
8 LEV	-0.385***	-0.198***	-0.363***	-0.099***	-0.077***	-0.276***	0.066***	1	
9 SIZE	0.049***	0.083***	0.058***	0.249***	0.247***	0.043***	0.145***	0.294***	1

*** p < 0.01; ** p < 0.05; * p < 0.10

2.5. Results

1) The relation between corporate international diversification and performance

In this section, I investigate how corporate international diversification influences financial performance. Table 2.3 reports the results of regression. Panel A presents the results using *FSTS* as the measure of international diversification, while Panel B describes the results using *FATA*. The three performance measures, *ROS* (model 1-3), *ROE* (model 4-6), and *ROS* (model 7-9), are used as the dependent variables. Each model includes a set of the control variables and year dummy variables. To examine the curvilinear relation between international diversification and performance, I include the quadratic terms and the cubic terms of the international diversification measures in the quadratic model (model 2, 5, 8) and the cubic model (model 3, 6, 9).

In Panel A, *FSTS* has the S-shaped relation with the performance measures. All over the models, the coefficients on the linear terms of *FSTS* have negative signs and statistical significances, while the coefficients on the cubic terms have negative signs. The signs of coefficients on quadratic terms are positive. Therefore, the results indicate that the relation between foreign sales ratio and performance is negative at the very low level of internationalization, while it becomes positive beyond certain level. It becomes negative again at the very high level of internationalization.

To confirm the points in which the relation is changed, I calculate its inflection points using the coefficient estimates on every term of *FSTS*. Regarding the relation between *FSTS* and *ROS*, inflection points are about 0.375 and 0.585. This implies that *ROS* declines under 37.5 % and over 58.5% of foreign sales ratio, and improves if the foreign sales ratio between 37.5% and 58.5%. In case of the relation between *FSTS* and *ROA*, the inflection points are about 0.362 and 0.624. Those in the relation between *FSTS* and *ROA* are about 0.378 and 0.597. Thus, firms in the range of level of foreign sales ratio approximately between 38% and 58.5% would experience an increase in their financial performance, while firms experience

decrease in performance at the other level. The real inflection points may be different in each firm, because these inflection points are calculated as average of sample firms,.

The regression results of Panel B are also consistent with those of Panel A. The signs of coefficients on the linear terms and cubic terms of *FATA* are negative, while those of the quadric terms are positive. The relation between foreign assets ratio and performance also vary with the levels of internationalization. The inflection points are about 0.291 and 0.53 in the relation between *FATA* and *ROS*, about 0.283 and 0.547 in the relation between *FATA* and *ROE*, and about 0.285 and 0.54 in the relation between *FATA* and *ROA*. Thus, financial performance may improve at the range of foreign assets ratio approximately between 28% and 53%, while it declines at the other range of level.

Control variables have significant effects on performance. *MTB* and *SIZE* are positively related to the performance measures, while *R&D* and *LEV* are negatively related to them. These findings imply that the firm with larger size or greater growth opportunity is more likely to have better performance. However, firms with greater R&D intensity and leverage would have lower performance. The result of R&D intensity is contrary to inference based on previous studies. This may result from decrease in net income of the firm due to the costs for R&D.

Therefore, international diversification of Japanese firms has the S-shaped relation with their performance, after controlling other determinants of profitability. This result supports the hypothesis that the relationship between international diversification of Japanese firms and performance is curvilinear. The result also indicates that firms at the very low and high level of internationalization may experience decrease in the performance, while the firms at the optimal level of internationalization may enhance the performance. This is also consistent with the result of and Lu and Beamish (2004). Given the argument of Contractor et al. (2003), performance may decline at the first and third stage of internationalization due to the higher costs of initial international expansion or over-internationalization, while the performance increases in the second stage of internationalization because

the benefits of overseas operations become larger than the costs at the moderate level of international diversification. To examine whether the argument could be applied to the result of this study, it is necessary to confirm whether sample firms at the very low and high degree of overseas activities are engaged in initial expansion or over-internationalization, and whether sample firms at the certain level of overseas activities in which the performance increases are optimally matured in internationalization.

Table 2.3 The relation between corporate international diversification and performance

Panel A Regression results using foreign sales ratio

	ROS			ROE			ROA		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-52.72*** (-16.21)	-51.44*** (-16.04)	-48.12*** (-12.38)	-86.50*** (-10.18)	-81.04*** (-9.67)	-72.16*** (-7.10)	-45.35*** (-18.86)	-43.93*** (-18.52)	-41.22*** (-14.27)
FSTS	-5.465*** (-4.27)	-10.88** (-2.11)	-62.66* (-1.77)	-11.28*** (-3.38)	-34.34** (-2.54)	-172.7* (-1.86)	-4.359*** (-4.61)	-10.35*** (-2.71)	-52.67** (-2.00)
FSTS ²		6.505 (1.27)	137.1* (1.67)		27.7** (2.07)	376.6* (1.76)		7.199* (1.9)	113.8* (1.87)
FSTS ³			-95.23* (-1.69)			-254.5* (-1.73)			-77.83* (-1.86)
R&D	-70.67*** (-13.63)	-71.91*** (-13.58)	-71.73*** (-13.41)	-1.279*** (-9.45)	-1.333*** (-9.63)	-1.328*** (-9.48)	-53.28*** (-13.90)	-54.66*** (-13.95)	-54.51*** (-13.71)
MTB	1.150*** (14.89)	1.162*** (14.93)	1.160*** (14.73)	2.731*** (13.54)	2.781*** (13.69)	2.777*** (13.47)	1.206*** (21.12)	1.219*** (21.18)	1.217*** (20.8)
LEV	-18.09*** (-23.68)	-18.10*** (-23.68)	-18.13*** (-23.40)	-43.43*** (-21.78)	-43.48*** (-21.78)	-43.58*** (-21.49)	-15.29*** (-27.09)	-15.31*** (-27.08)	-15.34*** (-26.63)
SIZE	5.624*** (19.59)	5.583*** (19.9)	5.745*** (18.11)	9.778*** (13.04)	9.602*** (13.1)	10.04*** (12.09)	4.778*** (22.51)	4.732*** (22.8)	4.865*** (20.63)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6301	6301	6301	6301	6301	6301	6301	6301	6301
R-sq	0.339	0.338	0.320	0.271	0.270	0.247	0.422	0.421	0.40

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 2.3 The relation between corporate international diversification and performance

Panel B Regression results using foreign assets ratio

	ROS			ROE			ROA		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-77.59*** (-17.30)	-71.38*** (-15.31)	-55.93*** (-7.10)	-124.0*** (-10.42)	-105.7*** (-8.56)	-65.22*** (-3.14)	-62.11*** (-18.54)	-55.80*** (-15.95)	-41.05*** (-6.75)
FATA	-11.10*** (-6.05)	-33.49*** (-4.34)	-137.3*** (-3.24)	-23.13*** (-4.75)	-89.13*** (-4.36)	-361.5*** (-3.24)	-9.049*** (-6.61)	-31.81*** (-5.50)	-131.0*** (-4.00)
FATA ²		33.61*** (3.48)	365.6*** (3.03)		99.08** (3.87)	969.9*** (3.04)		34.17*** (4.72)	351.1*** (3.76)
FATA ³			-297.0*** (-2.97)			-779.1*** (-2.95)			-283.6*** (-3.67)
R&D	-98.11*** (-13.46)	-101.2*** (-13.60)	-104.5*** (-12.93)	-167.5*** (-8.66)	-176.6*** (-8.95)	-185.3*** (-8.69)	-71.82*** (-13.19)	-74.94*** (-13.42)	-78.12*** (-12.51)
MTB	0.996*** (10.98)	1.021*** (11.12)	1.099*** (10.73)	2.621*** (10.89)	2.694*** (11.07)	2.898*** (10.73)	1.100*** (16.24)	1.125*** (16.33)	1.200*** (15.17)
LEV	-20.02*** (-19.49)	-20.67*** (-19.66)	-20.00*** (-18.24)	-52.19*** (-19.14)	-54.09*** (-19.42)	-52.34*** (-18.11)	-17.78*** (-23.17)	-18.43*** (-23.37)	-17.79*** (-21.02)
SIZE	7.902*** (20.9)	7.669*** (20.49)	7.070*** (16.3)	13.55*** (13.51)	12.87*** (12.97)	11.30*** (9.88)	6.386*** (22.62)	6.149*** (21.89)	5.578*** (16.65)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3958	3958	3958	3958	3958	3958	3958	3958	3958
R-sq	0.403	0.394	0.328	0.324	0.316	0.249	0.487	0.475	0.383

*** p < 0.01; ** p < 0.05; * p < 0.10

2) The comparison between the high level and low level of international diversification

In this section, I investigate whether the relation between corporate international diversification and performance is consistent regardless of the level of internationalization. It is reasonably estimated that the level of international diversification may influence the relation between international diversification and firm performance. To clarify inference, I divide all the samples into two groups: high level of international diversification and low level of international diversification. Based on whether *FSTS* (*FATA*) of the observations are above or below the median of *FSTS* (*FATA*) in the year, the firms are divided into high and low for each year.

Table 2.4 shows the regression results for each group. ‘H’ and ‘L’ indicate the sample group of firms at high and low levels of international diversification, respectively. Panel A presents the results using *FSTS* as international diversification measures, while Panel B describes the results using *FATA* as in Table 2.3. Other components of models are also consistent with those of Table 2.3.

In Panel A and B of Table 2.4, the international diversification measures have curvilinear relations with the performance measures for the high-level group, while the negative or no relation are shown in the low-level group. In the results of the high level group, *FSTS* has the U-shaped relation with *ROE*, and *FATA* has the S-shaped relation with all the performance measures. However, in the results of the low-level group, *FSTS* is negatively associated with the performance measures, and *FATA* has no statistically significant relation.

The results provide different implications drawn by results of Table 2.3. The firms in the high-level group show greater *R&A*, *MTB*, *SIZE* and lower leverage, compared to firms in the low-level group. This implies that larger firms with greater growth opportunities would make a profit with international diversification at optimal level. However, foreign expansion of small firms with greater leverage is likely to decrease their financial performance, because it may be over-investment.

Table 2.4 The comparison between the high and low levels of international diversification

Panel A Regression results using foreign sales ratio

	ROS (H)			ROS (L)			ROE (H)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-74.30*** (-15.19)	-69.38*** (-11.81)	-22.86 (-0.69)	-42.91*** (-8.81)	-39.85*** (-7.07)	-29.13 (-1.61)	-102.6*** (-8.51)	-85.03*** (-5.88)	20.2 -0.25
FSTS	-5.932*** (-2.78)	-20.83 (-1.44)	-374.5 (-1.58)	-6.751** (-2.33)	-33.53 (-0.97)	-214.1 (-0.77)	-10.30* (-1.96)	-63.52* (-1.78)	-863.7 (-1.49)
FSTS ²		14.51 (1.16)	701.1 (1.58)		59.78 (0.83)	1066.0 (0.75)		51.83* (1.68)	1605.1 (1.47)
FSTS ³			-417.5 (-1.59)			-1639.6 (-0.75)			-944.6 (-1.47)
R&D	-96.98*** (-13.38)	-99.02*** (-13.12)	-95.01*** (-12.23)	-34.17*** (-4.37)	-34.26*** (-4.35)	-34.84*** (-4.15)	-149.7*** (-8.38)	-157.0*** (-8.45)	-148.0*** (-7.79)
MBT	1.016*** (10.1)	1.040*** (10.08)	1.145*** (8.24)	1.328*** (9.69)	1.320*** (9.51)	1.199*** (5.17)	2.501*** (10.09)	2.585*** (10.17)	2.823*** (8.31)
LEV	-18.12*** (-16.26)	-18.12*** (-16.21)	-17.31*** (-13.60)	-18.50*** (-16.18)	-18.54*** (-16.16)	-17.47*** (-9.19)	-43.18*** (-15.72)	-43.16*** (-15.67)	-41.34*** (-13.28)
SIZE	7.533*** (17.48)	7.406*** (17.97)	8.146*** (12.22)	4.711*** (10.89)	4.650*** (10.93)	4.447*** (8.69)	11.15*** (10.5)	10.70*** (10.54)	12.37*** (7.59)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3147	3147	3147	3154	3154	3154	3147	3147	3147
R-sq	0.400	0.396	0.318	0.298	0.290	0.210	0.316	0.312	0.234

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 2.4 The comparison between the high and low levels of international diversification

Panel A (continued)

	ROE (L)			ROA (H)			ROA (L)		
	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Intercept	-94.68*** (-6.73)	-86.22*** (-5.31)	-58.65 (-1.14)	-57.14*** (-15.84)	-52.63*** (-12.15)	-18.12 (-0.74)	-43.23*** (-11.90)	-41.77*** (-9.97)	-35.98*** (-2.75)
FSTS	-21.43** (-2.57)	-95.39 (-0.96)	-559.9 (-0.71)	-4.069*** (-2.58)	-17.72* (-1.66)	-280.1 (-1.59)	-5.636*** (-2.61)	-18.39 (-0.72)	-116.0 (-0.58)
FSTS ²		165.1 (0.79)	2753.7 (0.68)		13.29 (1.44)	522.7 (1.59)		28.48 (0.53)	572.2 (0.56)
FSTS ³			-4218.1 (-0.67)			-309.8 (-1.59)			-885.9 (-0.56)
R&D	-102.1*** (-4.52)	-102.3*** (-4.50)	-103.8*** (-4.34)	-68.16*** (-12.75)	-70.03*** (-12.59)	-67.05*** (-11.65)	-31.66*** (-5.42)	-31.70*** (-5.41)	-32.02*** (-5.27)
MBT	2.993*** (7.57)	2.971*** (7.42)	2.661*** (4.02)	1.064*** (14.34)	1.085*** (14.26)	1.163*** (11.31)	1.460*** (14.29)	1.457*** (14.11)	1.392*** (8.28)
LEV	-49.24*** (-14.92)	-49.36*** (-14.92)	-46.61*** (-8.60)	-15.43*** (-18.78)	-15.43*** (-18.71)	-14.83*** (-15.73)	-15.83*** (-18.57)	-15.85*** (-18.58)	-15.27*** (-11.09)
SIZE	10.84*** (8.68)	10.67*** (8.69)	10.14*** (6.95)	5.803*** (18.26)	5.687*** (18.71)	6.236*** (12.63)	4.580*** (14.2)	4.551*** (14.38)	4.441*** (11.98)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3154	3154	3154	3147	3147	3147	3154	3154	3154
R-sq	0.236	0.230	0.160	0.472	0.468	0.394	0.389	0.385	0.351

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 2.4 The comparison between the high and low levels of international diversification

Panel B Regression results using foreign assets ratio

	ROS (H)			ROS (L)			ROE (H)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-71.37*** (-10.73)	-60.10*** (-8.09)	-9.343 (-0.34)	-88.02*** (-12.40)	-83.56*** (-8.03)	-71.83** (-2.43)	-97.39*** (-6.03)	-59.27*** (-3.22)	116.1 -1.58
FATA	-9.997*** (-3.21)	-73.63*** (-2.65)	-463.0** (-2.21)	-6.395 (-1.20)	-47.11 (-0.64)	-294.1 (-0.57)	-20.03*** (-2.65)	-235.1*** (-3.41)	-1580.5*** (-2.86)
FATA ²		75.11** (2.51)	1064.1** (2.17)		131.8 (0.58)	2053.4 (0.56)		253.9*** (3.43)	3671.3*** (2.84)
FATA ³			-758.3** (-2.15)			-4452.5 (-0.56)			-2620.1*** (-2.82)
R&D	-107.8*** (-10.62)	-112.5*** (-10.54)	-107.9*** (-9.74)	-88.57*** (-7.91)	-89.95*** (-7.65)	-88.34*** (-7.54)	-178.6*** (-7.25)	-194.4*** (-7.36)	-178.5*** (-6.12)
MTB	1.175*** (8.78)	1.162*** (8.51)	1.226*** (8.3)	0.969*** (6.99)	0.994*** (6.68)	1.020*** (5.8)	2.989*** (9.21)	2.943*** (8.71)	3.168*** (8.13)
LEV	-17.80*** (-11.39)	-19.27*** (-11.41)	-15.49*** (-7.44)	-23.39*** (-15.24)	-23.30*** (-15.00)	-23.03*** (-13.28)	-48.31*** (-12.74)	-53.27*** (-12.74)	-40.21*** (-7.33)
SIZE	7.229*** (12.83)	7.404*** (12.35)	6.852*** (11.75)	8.949*** (14.79)	8.778*** (13.62)	8.586*** (10.12)	11.02*** (8.07)	11.61*** (7.82)	9.707*** (6.31)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1974	1974	1974	1984	1984	1984	1974	1974	1974
R-sq	0.398	0.375	0.285	0.428	0.420	0.372	0.343	0.289	0.078

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 2.4 The comparison between the high and low levels of international diversification

Panel B (continued)

	ROE (L)			ROA (H)			ROA (L)		
	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Intercept	-163.8*** (-7.87)	-185.7*** (-6.03)	-250.1*** (-2.76)	-60.54*** (-11.89)	-47.49*** (-8.16)	9.719 -0.41	-66.66*** (-12.88)	-64.65*** (-8.56)	-60.60*** (-2.90)
FATA	-4.345 (-0.28)	196.0 (0.89)	1553.0 (0.98)	-8.923*** (-3.74)	-82.56*** (-3.79)	-521.5*** (-2.94)	-5.309 (-1.37)	-23.61 (-0.44)	-109.0 (-0.30)
FATA ²		-648.6 (-0.97)	-11205.4 (-1.00)		86.92*** (3.71)	1201.8*** (2.9)		59.24 (0.36)	723.8 (0.28)
FATA ³			24460.9 (1.01)			-854.8*** (-2.87)			-1539.9 (-0.28)
R&D	-162.0*** (-4.93)	-155.2*** (-4.46)	-164.0*** (-4.56)	-77.57*** (-9.98)	-83.00*** (-9.92)	-77.80*** (-8.30)	-69.97*** (-8.56)	-70.58*** (-8.27)	-70.03*** (-8.47)
MTB	2.884*** (7.1)	2.758*** (6.27)	2.619*** (4.86)	1.316*** (12.85)	1.300*** (12.15)	1.373*** (10.98)	0.989*** (9.78)	1.000*** (9.25)	1.009*** (8.13)
LEV	-62.05*** (-13.79)	-62.47*** (-13.60)	-63.98*** (-12.02)	-16.93*** (-14.15)	-18.63*** (-14.08)	-14.37*** (-8.16)	-19.38*** (-17.31)	-19.34*** (-17.15)	-19.25*** (-15.72)
LnSales	17.23*** (9.71)	18.07*** (9.48)	19.13*** (7.35)	6.163*** (14.3)	6.365*** (13.55)	5.744*** (11.64)	6.885*** (15.59)	6.808*** (14.55)	6.742*** (11.26)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1984	1984	1984	1974	1974	1974	1984	1984	1984
R-sq	0.334	0.313	0.199	0.485	0.439	0.252	0.520	0.508	0.496

*** p < 0.01; ** p < 0.05; * p < 0.10

2.6. Conclusion

This chapter examines the relation between corporate international diversification and financial performance. The balance of the benefits and costs of foreign expansion would be key determinant of the relation. Although many previous studies have attempted to identify the relation, the results are inconsistent.

The regression results using a sample of Japanese firms suggest that corporate international diversification and performance have a curvilinear relation. The foreign sales ratio and the foreign assets ratio have the S-shaped relation with all the measures of performance. Especially, the S-shaped relation is likely to be observed in larger firms with greater growth opportunities. The curvilinear relation indicates whether the benefits of foreign expansion dominate the costs varies with different phases of internationalization.

The result of this chapter provides important implications for Japanese firms. The firms can make a profit with multinational operations at the moderate level, while they may experience a decrease in their performance at the very low and high levels of international diversification. Therefore, firms should consider deploying international diversification at the optimal level, to achieve better performance by foreign expansion. In addition, improvement in performance at the optimal level of overseas business activities is more expected for larger firms with higher growth opportunities than small firms. Small firms with high leverage are likely to fail to enhance their performance through foreign expansion.

3. The Effect of Corporate International Diversification on Firm Risk

3.1. Introduction

Firm risk is an important factor in investment decision making process, because it implies the uncertainty regarding the expected returns on the investment. It is also a determinant of the firm's cost of capital, which indicates required return of investors. Higher risk causes an increase in required returns due to risk premium for higher risk, resulting in increasing of cost of capital. Therefore, knowledge of the level of risk would be crucial for firms that invest overseas. However, the relation between corporate international diversification and firm risk has not been completely clarified. The expected effect of overseas operations on risk is conflicting based on theoretical background. The empirical results of previous studies are also inconsistent.

According to the portfolio theory, corporate international diversification can reduce firm risk. Because multinational firms are highly diversified compared to domestic firms, they would get risk-reducing effect comparable with diversification benefits which are obtained by holding an efficiently diversified portfolio. Rugman(1976) and Shapiro(1978) argue that cash flows from various markets correlated imperfectly generate the advantage of risk reduction. The results of some empirical studies are consistent with their argument and present that overseas activities is associated with lower firm risk (e.g., Agmon and Lessard, 1977; Fatemi, 1984).

However, multinational firms may experience a greater firm risk owing to additional risk factors accompanied by foreign expansion. Their operations in foreign markets are exposed to various risks such as exchange risk, political risk, an increase in agency costs, and information asymmetry between parent and foreign subsidiaries. As a result, these risks cause an increase in firm risk. Some previous studies support this view and suggest that international operations are positively related to risk (e.g., Reeb et al., 1998; Olibe et al., 2008).

As discussed above, there are inconsistent results on corporate international

diversification may have conflicting effects on firm risk, risk-increasing and risk-decreasing. Thus, the effect of corporate international diversification on risk depends on the net of two sides of effect. Moreover, most of previous studies use samples of American or European firms, thus, it is hard to find the research on case of Japanese firms. Despite to their active foreign expansions, there is little empirical evidence of international diversification of Japanese firms as compared to that of American or European firms. Therefore, in this chapter, I explore the relation between corporate international diversification and firm risk with a sample of listed Japanese firms. This study aims to obtain the empirical implication of the impacts of foreign expansion on risk for managers and investors of Japanese firms. Moreover, the result of this study would have importance in terms of cost of capital. In recent, the importance of cost of capital has received considerable attention in Japan. The Ito Review (2014)⁴ suggests that firms should pursue sufficient earnings that dominate their cost of capital for sustainable growth. Firms need to perceive their cost of capital exactly when they establish their earnings goal. This study aims to investigate the relation between corporate international diversification and the level of cost of capital by examining how foreign expansion of Japanese firms influences their risk.

In empirical analyses, I consider three types of risk, which are systematic risk, idiosyncratic risk, and total risk. Most previous studies on the relation between international diversification and risk have focused on systematic risk, because idiosyncratic risk is expected to be eliminated through diversification under the Capital Asset Pricing Model (hereafter, CAPM). However, some research suggests that idiosyncratic risk is not fully diversified owing to market imperfections and, thus, influences stock returns significantly (e.g., Merton, 1987; Malkiel and Xu, 2002; Ang et al., 2009). If idiosyncratic risk is not eliminated by international diversification, it

⁴ Ito review is the final report that summarizes the results of the discussion of the “Competitiveness and Incentives for Sustainable Growth: Building Favorable Relationships between Companies and Investors” project by the Ministry of Economy, Trade and Industry (METI) in Japan. The report contains recommendations with respect to the issues companies face in seeking to increase corporate value and generate on-going growth via investor dialogue and capital procurement. As the project was chaired by Professor Kunio Ito, Graduate School of Commerce and Management, Hitotsubashi University, the final report is known as the Ito Review.

would affect total risk and the cost of capital as well. Thus, this study investigates the effect overseas business activities on each risk measure, considering idiosyncratic risk with other two risks. The ratio of foreign sales and assets are used as proxies for the degree of international diversification. .

Regression results of this study show that corporate international diversification increases firm risk. International diversification measures are positively associated with systematic risk, idiosyncratic risk, and total risk, after controlling for other determinants of firm risk. These results also indicate that shareholders of Japanese firms assume that foreign expansion increases risk of the firm. In addition, the cost of capital becomes higher as firm risk increases. Therefore, firms diversified internationally should fully understand the increased risk involved in their foreign expansion.

The remainder of this chapter is organized as follows. Section 2 introduces theoretical backgrounds for this research. Then, Section 3 reviews the literature and establishes hypothesis. Section 4 describes the sample, variables and the method for empirical analysis and Section 5 presents the results of regression. Finally, Section 6 draws conclusions.

3.2. Theoretical Background

(1) Corporate international diversification and risk

Corporate international diversification has conflicting effects on firm risk. Previous literature suggests that firms can obtain several benefits from multinational operations that contribute a reduction in their risk. However, foreign expansion requires additional costs which may increase firm risk. Hereafter, I introduce the benefits and costs related to the effect of overseas activities on firm risk.

Some advantages of international diversification would decrease risk of firms with foreign expansion. First, according to the argument of portfolio theory, multinational operations can generate diversification benefit. The theory suggests that one can reduce risk of portfolio by combining assets, returns of which are not perfectly

correlated. Due to this effect, internationally diversified firms are able to get such diversification benefits. Indeed, operations in multiple markets, where are imperfectly correlated increase earnings stability (Rugman, 1976). The correlation between earnings of multinational firms and domestic markets decreases as the firms become more diversified internationally, owing to cash flows generated by those multiple markets, (Shapiro, 1978). Especially, under the circumstance where the barriers of international capital flow exist, investors can indirectly diversify their portfolios by investing multinational firms (Agmon and Lessard, 1977). In addition, business activities performed in multiple markets may increase the firm's operational flexibility and decrease the probability of bankruptcy, thereby reducing its riskiness (Michel and Shaked, 1986; Bodnar et al., 2003).

On the contrary, firms expanding their operations internationally confront with various costs that may increase their risk. Multinational firms are exposed to currency risk, because their cash flows are influenced by changes in exchange rates (Reeb et al., 1998). Differences between home and host countries in political regulations and cultural practices can be also significant determinants of increased risk by foreign expansion. If multinational firms are not informed enough about their host countries compared to local firms, riskiness of foreign expansion becomes larger. In addition, geographical distance and difference in languages would make it difficult to monitor managers in foreign subsidiaries. Thus, information asymmetry between parent and foreign subsidiaries may increase as firms become more diversified internationally (Lee and Kwok, 1988). Moreover, greater complexity in operations of multinational firms is likely to exacerbate agency problem.

To summarize the discussion, the effects of corporate international diversification on firm risk are inconsistent. Business activities in multiple markets enable firms to take diversification benefits that decrease their riskiness. However, foreign expansion requires additional costs such as currency risk, political risk, increased agency costs and information asymmetry between parent and foreign subsidiaries. Thus, whether corporate international diversification is risk-decreasing or risk-increasing is determined by the net of those two effects.

(2) Various types of risk

Modern finance theory on asset pricing evaluates the risk of certain asset by dividing it into two parts, systematic and idiosyncratic risk. They have different characteristics and implication.

Systematic risk refers to market risk inherent in the economy and is not diversified with market portfolio. In the CAPM, the systematic risk is represented as beta (β) that means the sensitivity of the expected returns of individual asset to that of the market portfolio. The definition of beta is as follows:

$$\beta_i = (\rho_{im} \cdot \sigma_i) / \sigma_m \quad (3.1)$$

where ρ_{im} is the correlation coefficient between security i and the market portfolio; σ_i is the standard deviation of returns of security i ; σ_m is the standard deviation of the market returns. As seen in the equation, beta is determined by ρ_{jm} and σ_i . Therefore, systematic risk of an asset is positively related with the risk of the asset and the correlation between the asset and the market.

Contrary to the systematic risk, idiosyncratic risk is defined as the risk which can be mitigated by diversifying investment portfolio. It is also called firm-specific risk, because it influences the firm at the microeconomic level and has less or no correlation with market risk. Whether idiosyncratic risk should be priced is ambiguous. The traditional CAPM approach, based on the assumption that all investors hold the market portfolio in equilibrium, argues that idiosyncratic risk should not be incorporated into asset prices because it can be eliminated through diversification. However, in the real world, it is difficult for investors to fully diversify their portfolios because of various reasons such as transaction costs, incomplete information, taxes, and institutional restrictions including limitations on short sales. Under this circumstance, idiosyncratic risk would not be fully diversified, thus, some research argues that idiosyncratic risk would be priced in market (e. g., Merton, 1987; Malkiel and Xu, 2002).

This study considers both systematic risk and idiosyncratic risk, because some empirical studies suggest that idiosyncratic risk has significant effects on stock returns or portfolio returns (Goyal and Santa-Clara, 2003; Ang, Hodrick, Xing and Zhang, 2009; Angelidis, 2010; Fu, 2010). If idiosyncratic risk influences stock returns, investors would be concerned about it as well as systematic risk. Further, this study also examines total risk indicating the sum of systematic and idiosyncratic risk and measured by the firm's stock return volatility.

3.3. Literature Review and Hypotheses Development

1) The effect of corporate international diversification on systematic risk

As discussed above, overseas business activities may have conflicting effects on firm risk, risk-decreasing and risk-increasing. The relation between corporate international diversification and systematic risk is expected to depend on the net effect of these two effects. Regarding the relation, previous studies provide inconsistent results.

Some studies find that internationally diversified firms have lower systematic risk. Agmon and Lessard (1977) find that the foreign sales ratio of American multinational firms is related to lower systematic risk estimated based on domestic market. The result of research conducted by Fatemi (1984) also presents the risk-decreasing effect of international diversification. It shows that a portfolio of multinational firms has lower systematic risk compared to that of domestic firms. Michel and Shaked (1986) point out that the average domestic systematic risk of multinational firms is significantly lower than that of domestic firms. These results imply that multinational operations can contribute to reduce systematic risk of the firm by exploiting diversification benefits.

On the other hand, some studies indicate that the systematic risk of a firm becomes larger, as the firm diversifies its operations internationally. Reeb et al. (1998) find that foreign sales ratio and foreign assets ratio are positively associated with CAPM beta. They argue that multinational operations increase systematic risk

if an increase in the standard deviation of cash flows resulting from various costs of international diversification is greater than a decrease in the correlation between the firm and domestic market by operations in foreign multiple markets. Olibe et al. (2008) also suggest positive relations between international diversification proxies and systematic risk, by including geographical segment data adding to foreign sales and assets. The increase in systematic risk implies that the effects of the costs of international diversification exceed the diversification benefits.

As mentioned above, the results of previous studies on the relation between corporate international diversification and systematic risk are conflicting. As Reeb et al. (1998) argue, overseas activities can reduce systematic risk, because operations in multiple foreign markets decrease the correlation between the firm and domestic market. However, multinational firms is exposed various risks that increase the standard deviation of their stock returns. It is would be concluded that the relation between international activities and systematic risk is determined by the net of these adverse effects. Based on the discussion above, I examine the relation using the sample of listed Japanese firms. If the benefits of foreign expansion of Japanese firms dominate the costs, their systematic risk would decrease as they increase international operations, and vice versa.

So, I formulate the conflicting hypotheses as follows:

H1.a. Corporate international diversification is associated with greater systematic risk.

H1.b. Corporate international diversification is associated with lower systematic risk.

2) The effect of corporate international diversification on idiosyncratic risk

Literature on the relation between corporate international diversification and firm risk mainly focuses on systematic risk. Idiosyncratic risk has been hardly spotlighted, since it is regarded to be mitigated by diversification. However, some recent studies argue that idiosyncratic risk may not be fully diversified and form a significant part of

firm risk (e.g., Goyal and Santa-Clara, 2003; Ang, Hodrick, Xing and Zhang, 2009; Angelidis, 2010; Fu, 2010). Some previous literature not only suggests that the risks of foreign expansion contain idiosyncratic factors (e.g., Goldberg and Heflin, 1995; Krapl, 2015), but also provide evidence of the significant relation between international diversification and idiosyncratic risk, despite its limited number.

Hughes et al. (1975) find that a portfolio of multinational firms has lower idiosyncratic risk compared to that of domestically oriented firms. They refer that investors consider that multinational firms provide substantial diversification benefits. But, Krapl (2015) suggest that corporate international diversification increases idiosyncratic risk, and discusses that additional risk factors of international diversification include idiosyncratic components as well as systematic components. In terms of the components, it refers that currency risk would be systematic while other risks associated with international diversification may mostly be idiosyncratic.

Although corporate international diversification has significant effects on idiosyncratic risk, previous studies show conflicting results. Internationally diversified firms may have lower idiosyncratic risk than domestic firms, because the risk can be dispersed through operations in multiple markets. However, if additional risks of international diversification include idiosyncratic components and they are not perfectly diversified, idiosyncratic risk may increase, as a firm expands its operations to foreign markets. Some previous studies suggest that risks of foreign expansion include idiosyncratic factors, although systematic and idiosyncratic natures of the risks have not been identified definitely. Thus, how corporate international diversification influences idiosyncratic risk depends on which of these two effects is dominant. When the former effect predominates over the latter effect, idiosyncratic risk decreases with international diversification, and vice versa.

Therefore, I hypothesize on the relation between corporate international diversification and idiosyncratic risk as follows:

H2.a. Corporate international diversification is associated with greater idiosyncratic risk.

H2.b. Corporate international diversification is associated with lower idiosyncratic risk.

3) The effect of corporate international diversification on total risk

In this section, I investigate the effects of corporate international diversification on total risk. The change in systematic risk and idiosyncratic risk causes a change in total risk, because total risk indicates the sum of two risks. If foreign expansion has significant effects on systematic and idiosyncratic risk in the same direction, it also would influence total risk in the same way. For example, Krapl (2015) finds that international diversification increases systematic risk, idiosyncratic risk, and total risk. However, the effects on systematic and idiosyncratic risk may be offset against each other. Goldberg and Heflin (1995) find that firms with greater international involvement have higher total risk, while they have lower systematic risk. It is due to larger portion of idiosyncratic risk which is diversified away. Thus, the relation between corporate international diversification and total risk would be determined by how foreign expansion affects systematic and idiosyncratic risk.

So, the hypotheses are established as follows:

H3.a. Corporate international diversification is associated with greater total risk.

H3.b. Corporate international diversification is associated with lower total risk.

3.4. Data and Methodology

1) Sample selection

The sample consists of all firms listed on the Tokyo Stock Exchange (TSE) excluding financial companies. Financial information and international diversification information of sample firms are extracted from Nikkei Needs Financial Quest database. Weekly stock returns data and Kubota & Takehara's Fama-French data which includes data for estimating risk proxies are acquired from NPM data service. Since information of foreign assets has been disclosed from 1999, I collect the data from

1999 to 2012. Observations without positive foreign sales ratio or foreign assets ratio are excluded. Observations with missing value of variables are also excluded. To minimize the effects of outliers, I winsorize all of the variables at the 1% level. The final dataset consists of 1,670 firms and 12,171 firm-year observations of foreign sales ratio, 987 firms and 6,585 firm-year observations of foreign assets ratio.

2) Risk measures

I use three types of risk parameters, which are systematic risk, idiosyncratic risk, and total risk. To estimate the risk measures, I employ Fama-French three-factor model (Fama and French, 1993) composed of the CAPM and two additional factors.⁵ The equation of the model is as follows:

$$R_{it} - R_{ft} = \beta_i(R_{mt} - R_{ft}) + s_iSMB_t + h_iHML_t + \varepsilon_{it} \quad (3.2)$$

where R_{it} is the stock return of firm i in week t , R_{ft} is the weekly risk-free rate of return which is calculated from the rates of 10-year Japanese government bonds, R_{mt} is the weekly return of value-weighted market portfolio which consists of all listed firms on the TSE, β_i is the beta which is the measure of systematic risk, SMB_t is the size premium computed as the average return for the smallest 50% of stocks minus the average return for the largest 50% stocks in week t , HML_t is the value premium computed as the average return for the 30% of stocks with the highest book-to-market ratio minus the average return for the 30% of stocks with the lowest book-to-market ratio in week t , and ε_{it} is the weekly idiosyncratic stock returns of firm i . I estimate total risk (σ_R) using the standard deviation of weekly excess stock returns ($R_{it} - R_{ft}$). I also estimate idiosyncratic risk (σ_{RES}) using the standard deviation of idiosyncratic stock returns ε_{it} , obtained by residuals from the equation.

⁵ The estimated systematic risk in this study may be imperfect, as it just considers the coefficient of market excess returns (β_i) excluding the coefficients of the size effect (s_i) and the value effect (h_i). For that reason, I also estimate the risk measures relying on the original version of CAPM. The risk measures provide results that are consistent with the results of this study.

All the risk measures are based on 1-year (52 weeks) rolling period windows.⁶

3) Corporate international diversification measures

The ratio of Foreign Sales to Total Sales (*FSTS*) and the ratio of Foreign Assets to Total Assets (*FATA*) are used as the measure of international diversification. These two measures are used in previous studies frequently (Reeb et al., 1998; Olibe et al., 2008). Each of these two measures reflects different facets of international diversification. The ratio of foreign sales to total sales provides a measure of a firm's dependence on its foreign markets for sales revenues, while the ratio of foreign assets to total assets can be regarded as a proxy for a firm's dependence on foreign production. In addition, while the ratio of foreign sales cannot fully capture geographical economic activities of firms, the ratio of foreign assets mitigating the problem of mixed export and foreign subsidiary sales captures geographic structural information.

4) Control variables

Based on previous studies, I include some control variables in empirical analysis to control the other determinants of firm risk. Return on assets (*ROA*) is expected to be negatively associated with firm risk, because greater profitability can increase expected stock returns by investors. Firms with greater liquidity may have lower risk, because they are likely to be less sensitive to fluctuations in the economy. In this study, the Quick ratio defined as the ratio of quick assets to current liabilities is used as the measure of corporate liquidity (*LIQ*). The quick assets include cash and current assets which can be quickly converted to cash such as account payable, and marketable securities. Dividend payout (*DIVPO*) defined as the ratio of the firm's dividends to net income also is expected to reduce firm risk due to positive perception by investors. In addition, operating efficiency (*EFF*) and firm size (*SIZE*)

⁶ The estimation period is matched to fiscal year end of given observation. For example, the observation with fiscal year end of March 2012 is estimated with the data from April 2011 to March 2012.

may contribute to decrease in risk, because they are related to greater revenue and lower possibility of bankruptcy, respectively. I also use the ratio of total revenues to total assets as the measure of the firm's operating efficiency and the natural logarithm of total assets as the proxy for firm size. In contrast, previous studies find that firms with higher growth opportunities and leverage have greater risk. I define growth opportunity as the market-to-book ratio (*MTB*) and firm leverage (*LEV*) as the ratio of total debt to total assets.

5) Method

To investigate the effect of corporate international diversification on firm risk, this study uses panel data composed of various cross-sectional units. I rely on fixed effects model to control for unobserved firm-specific characteristics. Estimated regression model is as follows:

$$RISK_{it} = \beta_0 + \beta_1 ID_{it} + \beta_2 ROA_{it} + \beta_3 LIQ_{it} + \beta_4 DIVPO_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 EFF_{it} + \beta_8 SIZE_{it} + \delta_y YEAR_y + u_i + \varepsilon_{it} \quad (3.3)$$

where $RISK_{it}$ is the risk measures of firm i in year t , ID_{it} is the measures of international diversification, ROA_{it} is return on assets, LIQ_{it} is corporate liquidity, $DIVPO_{it}$ is the dividend payout ratio, MTB_{it} is market-to-book ratio, LEV_{it} is corporate leverage, EFF_{it} is operational efficiency, $SIZE_{it}$ is firm size measured by the natural logarithm of total assets. The set of year dummy variables are included to control time-variant effects, as well as control variables mentioned above.

7) Descriptive statistics

Table 3.1 Descriptive statistics

Panel A Summary statistics

Variables	Observations	Mean	Median	Std Dev
β	11,797	0.846	0.825	0.406
σ_{RES}	12,123	4.531	4.108	1.945
σ_R	12,130	5.355	4.950	2.132
FSTS	12,171	0.296	0.246	0.213
FATA	6,585	0.228	0.199	0.140
ROA	12,472	3.496	2.749	2.994
LIQ	12,472	1.602	1.201	1.331
DIVPO	12,472	0.461	0.257	0.773
MTB	12,472	1.144	1.003	0.593
LEV	12,472	0.492	0.498	0.203
EFF	12,472	1.010	0.912	0.478
SIZE	12,472	11.186	10.990	1.567

Note: β =systematic risk; σ_{RES} =idiosyncratic risk; σ_R =total risk ; FSTS = foreign sales/total sales; FATA =foreign assets/total assets;; ROA=return on assets; LIQ=quick ratio; DIVPO=dividend payout ratio; MTB=market-to-book ratio; LEV= total debts/total asset; EFF=total revenue/total assets; SIZE=the natural logarithm of total assets

Panel A of Table 3.1 presents summary statistics of the sample; the number of observations, mean, median, and standard deviation of each variables. The average foreign sales ratio (*FSTS*) is 0.296 and the average foreign assets ratio (*FATA*) is 0.228. Sample firms have average systematic risk (β) of 0.846, average idiosyncratic risk (σ_{RES}) of 4.531, and average total risk (σ_R) of 5.355.

Table 3.1 Descriptive statistics

Panel B Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1. β	1											
2. σ_{RES}	0.330**	1										
3. σ_{R}	0.497**	0.966**	1									
3. FSTS	0.138**	0.043**	0.076**	1								
4. FATA	0.023*	-0.013	-0.0001	0.616**	1							
5. ROA	-0.012	0.037**	0.022*	0.191**	0.144**	1						
6. LIQ	-0.123**	-0.061**	-0.082**	0.054**	0.004	0.223**						
7. DIVPO	-0.052**	-0.036**	-0.023**	-0.055*	-0.047**	-0.327**	0.045**	1				
8. MTB	0.100**	0.186**	0.181**	0.145**	0.118**	0.551**	0.110**	-0.135**	1			
9. LEV	0.221**	0.162**	0.193**	-0.066**	-0.051**	-0.349**	-0.700**	-0.059**	-0.090**	1		
10. EFF	0.002	-0.003	0.005	-0.036**	0.071**	0.026**	-0.282**	-0.070**	-0.040**	0.307**	1	
11. SIZE	0.089**	-0.240**	-0.180**	0.204**	0.258**	-0.083**	-0.181**	-0.036**	0.094**	0.223**	-0.026**	1

** p < 0.001; * p < 0.05

Correlation matrix between all the variables is displayed in Panel B of Table 3.1. The correlation coefficients among the risk measures are positive. Especially, idiosyncratic risk (σ_{RES}) and total risk (σ_R) have considerably strong correlation of 0.966. The correlation between foreign sales ratio ($FSTS$) and foreign assets ratio ($FATA$) is 0.616. $FSTS$ is positively correlated with the risk measures and statistically significant at the 1% level, implying that firms with greater foreign sales ratio have lower systematic, idiosyncratic, and total risk. On the other hand, $FATA$ and systematic risk have a positive correlation which is statistically significant at the 5% level, while the correlation coefficients between $FATA$ and other risk measures have no statistical significance. It is possible that the effects of other determinants of firm risk distort the relation between foreign assets ratio and idiosyncratic risk or total risk.

Table 3.2 The effect of corporate international diversification on systematic risk

	β			
	Model 1	Model 2	Model 3	Model 4
Intercept	0.820*** (31.71)	-0.054 (-0.17)	0.881*** (29.56)	-0.317 (-0.75)
FSTS	0.216*** (3.05)	0.153** (2.16)		
FATA			0.320*** (3.09)	0.223** (2.06)
ROA		0.0004 (0.17)		-0.004 (-1.49)
LIQ		-0.011 (-1.41)		-0.021* (-1.95)
DIVPO		-0.008* (-1.78)		-0.0005 (-0.07)
MTB		0.078*** (5.46)		0.085*** (5.31)
LEV		0.156* (1.89)		0.057 (0.50)
EFF		-0.058* (-1.83)		-0.006 (-0.13)
SIZE		0.082*** (2.95)		0.102*** (2.77)
Year Dummies	YES	YES	YES	YES
N	11,797	11,797	6,411	6,411
R-sq	0.040	0.053	0.048	0.059

*** p < 0.01; ** p < 0.05; * p < 0.10

3.5. Results

1) The effect of corporate international diversification on systematic risk

At first, I investigate the effect of corporate international diversification on systematic risk. Table 3.2 shows the results of fixed effect regression. Model 1 and 2 represent the results using *FSTS* as a proxy for corporate international diversification, while model 3 and 4 represent the results using *FATA*. For all models, the estimated beta is used as the measure of systematic risk. The table shows the

results of the basic model not including control variables except for year dummies, and the results of the advanced model with all other control variables.

Both international diversification measures (*FSTS* and *FATA*) are positively associated with systematic risk. In model 1, which is the basic version of regression, the estimated coefficient on *FSTS* is 0.216 and statistically significant at the 1% level. This indicates that the level of foreign sales ratio is positively correlated with beta. Even after controlling for other determinants of systematic risk, the result remains unchanged. In model 2, including the complete set of control variables, the estimate coefficient on *FSTS* is 0.153 and statistically significant at the 5% level. The coefficient on *FSTS* of model 2 is lower than that of model 1 and it may result from the effects of control variables. The results of regression using *FATA* report are consistent with those using *FSTS*. In model 3 and 4, the coefficient estimates on *FATA* are positive (0.32 and 0.223) and statistically significant at or less than the 5% level.

Thus, corporate international diversification increases the firm's systematic risk, even when controlling for other control variables. The regression results of Table 2 represent the positive relation between the international diversification measures and beta, as supporting the hypothesis 1a that corporate international diversification is associated with greater systematic risk. It is interpreted that the effects of additional risk of foreign expansion predominate over the reduction in the correlation between multinational firms and domestic market (Reeb et al, 1998; Olibe et al., 2008). Therefore, firms with more international activities may confront with greater systematic risk in Japan.

Control variables have significant effects on systematic risk. *MTB* and *LEV* are positively associated with beta, implying that the firms with greater growth opportunities and leverage have higher systematic risk. However, *LIQ*, *DIVPO*, and *EFF* are negative related with beta. Increase in liquidity, dividend payout, and operational efficiency contribute to reduction in systematic risk. Opposite to the expectation, *SIZE* is positively associated with systematic risk. In Japan, larger firms have greater systematic risk and this is contrary to the conventional

arguments and existing evidences.

2) The effect of corporate international diversification on idiosyncratic risk

I investigate the effect of corporate international diversification on idiosyncratic risk, as well as systematic risk, because the risk may be the significant part of firm risk. Table 3.3 reports the regression results considering idiosyncratic risk. I use the standard variations of idiosyncratic stock returns as dependent variables, instead of betas. Other components of each models are consistent with those of Table 3.2.

I find that corporate international diversification is positive related with idiosyncratic risk based on the regression results. In model 1 and 2, the estimated coefficients on *FSTS* are positive (0.587 and 0.663) and statistically significant at the 10% level. The estimated coefficients on *FATA*, in model 3 and 4, are also positive (1.042 and 1.179) and statistically significant at the 5% level.

Corporate international diversification is positively associated with idiosyncratic risk, after controlling for other determinants of idiosyncratic risk. This result supports the hypothesis 2a that corporate international diversification is associated with greater idiosyncratic risk. The result indicates that the risks of foreign expansion include idiosyncratic factors that become larger with the firm's increased overseas activities (Krapl, 2015). Unlike the argument of portfolio theory, this finding suggests that idiosyncratic risk is not fully dispersed by multinational operations, but rather becomes greater with internationalization.

From the results of the control variables, other determinants also have significant effects on idiosyncratic risk. Greater growth opportunities and leverage are associated with higher idiosyncratic risk. Conversely, liquidity, dividend payout, and operational efficiency are likely to decrease idiosyncratic risk. Larger firms have lower idiosyncratic risk, but they have higher systematic risk. Finally, contrary to the expectation, profitability is positively related to idiosyncratic risk.

Table 3.3 The effect of corporate international diversification on idiosyncratic risk

	σ_{RES}			
	Model 1	Model 2	Model 3	Model 4
Intercept	3.408*** (26.49)	10.61*** (7.10)	5.488*** (37.19)	11.36*** (5.75)
FSTS	0.587* (1.65)	0.663* (1.94)		
FATA			1.042** (2.07)	1.179** (2.49)
ROA		0.030*** (2.81)		0.028** (2.12)
LIQ		-0.051 (-1.46)		-0.025 (-0.53)
DIVPO		-0.055** (-2.46)		-0.009 (-0.30)
MTB		0.730*** (11.46)		0.573*** (7.98)
LEV		2.334*** (6.66)		2.276*** (4.71)
EFF		-0.612*** (-4.29)		-0.546*** (-3.33)
SIZE		-0.534*** (-4.01)		-0.589*** (-3.43)
Year Dummies	YES	YES	YES	YES
N	12,123	12,123	6,572	6,572
R-sq	0.293	0.336	0.328	0.356

*** p < 0.01; ** p < 0.05; * p < 0.10

3) The effect of corporate international diversification on total risk

In this section, I examine how corporate international diversification influences total risk. Table 3.4 presents the estimates of the regression models. The standard variations of weakly stock returns are used as dependent variables,. Other components are consistent with those of Table 3.2 and 3.3.

Consistent with the results of regressions regarding systematic and idiosyncratic risk results, corporate international diversification is positively associated with total

risk. In model 1 and 2, the estimated coefficients on *FSTS* are positive (0.953 and 0.902) and statistically significant at the 5% level. Similarly, the estimated coefficients on *FATA*, in model 3 and 4, are positive (1.511 and 1.452) and statistically significant at the 1% level. Even when controlling for other determinants of total risk, the positive relation between corporate international diversification and total risk remains unchanged. The result also suggest that when firms expand operations internationally, they become to be exposed to greater costs exceeding benefits, based on the estimates of systematic and idiosyncratic risk.

Table 3.4 The effect of corporate international diversification on total risk

	σ_R			
	Model 1	Model 2	Model 3	Model 4
Intercept	4.170*** (30.08)	9.890*** (6.08)	6.917*** (42.80)	10.70*** (4.99)
FSTS	0.953** (2.48)	0.902** (2.45)		
FATA			1.511*** (2.74)	1.452*** (2.73)
ROA		0.025** (2.20)		0.017 (1.17)
LIQ		-0.086** (-2.08)		-0.095 (-1.42)
DIVPO		-0.055** (-2.25)		0.001 (0.04)
MTB		0.816*** (12.25)		0.698*** (8.50)
LEV		2.235*** (5.76)		2.013*** (3.75)
EFF		-0.508*** (-3.27)		-0.349* (-1.91)
SIZE		-0.346** (-2.39)		-0.411** (-2.22)
Year Dummies	YES	YES	YES	YES
N	12,130	12,130	6,577	6,577
R-sq	0.308	0.352	0.359	0.387

*** p < 0.01; ** p < 0.05; * p < 0.10

3.6. Conclusion

In this chapter, I examine how corporate international diversification affects firm risk. Given the portfolio theory, international diversification is considered to contribute to reducing risk resulting diversification benefits, while multinational firms face additional costs that increase the firms' risk. Thus, the relation between corporate international diversification depends on the net of the adverse effects. The relation is still unanswered due to the lack of consensus among the results of previous studies.

The regression results using a sample of listed Japanese firms suggest that corporate international diversification increases systematic risk, idiosyncratic risk, and total risk. The international diversification measures, represented by the ratio of foreign sales and assets, are positively associated with all risk proxies, after controlling other determinants of risk. This result is consistent with previous studies suggesting that the additional costs of multinational operations such as currency risk, political risk, and greater agency costs result in greater firm risks (e.g., Lee and Kwok, 1988; Reeb et al., 1998). Therefore, the result of empirical analysis can be explained that the costs of foreign expansion by Japanese firms may be dominate benefit, thereby increasing their corporate risk.

Given the finding of this study, as firms increase overseas activities, their firm risks become greater. Even idiosyncratic risk, which is expected to be mitigated by diversification, also increases with overseas expansion. This result provides implications for investors that investing in internationally diversified firms leads to greater risk. If investors hold stocks of multinational firms, they will be exposed to increased idiosyncratic risk as well as systematic risk. In addition, the increase in firm risk is likely to result in the greater cost of capital, because investors require the higher returns for the higher risk. It may also influence the firm's ability to take on capital investment. Therefore, it is recommended for managers of multinational firms to take an efficient risk management of their foreign operations.

4. The Effect of Corporate International Diversification on the Accuracy of Management Earnings Forecasts

4.1. Introduction

The accuracy of earnings forecasts is an indicator that measures predictability of future earnings. Because most managers concerned about their earnings owing to its direct linkage with performance, the level of predictability about future earnings is one of the important information in firm's investment decision making. If then, it would be necessary for firms that expand operations into overseas to investigate how corporate international diversification influences the accuracy of the firm's earnings forecasts. It is also important for the reason that earnings forecasts by both of managers and analysts provide valuable information to investors.

To investigate the relation between corporate international diversification and the accuracy of earnings forecasts, some studies examine the effects of overseas business activities on the accuracy of analysts' earnings forecasts (Erwin and Perry, 2000; Duru and Reeb, 2002; Mauri et al., 2013). They suggest that company's international activities are negatively related to the accuracy of analysts' earnings forecasts, because the greater uncertainty of foreign operations increases the difficulty of forecasting tasks. However, the accuracy of analysts' forecasts is also influenced by information asymmetry between analysts and managers on the management strategy of the firm, as well as the difficulty of forecasting task (Duru and Reeb, 2002). If then, the result of analysts' earnings forecasts may be distorted by the effect of information asymmetry between analysts and managers.

Given the limitation of the results on analysts' earnings forecasts, management earnings forecasts may be more useful measure for exploring the relation between international activities and earnings predictability. Because, unlike analysts' forecasts, the accuracy of management forecasts would not be influenced by information asymmetry between managers and analysts. Therefore, exploring management earnings forecasts is expected to compliment the result on analysts' earnings forecasts. However, there is little evidence of the relation between

corporate international diversification and the accuracy of management earnings forecasts. While few studies examine how corporate international diversification influences management forecasts, these mainly focus on a forecast precision (Runyan and Smith, 2007) instead of an accuracy and the effects of Reg FD (Regulation Fair Disclosure)⁷ which is a rule for fair disclosure of corporate information (Herrmann et al., 2010), and use the voluntary management forecasts .

Therefore, this study investigates the relation between corporate international diversification and the accuracy of management earnings forecasts using a sample of listed Japanese firms. Unlike to United States where firms issue management forecasts voluntarily, almost listed firms in Japan provide management forecasts mandatorily. In addition, they release point estimates while management forecasts of U.S. firms include open-interval or range estimates. Thus, this study uses more abundant and less biased sample than prior studies using voluntary management forecasts. The sample of this study would provide more abundant and less biased information about management forecasts.

The regression results of this study suggest that corporate international diversification is associated with less accurate management earnings forecasts. The measures of international diversification are positively associated with the absolute errors of sales, operating income, and net income forecasts, after controlling other determinants of forecast accuracy. This implies that the forecasting tasks for managers become more difficult because of the greater uncertainty and complexity of multinational operations, as the firm becomes more diversified internationally.

This study has some valuable contributions. First, it complements the result of previous studies on analysts' forecast accuracy. The result about the accuracy of management forecasts would provide a better evidence for the effects of corporate international diversification on the difficulty of forecasting tasks, since it is not influenced by information asymmetry between managers and analysts. Second, use

⁷ A rule passed by the Securities and Exchange Commission is to prevent selective disclosure by public companies to market professionals and certain shareholders. The rule mandates that all publicly traded companies must disclose material information to all investors at the same time.

of sample of Japanese firms contributes to increase of observations and improving detachment. Almost listed firms in Japan provide regular forecasts with point estimates unlike those in United States. Therefore, the sample would provide abundant and less biased observations than prior studies which use voluntary management forecasts (Runyan and Smith, 2007; Herrmann et al., 2010). Finally, the result of study would be relevant to investor and analyst interested in the credibility of management forecasts, because management earnings forecasts provide important information to investor, analysts and other stakeholder who make decisions based on the forecasts.

The remainder of this thesis is organized as follows. Chapter 2 introduces management forecasts in Japan and chapter 3 provides theoretical backgrounds of this study. Next, chapter 4 reviews the literature and formulates hypothesis. Chapter 5 describes the sample and methodology for analysis and chapter 6 presents the results of regressions. Finally, Chapter 7 draws conclusions.

4.2. Management Earnings Forecasts in Japan

A disclosure of forecast information by listed firms has become generally established as a working practice In Japan. The information includes forecasts of management indexes, such as sales and earnings, and financial indexes that influence operating results. Because firms have most accurate information about their own conditions and future management policies, these management forecasts are regarded as more valuable information on investors' decision making.

Listed firms are requested to provide actively their management forecasts by Tokyo Stock Exchange (TSE) to alleviate information asymmetry between managers and investors. In response to the request, the firms release their management earnings forecasts of forthcoming year along with earnings announcement of current year. Thus, management forecasts for year t are announced in year $t-1$, when actual earnings for year $t-1$ are announced. Though there is no restriction on the way of disclosure, the firms usually issue their forecasts of sales, operating income, ordinary income, and net income through the

Kessan Tanshin, a summary of financial statement.

The firms are requested to explain the background of their forecasts and risk factors which may affect future earnings, to provide the rationality and availability of forecasts for investors. In addition, firms are required to revise their earnings forecasts timely if significant changes in the forecasts occur, to secure the validity of management earnings forecasts. Forecast revision is also considered as a reason for a large percentage of listed firms that disclose management forecasts in Japan.

The disclosure of management forecasts for listed firms is not legal obligation but the request from the stock exchange in Japan in principal. However, almost all firms publically traded in Japan release their forecasts in practice and this is a critical difference between U.S. firms and Japanese firms. While management forecasts are purely voluntary in United States, managers of listed firms in Japan mandatorily provide forecasts of sales and earnings. In additon, they issue point forecasts, whereas U.S. firms issue forecasts including range, open-interval and general impression.

Previous studies provide evidence supporting the validity of management forecasts for Japanese firms. Kato et al. (2009) reported that over 90 percent of listed firms in Japan disclose their management earnings forecasts. Aman (2011) emphasizes that management forecasts of Japanese firms are valuable owing to their comprehensiveness with a less sample selection bias.

4.3. Theoretical Background

Brown (1993) refer that the accuracy of forecasts is affected by the difficulty or complexity of the forecasting tasks. Also, the degree of uncertainty is an important determinant of forecast accuracy. Thus, how corporate international diversification influences the difficulty of forecasting tasks would determine the relation between corporate international diversification and the accuracy of forecasts. However, corporate international diversification is expected to have conflictiong effects on the difficulty of forecasting tasks.

Internationally diversified firms would have a less difficulty in their forecasting task

if their multinational operations decrease the volatility of their earnings. In the portfolio theory, operations in imperfectly correlated multiple markets can reduce the earnings volatility because of diversification benefits. The diversification benefits include the reduction in the correlation between the firm's cash flows and domestic market-level cash flows. Rugman (1976) describes that the diversification of sales in various national economies in which are not perfectly correlated increases the stability of earnings. Shapiro (1978) also argues that multinational firms can take the diversification benefits caused by uncorrelated cash flows in multiple countries.

However, international diversification may increase the earnings volatility due to various risks of foreign expansion. Overseas operations involve more exposure to the fluctuation of foreign exchange rate, thereby increasing the variation of foreign returns. Multinational firms are also exposed to greater political risk such as host government appropriation, fund remittance control, differences in governmental and cultural practices and regulations (Reeb et al., 1998). The increase in the volatility of cash flows due to risks mentioned above may offset the merit of reduction in cash flow correlations by diversification (Reeb et al, 1998; Olibe et al., 2008).

In addition, the greater complexity in information environment of multinational operations would increase the difficulty of forecasting tasks. Geographical distance and difference in culture, language, and legal system influence the information flow in multinational firms, thereby increasing the difficulty of forecasting international operations (Duru and Reeb, 2002). In addition, multinational firms are likely to have the greater complexity and uncertainty of their operations because of the difficulties in communicating across borders and the principal-agent relationship between the domestic parent and foreign subsidiary (Runyan and Smith, 2007). They also have greater agency costs than domestic firms, since it is difficult to monitor managers in international market (Lee and Kwok, 1988).

As discussed above, the effects of corporate international diversification on the difficulty of forecasting tasks are inconclusive. Multinational operations may reduce the earnings volatility owing to the diversification benefits, thereby decreasing the difficulty of forecasting tasks. However, multinational firms may have the greater

difficulty in their forecasting tasks, since they are likely to experience the greater increase in cash flows volatility and the greater complexity of information environment. Therefore, the relation between overseas business activities and the difficulty of forecasting tasks would depend on the net effect of these conflicting effects.

4.4. Literature Review and Hypotheses Development

- 1) The relation between corporate international diversification and the accuracy of analysts' earnings forecasts

Previous studies on the effects of corporate international diversification on the accuracy of analysts' earnings forecasts suggest that overseas activities are associated with less accurate analysts' forecasts.

Erwin and Perry (2000) investigate the relation between foreign acquisition by U.S. firms and analysts' prediction error. They find that the firm's geographical expanding through foreign merger and acquisition increases analysts' prediction errors. The errors are larger in expansion beyond their core business segment. However, they argue that the less accurate forecasts result from the difficulty of forecasting for analysts who have less information of foreign firms and markets.

Duru and Reeb (2002) also provide the evidence for the negative effect of corporate international diversification on the accuracy of analysts' forecasts. They find that analysts' earnings forecasts become less accurate and more optimistic, as firms become more internationally diversified. Regarding the results, they discuss that the difficulty of forecasting task due to greater earnings volatility, less information for analysts about foreign operations and information asymmetry between analysts and managers decrease the accuracy of analysts' forecasts of multinational firms.

In addition, Mauri et al. (2013) present that firm's internationalization with cross-border integration decreases the accuracy of financial analysts' earnings forecasts. They suggest that firms that internationalize through cross-border integration would

experience the increased operational complexity and the higher variability of performance.

2) The relation between corporate international diversification on the accuracy of management earnings forecasts

The results of previous studies on the effects of corporate international diversification on the accuracy of management earnings forecasts are consistent with the results of the accuracy of analysts' forecasts. They claim that international business activities have negative on the accuracy of management forecasts.

Runyan and Smith (2007) examine the relationship between the degree of firms' multi-nationality and the precision of their management forecasts. They show that the precision of management forecasts decreases, as multi-nationality increases. The precision is measured by coding forecasts according to their forms (point, range, open-interval estimates, and general impression). They suggest that firms with a high degree of multi-nationality are likely to operate in a more complex environment and have the greater uncertainty of earnings forecasts compared to domestic corporations.

Herrmann et al. (2010) investigate the relation between corporate international diversification and management earnings guidance using the five different measures of likelihood, frequency, quality, forecast error and bias. They find that international diversification is associated with the less accurate and more biased management forecasts, following the implementation of Reg FD. This supports that international activities increase the complexity and uncertainty of operations of the firm.

3) Hypotheses

The accuracy of earnings forecasts by managers of multinational firms may rely on the relation between international diversification and the difficulty of forecasting task. Multinational operations can relieve the difficulty of forecasting task, because

they decrease the earnings volatility owing to the diversification benefits. However, the firms doing overseas activities are likely to face the greater earnings volatility due to several risks of foreign expansion and the greater complexity of information environment that result in the more difficulty of forecasting tasks. If the former effect dominates the latter effect, corporate international diversification would increase the accuracy of management earnings forecasts, and vice versa.

Some previous studies suggest that corporate international diversification decreases the accuracy of analysts' earnings forecasts. However, the accuracy of analysts' forecasts is influenced by information asymmetry between analysts and managers, as well as the difficulty of forecasting task. Although some studies on the accuracy of management forecasts provide the evidence for the greater difficulty of forecasting tasks of multinational firms, these studies apply the voluntary management forecasts. Thus, this study may show different results from that of previous studies, because forecasts of listed Japanese firms that provide management forecasts regularly are used.

So, I test conflicting hypotheses as follows:

H1.a. Corporate international diversification is associated with more accurate management forecasts.

H1.b. Corporate international diversification is associated with less accurate management forecasts.

4.5. Data and Methodology

1) Sample selection

The sample consists of all listed firms in Japan⁸ of which fiscal year ended on 31, March. The dataset excludes financial firms such as commercial banks, security houses, insurance companies, and credit and lease firms. The data concerning the firms' finance and international diversification is extracted from Nikkei Needs

⁸ I obtain consistent result from analysis with a sample of firms listed on Tokyo Stock Exchange (TSE).

Financial Quest database. Since information of foreign assets has been disclosed from 1999, I collect the data from 1999 to 2012. This study uses three types of management forecasts, which are forecasts of sales, ordinary income, and net income, to analyze forecast accuracy,. The observations of the firm without management forecasts in each year are excluded. I winsorize all the variables at the 1% level, to minimize the effects of outliers. Table 4.1 and 4.2 describe the details of selected samples. As a result, the final dataset consists of 3,236 firms and 33,701 firm-year observations.

Table 4.1 The ratio of firms that disclose management earnings forecasts in listed Japanes firms

Year	All	Sale (%)	Ordinary Income (%)	Net Income (%)
1999	2,862	2,427 (84.80)	2,417 (84.45)	2,409 (84.17)
2000	2,927	2,484 (84.87)	2,480 (84.73)	2,485 (84.90)
2001	2,975	2,516 (84.57)	2,511 (84.40)	2,516 (84.57)
2002	3,006	2,555 (85.00)	2,548 (84.76)	2,553 (84.93)
2003	2,991	2,559 (85.56)	2,554 (85.39)	2,558 (85.52)
2004	2,937	2,605 (88.70)	2,600 (88.53)	2,605 (88.70)
2005	2,913	2,627 (90.18)	2,622 (90.01)	2,624 (90.08)
2006	2,873	2,678 (93.21)	2,670 (92.93)	2,673 (93.04)
2007	2,827	2,626 (92.89)	2,624 (92.82)	2,625 (92.85)
2008	2,761	2,549 (92.32)	2,546 (92.21)	2,546 (92.21)
2009	2,714	2,468 (90.94)	2,466 (90.86)	2,467 (90.90)
2010	2,640	2,406 (91.14)	2,405 (91.10)	2,405 (91.10)
2011	2,568	2,348 (91.43)	2,344 (91.28)	2,345 (91.32)
2012	2,507	2,326 (92.78)	2,319 (92.50)	2,320 (92.54)
Total	39,501	35,174 (89.05)	35,106 (88.87)	35,131 (88.94)

Table 4.1 shows the proportion of firms that disclose their management earnings forecasts by year from 1999 to 2012. The first column of the table is the number of all listed firms with March fiscal year-end. The second column is the number of firms disclosing management forecast of sales for forthcoming year. The values in parentheses are the ratio of firms with management forecast to total firms in the first column. The third and fourth columns are the number and ratio of firms disclosing

management forecast of ordinary income and net income, respectively. As shown in Table 4.1, about 85 percent of firms issued their management earnings forecasts in 1999. In recent, over 90 percent of firms disclose management forecasts.

Table 4. 2 International Diversification of Japanese firms

Panel A Firms with Foreign Sales and Foreign Assets

Year	All	Foreign sales (%)	Foreign assets (%)
1999	2,862	1,036 (36.20)	520 (18.17)
2000	2,927	1,056 (36.08)	557 (19.03)
2001	2,975	1,052 (35.36)	579 (19.46)
2002	3,006	1,068 (35.53)	625 (20.79)
2003	2,991	1,090 (36.44)	630 (21.06)
2004	2,937	1,073 (36.53)	639 (21.76)
2005	2,913	1,092 (37.49)	677 (23.24)
2006	2,873	1,112 (38.71)	700 (24.36)
2007	2,827	1,111 (39.30)	725 (25.65)
2008	2,761	1,094 (39.62)	731 (26.48)
2009	2,714	994 (36.63)	745 (27.45)
2010	2,640	993 (37.61)	747 (28.30)
2011	2,568	927 (36.10)	
2012	2,507	929 (37.06)	
Total	39,501	14,627 (37.03)	7,875 (19.94)

Table 4. 2 International Diversification of Japanese firms

Panel B Industrial Distribution

Industry	All	Foreign sales (%)		Foreign assets (%)	
Food	1,500	245	(16.33)	137	(9.13)
Textiles	754	378	(50.13)	171	(22.68)
Paper & Pulp	369	132	(35.77)	56	(15.18)
Chemicals	2,576	1,693	(65.72)	776	(30.12)
Pharmaceuticals	705	356	(50.50)	124	(17.59)
Oil	108	38	(35.19)	45	(41.67)
Rubber	273	203	(74.36)	146	(53.48)
Ceramics	806	349	(43.30)	181	(22.46)
Steel	791	459	(58.03)	113	(14.29)
Nonferrous metals	1,737	749	(43.12)	341	(19.63)
Machinery	3,060	2,216	(72.42)	1,078	(35.23)
Electrical Machinery	3,556	2,718	(76.43)	1,778	(50.00)
Shipbuilding	85	85	(100.00)	24	(28.24)
Automobiles	1,147	936	(81.60)	717	(62.51)
Transportation Equipment	204	137	(67.16)	68	(33.33)
Precision Machinery	637	506	(79.43)	324	(50.86)
Miscellaneous Manufacturing	1,279	492	(38.47)	316	(24.71)
Marine products	103	25	(24.27)	31	(30.10)
Mining	124	64	(51.61)	22	(17.74)
Construction	2,674	488	(18.25)	139	(5.20)
Trading House	4,190	1,248	(29.79)	648	(15.47)
Retail	1,606	34	(2.12)	8	(0.50)
Miscellaneous Finance	992	124	(12.50)	43	(4.33)
Real estate	1,029	37	(3.60)	25	(2.43)
Railroads & Buses	468	10	(2.14)	2	(0.43)
Trucking	505	71	(14.06)	44	(8.71)
Shipping	224	175	(78.13)	101	(45.09)
Airlines	84	28	(33.33)	2	(2.38)
Warehousing	531	129	(24.29)	78	(14.69)
Telecommunications	404	10	(2.48)	20	(4.95)
Electric Power	167	1	(0.60)	0	(0.00)
Gas	126	0	(0.00)	0	(0.00)
Services	6,687	491	(7.34)	317	(4.74)
Total	39,501	14,627	(37.03)	7,875	(19.94)

The information of international diversification is presented in Table 4.2. Panel A of the table shows the number and percentage of the firms with foreign sales and foreign assets. Because many firms have disclosed their tangible fixed assets instead of total assets in segment disclosure from 2011, I use the data of foreign assets from 1999 to 2010. From Panel A, I find that about 37 percent of entire firm-year observations show positive foreign sales ratio. In addition, the percentage of firms with foreign assets has increased from 18 to 28, approximately. This indicates that overseas production and foreign subsidiaries of Japanese firms have increased.

Panel B of Table 4.2 displays the industry distribution of samples. This is based on the 36 Nikkei industrial classification code (Nikkei gyoshu chu bunrui). The second and third columns show the distribution of the firms with foreign sales and foreign assets, respectively. The firms in some industries including shipbuilding, automobiles and machinery aggressively expand their operations abroad. On the other hand, firms included in retail or tele-communication hardly diversify their operations internationally.

2) Management forecast accuracy measures

Management forecasts for year t are announced in year $t-1$ in Japan, when actual earnings for year $t-1$ are announced. The equation of the accuracy of management forecasts can be written as follows:

$$ACCURACY_SALE_t = |FORECAST_SALE_t^{t-1} - ACT_SALE_t|/ASSET_{t-1} \quad (4.1)$$

$$ACCURACY_ORD_t = |FORECAST_ORD_t^{t-1} - ACT_ORD_t|/ASSET_{t-1} \quad (4.2)$$

$$ACCURACY_{NET_t} = \frac{|FORECAST_NET_t^{t-1} - ACT_NET_t|}{MARKET\ CAPITALIZATION_{t-1}} \quad (4.3)$$

where $ACCURACY_X_t$ is the absolute forecast error of variable X ($=SALE$, OLD , and

NET) at time t , *SALE* is total sales, *ORD* is ordinary income, *NET* is net income, $FORECAST_t^{t-1}$ is the management forecast of period t sales and earnings made at period $t-1$, ACT_t is actual sales and earnings for period t , and $ASSET_{t-1}$ is the total assets at the time of forecast ($t-1$). I employ market capitalization instead of total assets in the equation of net income. As indicated by the equation, the larger value of *ACCURACY* means less accurate management forecasts.

3) International diversification measures

The degree of internationalization is measured by the ratio of Foreign Sales to Total Sales (*FSTS*) and the ratio of Foreign Assets to Total Assets (*FATA*). These two measures are frequently used in previous studies (Duru and Reeb, 2002; Runyan and Smith, 2007; Herrmann et al., 2010). Each measures reflect different facets of international diversification. The foreign sales ratio is a measure of a firm's dependence on its foreign markets for sales revenues, and the foreign assets ratio is regarded as a proxy for a firm's dependence on foreign production. While the ratio of foreign sales does not fully capture geographical economic activities of the firm, the ratio of foreign assets mitigates the problem of mixing export and foreign subsidiary sales and captures geographic structural information (Reeb et al., 1998). We calculate *FSTS* with data of foreign sales. However, *FATA* are calculated with total assets except for assets of Japan obtained from segment disclosure because foreign assets cannot be gained directly.

4) Control variables

Based on previous studies (e.g., Duru and Reeb, 2002; Runyan and Smith, 2007; Kato et al., 2009; Herrmann et al., 2010; De Jong et al., 2010; Ota, 2011), I include control variables to control other determinants of the forecast accuracy. *SIZE* is measured by a natural logarithm of market capitalization. Firm size can have two opposing effects. One of the effect is that larger firms are likely to be related to more complex operations resulting in forecasting difficulty. Otherwise, they could have

greater ability to forecast. The larger earnings volatility (*EVOL*) and forecast horizon (*HOR*) is associated with less accurate forecasts. *EVOL* is measured as the standard deviation of return on assets of the previous five-year period and forecast horizon in month is employed as horizon variable. Forecasts for growing firms are likely to become less accurate. I use sales grow rate (*SG*) and market-to-book ratio (*MTB*) as proxy for firm's growth opportunities. Financial condition and earnings trend may also influence to the accuracy of management forecasts. Leverage (*LEV*) and dummy variable for net income loss in current and forthcoming year (*LOSS*, *LOSS2*) are adopted to measure the firm's financial condition, and growth rate of net income (*NG*) and dummy variable for declining earnings (*DE*) are used as proxy for earnings trend. Finally, I add dummy variables for the first section of TSE, industry and year.

5) Method

I investigate the effects of corporate international diversification on the accuracy of management forecasts, controlling other determinants of forecast accuracy, to test the hypotheses. I use an OLS model and the estimated regression model is as follows:

$$\begin{aligned}
 ACCURACY_{i,t+1} = & \beta_0 + \beta_1 ID_{it} + \beta_2 SIZE_{it} + \beta_3 EVOL_{it} + \beta_4 HOR_{it} + \beta_5 MTB_{it} \\
 & + \beta_6 SG_{it} + \beta_7 LEV_{it} + \beta_8 LOSS_{it} + \beta_9 LOSS2_{it} + \beta_{10} NE_{it} + \beta_{11} \\
 & + \beta_{12} TSE1_{it} + \delta_y IND_y + \partial_y YEAR_y + \varepsilon_i
 \end{aligned} \tag{4.4}$$

where $ACCURACY_{i,t+1}$ is the management forecast accuracy measures of firm *i* at time *t*, ID_{it} is the international diversification measures, $SIZE_{it}$ is firm size, $EVOL_{it}$ is previous earnings volatility, HOR_{it} is forecast horizon, MTB_{it} is market-to-book ratio, SG_{it} is sales growth, LEV_{it} is leverage, $LOSS_{it}$ is dummy variables for net income loss in current year, $LOSS2_{it}$ is dummy variables for net income loss in forthcoming year, NE_{it} is net income growth rate, DE_{it} is dummy variable for declining earnings,

and $TSE1_{it}$ is dummy variables for the firms listed in the first section of TSE.

I apply this regression model to investigate accuracy of management forecasts on sales, ordinary income and net income. ID_{it} is the measures of international diversification ($FSTS$ and $FATA$). $ACCURACY$ means the absolute forecast errors. Therefore, it would support hypothesis 1b that corporate international diversification is associated with less accurate management forecasts, if the coefficient on ID has a positive value, and vice versa.

6) Descriptive Statistics

Table 4.3 presents summary statistics and correlation matrix of samples. In Panel A, $FSTS$ (Int Firms) and $FATA$ (Int Firms) are only for the internationally diversified firms which show positive value of $FSTS$ and $FATA$. As shown in the Panel A, for the internationally diversified firms in the sample, the mean of the ratio of foreign sales is 29.6 % and that of the ratio of foreign assets 22.7 %.

Panel B in Table 4.3 is the correlation matrix of all the variables. The management forecast accuracy measures ($ACCURACY_SALE$, $ACCURACY_ORD$ and $ACCURACY_NET$) show positive correlations. The correlation between international diversification variables ($FSTS$, $FATA$) and management forecast accuracy variables ($ACCURACY_SALE$, $ACCURACY_ORD$) are also positive. This means that corporate international diversification is correlated with the less accurate management forecasts. Other control variables also have significant correlation with forecast accuracy.

Table 4.3 Descriptive statistics

Panel A Summary statistics

	Obs	Mean	SD	P25	P50	P75
Dependent Variables						
<i>ACCURACY_SALE</i>	33,469	0.077	0.091	0.019	0.047	0.100
<i>ACCURACY_ORD</i>	33,436	0.021	0.027	0.004	0.011	0.025
<i>ACCURACY_NET</i>	33,364	0.070	0.134	0.008	0.024	0.065
Independent Variables						
<i>FSTS</i>	33,701	0.119	0.198	0.000	0.000	0.185
<i>FSTS</i> (Int Firms)	13,525	0.296	0.212	0.132	0.248	0.422
<i>FATA</i>	33,701	0.050	0.115	0.000	0.000	0.000
<i>FATA</i> (Int Firms)	7,436	0.227	0.141	0.124	0.198	0.302
Control Variables						
<i>SIZE</i>	33,701	23.47	1.767	22.201	23.219	24.505
<i>EVOL</i>	33,701	2.953	4.337	0.834	1.616	3.269
<i>HOR</i>	33,701	11.982	0.312	12.000	12.000	12.000
<i>MTB</i>	33,701	1.101	0.629	0.815	0.961	1.152
<i>SG</i>	33,701	0.028	0.209	-0.056	0.013	0.082
<i>LEV</i>	33,701	0.544	0.217	0.383	0.554	0.709
<i>LOSS</i>	33,701	0.216	0.412	0.000	0.000	0.000
<i>LOSS2</i>	33,701	0.211	0.408	0.000	0.000	0.000
<i>NG</i>	33,701	-0.440	4.078	-0.857	-0.101	0.364
<i>DE</i>	33,701	0.442	0.497	0.000	0.000	1.000

Note: *ACCURACY_SALE* = the absolute forecast error for sale deflated by total asset; *ACCURACY_ORD* = the absolute forecast error for ordinary income deflated by total asset; *ACCURACY_NET* = the absolute forecast error for net income deflated by market capitalization; *FSTS* = foreign sales / total sales; *FATA* = foreign assets / total assets; *SIZE* = natural log of market capitalization; *EVOL* = earnings volatility, the standard deviation of return on assets for the previous five-year period; *HOR* = forecast horizon in months; *MTB* = market-to-book ratio; *SG* = sales growth rate; *LEV* = leverage; *LOSS* = indicator variable equal 1 for negative net income in current year, 0 otherwise; *LOSS2* = indicator variable equal 1 for negative net income in forthcoming year, 0 otherwise; *NE* = net income growth rate; *DE* = indicator variable equal 1 for declining net income from current year to forthcoming year, 0 otherwise.

Table 4.3 Descriptive statistics

Panel B Correlation matrix

Variable	1	2	3	4	5	6	7
1. <i>ACCURA</i> <i>CY_SALE</i>	1.000						
2. <i>ACCURA</i> <i>CY_ORD</i>	0.502***	1.000					
3. <i>ACCURA</i> <i>CY_NET</i>	0.016***	0.059***	1.000				
4. <i>FSTS</i>	0.043***	0.101***	-0.006	1.000			
5. <i>FATA</i>	0.035***	0.067***	-0.002	0.668***	1.000		
6. <i>SIZE</i>	-0.159***	-0.106***	-0.262***	0.326***	0.282***	1.000	
7. <i>EVOL</i>	0.186***	0.300***	0.155***	0.022***	-0.007	-0.166***	1.000
8. <i>HOR</i>	0.033***	0.025***	0.020***	0.012**	0.011**	-0.013**	-0.002
9. <i>MTB</i>	0.116***	0.214***	-0.123***	0.049***	0.060***	0.290***	0.284***
10. <i>SG</i>	0.055***	0.068***	-0.084***	0.009*	-0.007	0.108***	0.080***
11. <i>LEV</i>	0.040***	-0.100***	0.186***	-0.066***	-0.036***	-0.080***	-0.035***
12. <i>LOSS</i>	0.070***	0.109***	0.293***	0.005	0.009*	-0.224***	0.170***
13. <i>LOSS2</i>	0.191***	0.331***	0.552***	0.011**	0.007	-0.179***	0.162***
14. <i>NG</i>	-0.051***	-0.071***	-0.169***	0.008	0.010*	0.044***	-0.017***
15. <i>DE</i>	0.110***	0.162***	0.193***	-0.014***	-0.024***	-0.019***	0.015***

Variable	8	9	10	11	12	13	14	15
8. <i>HOR</i>	1.000							
9. <i>MTB</i>	-0.007	1.000						
10. <i>SG</i>	-0.001	0.235***	1.000					
11. <i>LEV</i>	0.002	-0.042***	-0.031***	1.000				
12. <i>LOSS</i>	-0.001	-0.067***	-0.193***	0.184***	1.000			
13. <i>LOSS2</i>	-0.005	-0.046***	-0.087***	0.117***	0.333***	1.000		
14. <i>NG</i>	0.006	0.027***	0.019***	-0.048***	-0.021***	-0.248***	1.000	
15. <i>DE</i>	0.013**	-0.034***	0.045***	-0.036***	-0.211***	0.339***	-0.191***	1.000

*** p < 0.01; ** p < 0.05; * p < 0.10

4.6. Results

Table 4.4 shows the results of regressions. Panel A in Table 4.4 presents the results using *FSTS* as the measure of corporate international diversification, while Panel B in Table 1 is the results using *FATA*. Regarding the dependent variables, I use the management forecast accuracy measures, *ACCURACY_SALE* (model 1 and 2), *ACCURACY_OLD* (model 3 and 4), and *ACCURACY_NET* (model 5 and 6). The table displays the results of the basic model which only include the international diversification measure as the explanatory variable, as well as those of the advanced model with all control variables. I control year and industry effects in all of the regressions.

Both international diversification measures (*FSTS* and *FATA*) are positively associated with all the management forecast accuracy measures. In model 1, which is the basic model of regression, the estimated coefficient on *FSTS* is 0.038 with statistical significance at the 1% level. This indicates that the level of foreign sales ratio is positively related with the absolute errors of sales forecasts. After controlling other determinants of the forecast accuracy, the result remains unchanged. In model 2, that includes the complete set of control variables, the coefficient estimation on *FSTS* is 0.043 with statistical significance at the 1% level. The same conclusion is obtained from the models using other management forecast accuracy variables (*ACCURACY_OLD* and *ACCURACY_NET*). While the coefficient on *FSTS* has no statistical significance in model 5, it becomes statistically significant at the 1% level when controlling control variables (model 6).

Based on the estimation results discussed above, it can be said that corporate international diversification decreases the accuracy of management earnings forecasts, when controlling other control variables. The regression results of Table 4.4 present the positive relation between the international diversification measures and the absolute forecast errors, supporting the hypothesis 1b that corporate international diversification is associated with less accurate management forecasts. Therefore, management earnings forecasts become less accurate as their firms increase international operations. This suggests that managers of multinational

firms would experience greater difficulty with earnings forecasts because of various risks of foreign expansion that increase their earnings volatility and the complexity of information environment (Duru and Reeb, 2002; Runyan and Smith, 2007).

Control variables have also influence the accuracy of management forecasts. As shown in regression results, *SIZE* is negatively associated with the absolute forecast error, indicating that larger firms issue more accurate forecasts. On the other hand, *EVOL* and *HOR* are associated with less accurate forecasts since they increase the difficulty of forecasting task (Duru and Reeb, 2002). The firms with greater growth opportunities (*MTB* and *SG*) are also associated with less accurate forecasts. Finally, management forecasts of the firms in poor financial condition, such as earnings loss (*LOSS* and *LOSS2*) or declining earnings (*DE*), are likely to be less accurate.

Table 4.4 The relation between corporate international diversification and the accuracy of management earnings forecasts

Panel A Regression results using foreign sales ratio

	Sale		Ordinary Income		Net Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.093*** (61.26)	0.123*** (7.58)	0.030*** (57.02)	0.021*** (5.15)	0.072*** (37.40)	0.112*** (5.31)
<i>FSTS</i>	0.038*** (11.50)	0.043*** (12.50)	0.016*** (14.98)	0.014*** (13.50)	0.003 (0.66)	0.027*** (6.84)
<i>SIZE</i>		-0.008*** (-17.63)		-0.002*** (-14.06)		-0.011*** (-20.22)
<i>EVOL</i>		0.002*** (9.73)		0.001*** (14.70)		0.002*** (7.66)
<i>HOR</i>		0.007*** (6.52)		0.003*** (10.79)		0.011*** (7.22)
<i>MTB</i>		0.024*** (17.21)		0.010*** (19.91)		-0.011*** (-10.29)
<i>SG</i>		0.017*** (5.03)		0.004*** (3.62)		-0.004 (-1.03)
<i>LEV</i>		0.015*** (6.28)		-0.014*** (-18.81)		0.072*** (22.11)
<i>LOSS</i>		0.0004 (0.33)		0.002*** (3.62)		0.030*** (13.61)
<i>LOSS2</i>		0.027*** (18.06)		0.018*** (38.41)		0.147*** (60.73)
<i>NG</i>		0.00008 (0.58)		0.00006 (1.33)		-0.001*** (-2.63)
<i>DE</i>		0.008*** (7.73)		0.003*** (10.21)		0.015*** (11.20)
TSE1 Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	33,469	33,469	33,436	33,436	33,364	33,364
R-sq	0.117	0.184	0.101	0.274	0.066	0.377

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 4.4 The relation between corporate international diversification and the accuracy of management earnings forecasts

Panel B Regression results using foreign assets ratio (*FATA*)

	Sale		Ordinary Income		Net Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.092*** (61.06)	0.103*** (6.47)	0.030*** (56.75)	0.015*** (3.53)	0.071*** (37.41)	0.107*** (5.09)
<i>FATA</i>	0.032*** (6.36)	0.040*** (7.86)	0.013*** (7.84)	0.013*** (7.90)	0.006 (0.83)	0.041*** (6.77)
<i>SIZE</i>		-0.007*** (-16.43)		-0.002*** (-12.07)		-0.011*** (-20.22)
<i>EVOL</i>		0.002*** (10.17)		0.001*** (15.12)		0.002*** (7.82)
<i>HOR</i>		0.007*** (6.53)		0.003*** (10.61)		0.011*** (7.21)
<i>MTB</i>		0.024*** (17.06)		0.010*** (19.80)		-0.011*** (-10.30)
<i>SG</i>		0.018*** (5.10)		0.004*** (3.68)		-0.004 (-0.99)
<i>LEV</i>		0.015*** (6.14)		-0.014*** (-18.89)		0.072*** (22.01)
<i>LOSS</i>		0.001 (0.58)		0.002*** (3.89)		0.030*** (13.68)
<i>LOSS2</i>		0.028*** (18.27)		0.019*** (38.57)		0.147*** (60.81)
<i>NG</i>		0.000 (0.50)		0.000 (1.24)		-0.001*** (-2.65)
<i>DE</i>		0.008*** (7.79)		0.003*** (10.27)		0.015*** (11.30)
TSE1 Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	33,469	33,469	33,436	33,436	33,364	33,364
R-sq	0.114	0.181	0.095	0.270	0.066	0.377

*** p < 0.01; ** p < 0.05; * p < 0.10

4.7. Conclusion

In this chapter, I investigate the relation between corporate international diversification and the accuracy of management earnings forecasts using a sample of listed Japanese firms. Expected effects of multinational operations on the difficulty of forecasting are conflicting. Multinational operations may decrease the difficulty of forecasting tasks owing to the stable earnings by the diversification benefits, thereby enhancing the accuracy of management forecasts. However, internationally diversified firm are likely to experience the larger earnings volatility and the complexity of information environment that increase the difficulty of forecasting tasks.

From the results of empirical analysis using a sample of listed Japanese firms, I find that the firms' international activities decrease the accuracy of their management earnings forecasts. The international diversification measures are positive associated with the absolute forecast error of sales, ordinary income, and net income, after controlling other determinants of forecast accuracy. This implies that the forecasting tasks become more difficult, as firms increase overseas activities.

Corporate international diversification is expected to accompany greater risks that reduce the predictability of the firm's operations. Thus, managers should pay attention to the risks when their firms expand operations abroad. In addition, the finding of this study provides important implication for investors and analysts who utilize the management forecasts. Investors and analysts should be more prudent when they evaluate multinationals based on its management earnings forecasts, because the accuracy of management forecasts by internationally diversified firms may be interfered with expansion to overseas.

5. The Effect of Corporate International Diversification on Stock Liquidity

5.1. Introduction

Stock liquidity has been received considerable attention from the market microstructure and corporate finance literature. Previous studies on stock liquidity suggest that the level of stock liquidity influence stock return or firm value (e.g., Amihud and Mendelson, 1986; Amihud, 2002, Faucault et al., 2013). Thus, stock liquidity would be one of matter of concerns of business management. However, the effect of corporate international diversification on stock liquidity has been unexplored, although many studies that examining its effect on various business outcomes exist. In this chapter, I investigate the relation between firm's overseas business activities and its stock liquidity. I introduce some factors that determine the level of stock liquidity, to infer the relation,.

Previous literature suggests that stock liquidity is influenced by several factors. Among the factors, this study focuses on informed investors, investment horizon, corporate governance, and product market power as the determinants of liquidity. The existence of informed investors has two conflicting effects. It may decrease stock liquidity by bringing information asymmetry problem and adverse selection risk, while it could enhance the liquidity due to improved information efficiency driven by a competition among the multiple informed investors. The length of investment horizon is associated with less stock liquidity, since short-term investors trade more often to exploit their informational advantage. In addition, the stock liquidity declines because of poor corporate governance, since firms with poor governance are likely to have higher information asymmetry (lower transparency). However, the greater product market power which reduces the volatility of cash flow and stock return has an increasing effect on stock liquidity.

Given the relationship between determinants mentioned above and stock liquidity, it is considered that the degree of informational efficiency of stock price influence the stock liquidity significantly. Thus, corporate international diversification could

influence stock liquidity through its impact on information efficiency. The effect of corporate international diversification on stock liquidity may be conflicting. More extensive monitoring by investors and analysts worldwide and more detailed disclosure for foreign operations would improve information efficiency and stock liquidity. However, the increase in complexity of operations and agency costs of multinational firms make it difficult for investors to evaluate the price of the firms' stocks correctly, thereby decreasing the liquidity of the stocks.

This study examines the effect of corporate international diversification on stock liquidity with the sample of Japanese listed firms from 2004 to 2014 to test the above assumption. I use the three measures of stock liquidity, Amihud's relative illiquidity, the quoted spread, and the effective spread in empirical analysis. The measures of international diversification are the foreign subsidiaries ratio and the foreign sales ratio. The regression results suggest that corporate international diversification is associated with greater stock liquidity, after controlling for other determinants of stock liquidity. Thus, firms diversifying their operations internationally would experience higher stock liquidity.

In addition, I infer that the relationship between corporate international diversification and stock liquidity may depend on some characteristics of firm. In fact, corporate international diversification is related to aforementioned determinants of stock liquidity. First, a firm's international diversification increases a participation of foreign investors regarded as informed investors. Further, multinational firms are likely to have the greater market power because of advantages in international market. However, firms are related to poor corporate governance caused by greater information asymmetry and agency problems between parent and foreign subsidiaries.

Therefore, I investigate whether the determinants of stock liquidity influence the sensitivity of corporate international diversification to stock liquidity. I include interaction terms between international diversification measures and aforementioned determinants of liquidity to test the estimation. In the results, the interaction terms have significant impacts on the liquidity measures, but the

significantly positive relationship between international diversification and stock liquidity remains unchanged. Although the sensitivity of international diversification on stock liquidity is effected by the foreign informed investors, investment horizon, corporate governance, and market power, it seems that other factors omitted in this study influence the sensitivity as well.

This study makes several contributions. First, this study provides an empirical evidence that corporate international diversification has a significant impact on stock liquidity. This contributes to the on-going debate on the effect of corporate international diversification on various corporate outcomes, because the relationship between international diversification and stock liquidity has received less attention. Second, this study suggests that the relationship between international diversification and stock liquidity is significantly positive, after controlling for firm size and growth opportunity considered as ordinary characteristics of multinational firms. This implies that the relationship may be driven by other characteristics of international diversification as well. Finally, the positive relation between corporate international diversification and stock liquidity survives, even after controlling for informed investor, investment horizon, corporate governance, and market power. The result allows estimation that there are other factors determining greater stock liquidity of multinational firms.

The remainder of this paper is organized as follows. Section 2 reviews the literature on the determinants of stock liquidity and section 3 establishes the hypotheses. Then, section 4 describes the sample, the variables, and the method for analysis and section 5 presents the regression results. Finally, section 6 offers concluding discussions.

5.2. Literature Review

Previous studies on the stock liquidity provide evidence of several determinants of stock liquidity. Some of them describe the relation between the determinants and stock liquidity based on an informational perspective, implying that stock liquidity is influenced by information accuracy and efficiency of stock price, and information

asymmetry between informed investors (e.g., manager and large shareholders) and uninformed investors (e.g., individuals and liquidity investors). This study focuses on some of the determinants, characteristics of investors (informed investor and investment horizon), corporate governance and product market power.

The characteristics of investors have a significant effect on stock liquidity. Financial institutions, regarded as informed investors, influence liquidity of stocks in two ways. The presence of informed investors causes information asymmetry between informed and uninformed investors and adverse selection risk on uninformed investors. The adverse selection risk reduces the trade motivation of uninformed investors, because they are afraid of monetary loss due to their uncertainty about the true value of the stock. Thus, greater institutional ownership results in lower liquidity of the stock (higher bid-ask spread) (Glosten and Milgrom, 1985; Easley and O'Hara, 1987). On the other hand, competition among multiple institutions improves information efficiency related to stock price, thereby reducing the perceived uncertainty about the true value of the stock and leading to greater stock liquidity (Holden and Subrahmanyam, 1992; Mendelson and Tunca, 2004).

The length of investment horizon is also an important determinant of stock liquidity. Investor's holding periods are related to transaction cost, since short holding periods contribute to lower transaction costs. The lower transaction costs increase trading volume, thereby reducing trading costs (bid-ask spreads). Therefore, investment horizon is inversely associated with stock liquidity. In addition, short term investors are more informed, so that they trade more frequently to exploit their informational advantage (Yan and Zhang, 2009). With regard to the relation between the length of investment horizon and liquidity of stocks, Amihud and Mendelson (1986) discuss that asset with higher spreads are allocated in equilibrium to portfolios with longer horizon. Some empirical studies also support that longer investment horizon is associated with less stock liquidity (Atkins and Dyl, 1997; Vovchak, 2014).

According to agency theory, corporate governance influences stock liquidity. An improvement in corporate governance enhances the firm's financial and operational

transparency, which provide better understating about its operations to investors and reduce information asymmetries between insiders and outside investors, as well as among outside investors. The decrease in information asymmetry results in lower adverse selection risk which outside investors face and smaller spread posted by liquidity providers. Therefore, firms with more effective governance have more liquid stocks (Chung et al, 2010). The positive relationship between corporate governance and stock liquidity is also proved by empirical analyses (Chen et al., 2007; Chung et al., 2010; Prommin et al., 2014).

Product market power is also one of determinants of stock liquidity. A firm with market power has ability to pass productivity shocks on its customers, thereby reducing the volatility of the firm's cash flow and stock returns. The lower volatility of cash flow and stock returns enhance the precision of investor's information about stock price, resulting in lower price impact and more liquid stocks. Based on this discussion, Peress (2010) suggests that greater product market power improves liquidity of the stocks. Kale and Loon (2011) also test Peress 's inference empirically and provide an evidence of the positive relationship between product market power and stock liquidity.

As suggested by previous studies mentioned above, stock liquidity is influenced by investor characteristics, corporate governance, and market power, because they have effects on information accuracy and efficiency of stock price. the effect of firm's international diversification on stock liquidity has been underexplored, despite numerous studies on determinants of stock liquidity,. I expect that the corporate international diversification has an association with stock liquidity, because this is related to the degree of information accuracy and efficiency of stock price. I examine the relationship between overseas business activities and stock liquidity in next section.

5.3. Hypotheses Development

- 1) The relation between corporate international diversification and stock liquidity

Stock liquidity is influenced by firm's information accuracy and efficiency about the stock price. Thus, I infer that corporate international diversification can influence stock liquidity if it is related to the degree of the informational accuracy and efficiency of stock prices. However, I expect that its influence to stock liquidity is ambiguous because international operations have conflicting aspects on the informational accuracy and efficiency.

The first thing needed to consider is that corporate international diversification has a positive effect on the stock liquidity. As firms expand their business abroad through foreign subsidiaries and foreign sales, they are more likely to attract various stakeholders' attentions in the world. For example, many media presses and analysts are engaged in monitoring and evaluating their business activities. Firms also try to release detailed materials available to the public as possible, in order to allow investors to understand about their activities (Luo, 2005). A series of these consequences contribute not only to an increase in informational accuracy and efficiency about a firm and its stock price, but also to reduce the severity of asymmetric information among stakeholders, such as an adverse selection problem, implying that their ability to discern the true value of the firm is improved. Therefore, the improved informational accuracy and efficiency would enhance the firm's stock liquidity.

However, overseas business activities can have a negative effect on the stock liquidity. The structure of firms becomes more complex following overseas expansion. Foreign operations make it difficult for investors to correctly grasp detailed content of the operations and to evaluate the fundamental value of the firm, because of the greater complexity (Lee and Kwok, 1988). In addition, overseas business gives rise to information asymmetries between informed investors and uninformed investors, because the difficulty of valuation bring about an incentive for investors to gather information. Moreover, multinational firms face additional information barriers because of language, cultural norms, and geographic constraints and greater agency costs due to the costs of monitoring managers of foreign subsidiaries, which increase information asymmetry between insiders and

outside investors and among shareholders (Runyan and Smith, 2007). Therefore, overseas business activities can deteriorate the informational accuracy and efficiency of stock prices, leading to decrease stock market liquidity.

Therefore, two conflicting effects of corporate international diversification on stock liquidity can be considered based on the argument above. Overseas expansion enhances the liquidity of the firm's stocks resulting from an increase in informational accuracy and efficiency. However, the greater complexity and agency costs of multinational firms result in both a decrease in the informational accuracy and efficiency and an increase in information asymmetry, thereby reducing the stock liquidity. As a result, the relation between overseas business activities and stock market liquidity depends on whether the positive effect dominates the negative effect or not.

So I build conflicting hypotheses as follows:

H1.a. Corporate international diversification is associated with higher stock liquidity.

H1.b. Corporate international diversification is associated with lower stock liquidity.

I examine the relationship between corporate international diversification and stock market liquidity, to test the hypotheses above. Therefore, I assume the baseline equation as follows:

$$ILLIQ_{i,t} = \alpha + \beta \times ID_{i,t-1} + X'_{i,t-1} \times \gamma + \eta_t + \mu_k + u_{i,t} \quad (5.1)$$

where $ILLIQ_{i,t}$ is stock market illiquidity of firm i in fiscal year t , $ID_{i,t-1}$ is the degree of corporate international diversification, $X'_{i,t-1}$ is a set of control variables, η_t is a set of year fixed effects, absorbing time-varying shocks all firms face, μ_k is a set of industry fixed effects, absorbing time-invariant unobservable characteristics that differ across industries. I utilize multiple measures of $ILLIQ$ in our analysis.

Regarding the definition of industry fixed effects, I refer Nikkei Medium Classification Industry Code.

In the baseline equation, the coefficient of interest is β , representing the corporate international diversification sensitivity of stock market liquidity. If β has a negative sign, Hypothesis 1a is supported that corporate international diversification is associated with higher stock liquidity. This implies that overseas operations contribute to increase stock market liquidity by enhancing the informational accuracy and efficiency of stock prices. In contrast, if β is positive, Hypothesis 1b is supported.

2) The sensitivity of corporate international diversification to stock liquidity

I assume that the sensitivity of corporate international diversification to stock liquidity, β , is homogeneous across firms so far. As discussed before, corporate international diversification has mutually exclusive aspects on market liquidity. Depending on the opaqueness and the disparity in information across investors, international operations for some firms are more likely to contribute to the informational accuracy and efficiency of stock prices. This implies that corporate international diversification sensitivity has the heterogeneity across firms. I infer that both the opaqueness and the disparity faced by firms are closely related to the aforementioned determinants of liquidity. Thus, I consider the relation between corporate international diversification and those determinants.

First, international operations may increase a participation of foreign investors which can play a role of informed investors. Dahlquist and Robertsson (2001) show that large export sales are positively correlated with ownership by foreign investors. Further, previous studies suggest that foreign investors are likely to invest in firms for which they are well informed (Kang and Stulz, 1997; Lin and Shiu, 2003) and foreign institutional investors have an information advantage over domestic investors (Dvorak, 2005; Huang and Shiu, 2009). If foreign investors are more informed than domestic investors, they can influence a liquidity of stocks by causing information asymmetry and adverse selection problem. Therefore, greater foreign

ownership of multinational firms may have a significant effect on the sensitivity of overseas business activities to stock liquidity.

Poor corporate governance is a risk of overseas expansion. Agency problem of multinational firm is caused by a conflict between parent and foreign subsidiaries which may result in a conflict between overall firm and the firm's shareholders, as well as a conflict between manager and shareholders. Geographical distance, difference in culture and language, and difference in legal system increase the information asymmetry between parent and foreign subsidiaries (Duru and Reeb, 2002). In addition, multinational firms have greater agency costs than domestic firms owing to difficulty of monitoring managers of foreign subsidiaries (Lee and Kwok, 1988). Poor corporate governance caused by greater information asymmetry and agency costs is associated with less stock liquidity. Thus, it is considered that poor corporate governance have a significant impact on the relationship between corporate international diversification and stock liquidity.

On the other hand, overseas expansion may take a benefit from improved market power. Grant (1987) argues that multi-nationality may confer the firm's market power on the firm by international scope, and multinational firms have advantage to breach entry barriers compared to surrounding similar industries in other countries and can use cross-subsidisation to prevail nationally-based rivals. Greater market power has a positive effect on stock liquidity, as proved in Peress (2010) and Kale and Loon (2011). Therefore, the sensitivity of overseas business activities to stock liquidity may be influenced by greater market power of multinational firms.

So far, I discuss the factors related to the firm's overseas business activities. I consider the possibility that each of them has a significant effect on the sensitivity of corporate international diversification on stock liquidity. Therefore, I focus on the degree of foreign ownership, corporate governance (measured by the number of directors and outside directors), product market power, and investment horizon, because a change in the degree of foreign ownership could influence investment horizon.

Thus, the hypotheses are formulated as follows.

H2. The degree of foreign ownership has a significant effect on the sensitivity of corporate international diversification on stock liquidity.

H3. The length of investment horizon has a significant effect on the sensitivity.

H4.a. The number of directors has a significant effect on the sensitivity

H5.b. The number of outside directors has a significant effect on the sensitivity

H6. The degree of product market power has a significant effect on the sensitivity.

I assume that the corporate international diversification sensitivity is a linear function of the degree of foreign ownership, investment horizon, the structure of board of directors, and the degree of product market power, to test the hypotheses. I characterize the sensitivity of corporate international diversification stock market liquidity as follow:

$$\beta = \beta_0 + Z'_{i,t-1} \times \delta \quad (5.2)$$

Substituting the equation (5.2) for the equation (5.1),

$$ILLIQ_{i,t} = \alpha + \beta_0 \times ID_{i,t-1} + Z'_{i,t-1} \times OBA_{i,t-1} \times \delta + X'_{i,t-1} \times \gamma + \eta_t + \mu_k + u_{i,t} \quad (5.3)$$

5.4. Data and Methodology

1) Sample Selection

I use two types of database: Nikkei Financial Quest and Nikkei Value_Search. I obtain the firm's financial information and foreign sales information from Nikkei Needs Financial Quest database, and corporate governance information and information about foreign subsidiaries from Nikkei Value_Search database. The sample consists of all firms listed on the Japanese stock markets except financial industry and utilities. The data set covers the period 2004 - 2014 because firm's director data incorporated by Nikkei ValueSearch database has become available

since 2004. I exclude observations with stock prices below 100 yen and observations with missing value of variables that I use in the analysis. Then, I winsorize all the variables at the 1th and 99th percentiles to minimize the effects of outliers. The final dataset consists of 3,642 firms and 28,969 firm-year observations.

2) Stock liquidity measures

I use three types of illiquidity measures: Amihud(2002)'s illiquidity measure, quoted spread and effective spread.

(1) The Amihud estimate

Amihud (2002) illiquidity measure (*ILLIQ*) is the average ratio of the daily absolute return to the trading volume on that day. It is calculated as follows,

$$ILLIQ_{iy} = \frac{1}{D_{iy}} \sum_{t=1}^{D_{iy}} \frac{|R_{iyd}|}{VOLD_{ivy}} \quad (5.4)$$

where R_{iyd} is the return on stock i on day d of year y , $VOLD_{ivy}$ is the respective daily volume in yen, and D_{iy} is the number of days available to obtain data for stock i in year y . *ILLIQ* is a rough estimate of the daily price impact of the order flow and measures how much one yen of trading volume causes absolute price change. Then, we calculate the average relative illiquidity (*RILLIQ*) for each year. *RILLIQ* is the ratio of illiquidity measure to the average market illiquidity across stocks in that year. It is calculated as follows;

$$RILLIQ_{iy} = \frac{ILLIQ_{iy}}{\frac{1}{N_y} \sum_{t=1}^{N_y} ILLIQ_{iy}} \quad (5.5)$$

Where N_y is the number of stocks in year y . Since average illiquidity varies considerably over the years, *ILLIQ* is replaced by *RILLIQ*, its mean-adjusted value

of *ILLIQ* (Amihud, 2002). I use *RILLIQ* as the measure of illiquidity⁹.

(2) Quoted spread

The quoted percentage spread of stock (*QUOTED SPREAD*) is defined as the difference between ask price and bid price divided by the mid-price of the quotes. We calculate the quoted spread as follows;

$$Quoted_Spread_{it} = \frac{Ask_{it} - Bid_{it}}{(Ask_{it} + Bid_{it})/2} \quad (5.6)$$

where Ask_{it} is the ask price for stock i at time t , Bid_{it} is the bid price for stock i at time t . I compute the average spreads for each year. The quoted spread is the implicit trading cost for market orders when a trade occurs in the quoted price with no price improvement (Chung et al., 2010).

(3) Effective spread

The effective percentage spread of stock (*EFFECTIVE SPREAD*) is defined as the twice of the absolute value of the difference between the transaction price and the quote mid-price divided by mid-price of the quote. I calculate the effective spread as follow;

$$Effectiv_Spread_{it} = \frac{|P_{it} - (Ask_{it} + Bid_{it})/2| \times 2}{(Ask_{it} + Bid_{it})/2} \quad (5.7)$$

where P_{it} is the transaction price for stock i at time t . The effective spread measures the cost of trading when it occurs in prices inside the posted bid and ask quotes (Chung et al., 2010).

⁹ We obtain a consistent result from analysis using *ILLIQ*.

3) International diversification measures

The degree of overseas business activities is measured by the foreign subsidiaries ratio (*FSR*) and the ratio of foreign sales to total sales (*FSTS*). I calculate the foreign subsidiaries ratio by dividing the number of foreign subsidiaries of the firm to the total number of subsidiaries. I collect the number of consolidated subsidiaries from Nikkei Needs Financial Quest, but exclude associated companies. The foreign sales ratio is computed by dividing the firm's foreign sales to its total sales and the information about foreign sales is obtained from Nikkei Needs Financial Quest database.

4) Other variables

To examine whether some determinants of liquidity influence the sensitivity of corporate international diversification on stock liquidity, I include interaction terms of the international diversification measures (*FSR* and *FSTS*) each liquidity determinant measures (investment horizon, foreign investors, corporate governance and product market power). I introduce details on the liquidity determinant measures for interaction terms.

(1) Investment horizon (*I_HOR*)

I employ Uno and Kamiyama(2010)'s investment horizon measure following Mahanti et al. (2008). I compute a firm's investment horizon (*I_HOR*) using four investor categories; foreigners, individuals, non-financial corporations, and financial institutions (trust banks, insurance companies, and banks). The following is the equation for an investor group *j*'s investment horizon in year *t*:

$$\text{Investment horizon}_t^j = \frac{(\text{portfolio market value}_t^j + \text{portfolio market value}_{t-1}^j) \times \frac{1}{2}}{\text{total yen trading volume}_t^j} \quad (5.8)$$

Then, I compute horizon for firm k in year t as follows:

$$I_HOR_t^k = \sum_{j=1}^4 w_{k,t}^j \times Horizon_t^j \quad (5.9)$$

where j represents one of four investor categories, $w_{k,t}^j$ is a firm k 's ownership ratio, and $Horizon_t^j$ is the market-wide investment horizon by investor group j . Likewise, I estimate the investment horizon based upon the firm's ownership structure.

(2) Foreign investor (FI)

I consider foreign investors as informed investors because they have an information advantage over domestic investors (Dvorak, 2005; Huang and Shiu, 2009). Especially, foreign investors have prominently increased in Japan from 1990s (David et al., 2010). Regarding the measure of foreign investor, I use foreign ownership (FI) calculated by the ratio of shares hold by foreign investors to the number of total shares.

(3) Corporate governance

I employ two measures of the level of corporate governance, the number of directors (TO_DIR) and outside directors (OUT_DIR). Both the number of directors and outside directors are obtained from Nikkei ValueSearch database. The large number of them implies better governance, since a firm's directors and outside directors can contribute to improving corporate governance by monitoring management.

(4) Market power

I employ the Sale-based Herfindahl Index (S_HHI) as the measure of firm's market power. This is based on industry level and computed as the sum of the square of all of the firms' fractional sales in the industry. I calculate sales-based

Herfindahl index for industry j in year t as follows:

$$S_HHI_{jt} = \sum_{i=1}^n \left(\frac{s_{it}}{S_{jt}} \right)^2 \quad (5.10)$$

where S_j is the total sales of industry j , and s_i is sales of firm i in industry j . The larger Herfindahl index indicates the greater degree of market power.

5) Control variables

I include a number of control variables in empirical analysis to control the effects of other determinants of liquidity. Following previous studies, I employ the number of subsidiaries (*TO_SUB*), growth opportunity (*TOBIN_Q*), firm size (*SIZE*), cash flow ratio (*CF*), asset tangibility (*TA*), firm leverage (*LEV*), R&D intensity (*R&D*), company age (*AGE*), and dividend yield (*DIV*) as control variables. These are considered to have significant effects on stock market liquidity. For example, high-growth firms are likely to have higher stock liquidity, because they can attract more attention from investors. Larger firms may also have greater liquidity due to its more available information and smaller adverse selection risk. However, information about younger firms is restricted and less available. Lasty, firms with many subsidiaries are expected to have less liquid stocks because of the greater complexity of information environment.

Table 5.1 Descriptive statistics

Panel A Summary statistics

	All firm - years					
	Observations	Mean	Median	SD	Min	Max
Dependent Variables						
RILLIQ	28,969	1.011	0.129	2.307	0.000	41.355
Quoted Spread	28,969	1.489	0.818	1.818	0.129	14.133
Effective Spread	28,969	1.164	0.669	1.421	0.076	12.066
Independent Variables						
FSR	28,969	0.270	0.128	0.319	0.000	1.000
FSTS	28,969	0.137	0.000	0.215	0.000	1.000
Control Variables						
TO_SUB	28,969	17.419	6.000	41.985	0.000	687.000
SIZE	28,969	10.623	10.480	1.575	5.271	17.043
TOBIN_Q	28,969	1.198	0.986	0.986	0.342	18.229
CF	28,969	0.081	0.077	0.068	-0.750	0.449
TA	28,969	0.287	0.271	0.180	0.000	0.922
LEV	28,969	0.512	0.520	0.207	0.018	1.650
R&D	28,969	0.020	0.004	0.144	0.000	15.269
AGE	28,936	4.295	4.220	0.257	3.761	4.736
DIV	28,969	1.781	1.636	1.286	0.000	18.376
TO_DIR	28,969	8.209	8.000	3.452	3.000	50.000
OUT_DIR	28,969	0.761	0.000	1.148	0.000	13.000
I_HOR	28,969	2.526	2.299	1.263	0.230	8.258
FI	28,969	0.090	0.045	0.110	0.000	0.750
S_HHI	28,969	0.062	0.050	0.057	0.012	0.484

Note: *RILLIQ*=relative illiquidity measure, *Quoted Spread*=quoted spread, *Effective Spread*=effective spread, *FSR*=foreign subsidiaries ratio, *FSTS*=foreign sales ratio, *TO_SUB*=number of subsidiaries, *SIZE*=a natural logarithm of total assets, *TOBIN_Q*=Tobin's q ratio, *CF*=cash flow ratio, *TA*=tangible assets ratio, *LEV*=leverage, *R&D*=the ratio of R&D expenditure to total sales, *AGE*=a natural logarithm of firm age, *DIV*=dividend yield, *TO_DIR*=number of director, *OUT_DIR*=number of outside director, *I_HOR*=investment horizon, *FI*=foreign investors ratio, *S_HHI*=sales based Herfindahl Index

Table 5.1 Descriptive statistics

Panel B Sample without foreign subsidiaries V.S. sample with foreign subsidiaries

	Firm - years without foreign subsidiaries				Firm - years with foreign subsidiaries				Industry Adjusted	
	Observations	Mean	Median	SD	Observations	Mean	Median	SD	Difference test	
RILLIQ	12,327	1.545	0.389	2.937	16,642	0.615	0.054	1.583	30.82	***
Quoted Spread	12,327	1.946	1.160	2.086	16,642	1.152	0.620	1.503	37.61	***
Effective Spread	12,327	1.523	0.950	1.620	16,642	0.898	0.490	1.184	37.29	***
FSR	12,327	0.000	0.000	0.000	16,642	0.470	0.444	0.289	-166.04	***
FSTS	12,327	0.017	0.000	0.079	16,642	0.226	0.163	0.239	-67.98	***
TO_SUB	12,327	6.682	3.000	11.348	16,642	25.372	10.000	53.146	-45.50	***
SIZE	12,327	10.097	10.042	1.368	16,642	11.012	10.849	1.604	-52.12	***
TOBIN_Q	12,327	1.207	0.964	1.090	16,642	1.191	1.002	0.901	-9.33	***
CF	12,327	0.073	0.069	0.072	16,642	0.087	0.083	0.064	-13.84	***
TA	12,327	0.304	0.276	0.207	16,642	0.275	0.268	0.156	18.07	***
LEV	12,327	0.537	0.553	0.212	16,642	0.493	0.497	0.201	6.85	***
R&D	12,327	0.010	0.000	0.160	16,642	0.027	0.011	0.131	-1.63	
AGE	12,306	4.242	4.159	0.248	16,630	4.334	4.291	0.257	-9.77	***
DIV	12,327	1.806	1.669	1.395	16,642	1.763	1.619	1.199	3.82	***
TO_DIR	12,327	7.701	7.000	3.192	16,642	8.585	8.000	3.587	-23.61	***
OUT_DIR	12,327	0.686	0.000	1.074	16,642	0.816	0.000	1.196	-14.66	***
I_HOR	12,327	2.673	2.519	1.320	16,642	2.417	2.160	1.208	17.54	***
FI	12,327	0.057	0.019	0.087	16,642	0.115	0.076	0.119	-44.26	***
S_HHI	12,327	0.052	0.037	0.049	16,642	0.069	0.051	0.062	2.06	**

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 5.1 Descriptive statistics

Panel C Sample without foreign sales V.S. sample with foreign sales

	Firm - years without foreign sales				Firm - years with foreign sales				Industry Adjusted	
	Observations	Mean	Median	SD	Observations	Mean	Median	SD	Difference test	
RILLIQ	16,847	1.326	0.254	2.699	12,122	0.573	0.047	1.505	24.88	***
Quoted Spread	16,847	1.747	0.985	2.015	12,122	1.131	0.615	1.425	30.52	***
Effective Spread	16,847	1.371	0.816	1.573	12,122	0.875	0.485	1.115	30.30	***
FSR	16,847	0.128	0.000	0.242	12,122	0.467	0.478	0.310	-65.28	***
FSTS	16,847	0.000	0.000	0.000	12,122	0.327	0.288	0.220	-133.42	***
TO_SUB	16,847	9.797	4.000	22.902	12,122	28.012	11.000	57.366	-30.24	***
SIZE	16,847	10.260	10.178	1.455	12,122	11.126	10.940	1.597	-39.03	***
TOBIN_Q	16,847	1.226	0.971	1.123	12,122	1.158	1.006	0.752	-8.07	***
CF	16,847	0.077	0.071	0.073	12,122	0.087	0.084	0.061	-10.27	***
TA	16,847	0.296	0.268	0.204	12,122	0.276	0.273	0.139	0.00	***
LEV	16,847	0.528	0.537	0.209	12,122	0.489	0.496	0.202	7.31	***
R&D	16,847	0.010	0.000	0.104	12,122	0.033	0.020	0.185	-2.93	***
AGE	16,822	4.237	4.159	0.244	12,114	4.375	4.413	0.254	-17.73	***
DIV	16,847	1.853	1.711	1.397	12,122	1.681	1.555	1.106	7.60	***
TO_DIR	16,847	7.818	7.000	3.194	12,122	8.752	8.000	3.715	-19.52	***
OUT_DIR	16,847	0.734	0.000	1.110	12,122	0.797	0.000	1.197	-15.77	***
I_HOR	16,847	2.632	2.459	1.308	12,122	2.379	2.104	1.182	14.07	***
FI	16,847	0.066	0.026	0.094	12,122	0.123	0.087	0.122	-39.56	***
S_HHI	16,847	0.053	0.041	0.048	12,122	0.074	0.051	0.067	0.26	

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 5.2 Correlation matrix

	1	2	3	4	5	6	7	8	9
1 RILLIQ	1.000								
2 Quoted Spread	0.627	1.000							
3 Effective Spread	0.644	0.987	1.000						
4 FSR	-0.068	-0.055	-0.059	1.000					
5 FSTS	-0.134	-0.149	-0.155	0.528	1.000				
6 TO_SUB	-0.133	-0.192	-0.196	-0.040	0.285	1.000			
7 SIZE	-0.401	-0.466	-0.481	-0.021	0.282	0.571	1.000		
8 TOBIN_Q	-0.092	-0.127	-0.118	-0.008	-0.011	-0.014	-0.102	1.000	
9 CF	-0.236	-0.206	-0.219	0.090	0.099	0.035	0.126	0.261	1.000

	10	11	12	13	14	15	16	17	18	19
10 TA	1.000									
11 LEV	0.203	1.000								
12 R&D	-0.046	-0.080	1.000							
13 AGE	0.267	0.135	-0.014	1.000						
14 DIV	-0.045	-0.154	-0.049	-0.034	1.000					
15 TO_DI R	0.164	0.105	-0.023	0.309	-0.020	1.000				
16 OUT_ DIR	-0.017	0.028	0.039	0.062	-0.047	0.174	1.000			
17 I_HOR	0.080	0.056	-0.044	0.078	0.026	0.065	0.081	1.000		
18 FI	-0.061	-0.158	0.032	0.173	-0.071	0.238	0.241	-0.292	1.000	
19 S_HHI	0.203	0.083	0.012	0.240	0.007	0.089	-0.009	0.059	0.035	1.000

Note: All coefficients are statistically significant less than the 10 percent level.

6) Descriptive Statistics

Panel A of Table 5.1 presents summary of statistics of all the variables. The average foreign subsidiaries ratio (*FSR*) and foreign sales ratio (*FSTS*) are 0.27 and 0.137, respectively. The mean of sample firms' relative illiquidity (*RILLIQ*) is 1.011, and their average quoted spread (*QUOTED SPREAD*) and effective spread (*EFFECTIVE SPREAD*) are 1.489 and 1.164, respectively.

In Panel B of Table 5.1, I divide firms into two groups, multinational firms deploying international operations and domestic firms not deploying international operations, based on whether the firm has foreign subsidiaries in each period. In Panel C of Table 5.1, I divide the sample based on whether the firm has foreign sales in each period. The last columns of each Panel present the t-value of mean difference test, for which the influence of the industry specific factors is allowed. These present that, on average, the firms deploying international operations have larger total assets and higher Tobin's q ratio than domestic firms. Therefore, multinational firms in our sample have greater firm size and growth opportunity compared to domestic firms.

Table 5.2 shows the correlation coefficients between all variables. The stock liquidity measures show strong positive pairwise correlations ranging from 0.443 to 0.987. The correlation between foreign subsidiaries and foreign sales is 0.528. The international diversification measures (*FSR* and *FSTS*) are negatively correlated with liquidity measures, suggesting that firms deploying more overseas activities are associated with greater stock liquidity.

Table 5.3 The relation between corporate international diversification and stock liquidity

Panel A Regression results using foreign subsidiaries ratio

Variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD		RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD		RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD	
FSR	-0.575	***	-0.418	***	-0.312	***	-0.470	***	-0.404	***	-0.305	***	-0.461	***	-0.376	***	-0.283	***
	(0.045)		(0.039)		(0.030)		(0.042)		(0.035)		(0.027)		(0.042)		(0.034)		(0.027)	
TO_SUB							0.007	***	0.005	***	0.004	***	0.008	***	0.006	***	0.004	***
							(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
TOBIN_Q							-0.260	***	-0.192	***	-0.145	***	-0.273	***	-0.188	***	-0.142	***
							(0.017)		(0.011)		(0.008)		(0.017)		(0.011)		(0.008)	
SIZE							-0.724	***	-0.647	***	-0.503	***	-0.843	***	-0.694	***	-0.540	***
							(0.015)		(0.009)		(0.007)		(0.020)		(0.011)		(0.009)	
CF							-3.256	***	-1.687	***	-1.492	***	-3.634	***	-1.884	***	-1.646	***
							(0.322)		(0.173)		(0.133)		(0.329)		(0.176)		(0.135)	
TA							0.460	***	0.649	***	0.447	***	0.609	***	0.704	***	0.489	***
							(0.097)		(0.065)		(0.050)		(0.097)		(0.065)		(0.050)	
LEV							1.183	***	0.799	***	0.656	***	1.395	***	0.854	***	0.700	***
							(0.072)		(0.051)		(0.039)		(0.075)		(0.053)		(0.041)	
R&D							-0.489	***	-0.293	***	-0.241	***	-0.481	***	-0.279	***	-0.230	***
							(0.142)		(0.097)		(0.079)		(0.137)		(0.092)		(0.074)	
AGE							-0.426	***	-0.366	***	-0.357	***	-0.444	***	-0.401	***	-0.384	***
							(0.062)		(0.046)		(0.036)		(0.061)		(0.046)		(0.036)	

DIV				-0.056 ***	0.007	-0.010	-0.033 *	0.019 **	-0.001
				(0.017)	(0.009)	(0.007)	(0.017)	(0.009)	(0.007)
FI							2.465 ***	0.980 ***	0.771 ***
							(0.182)	(0.108)	(0.084)
I_HOR							0.182 ***	0.160 ***	0.123 ***
							(0.013)	(0.009)	(0.007)
TO_DIR							0.014 ***	0.005 *	0.004 **
							(0.003)	(0.003)	(0.002)
OUT_DIR							-0.044 ***	-0.023 ***	-0.021 ***
							(0.010)	(0.008)	(0.006)
S_HHI							-1.983 **	-0.662	-0.478
							(0.837)	(0.463)	(0.354)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,969	28,969	28,969	28,936	28,936	28,936	28,936	28,936	28,936
R-Sq	0.026	0.080	0.083	0.238	0.337	0.345	0.249	0.346	0.354

*** p < 0.01; ** p < 0.05; * p < 0.10

Table 5.3 The relation between corporate international diversification and stock liquidity

Panel B Regression results using foreign sales ratio

Variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
	RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD		RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD		RILLIQ		QUOTED SPREAD		EFFECTIVE SPREAD	
FSTS	-1.830	***	-1.956	***	-1.515	***	-0.231	***	-0.499	***	-0.383	***	-0.321	***	-0.490	***	-0.377	***
	(0.065)		(0.054)		(0.042)		(0.064)		(0.049)		(0.038)		(0.064)		(0.049)		(0.038)	
TO_SUB							0.008	***	0.005	***	0.004	***	0.009	***	0.006	***	0.005	***
							(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
TOBIN_Q							-0.261	***	-0.191	***	-0.144	***	-0.272	***	-0.188	***	-0.142	***
							(0.017)		(0.011)		(0.008)		(0.017)		(0.011)		(0.008)	
SIZE							-0.724	***	-0.639	***	-0.497	***	-0.842	***	-0.690	***	-0.537	***
							(0.016)		(0.009)		(0.007)		(0.021)		(0.011)		(0.009)	
CF							-3.323	***	-1.696	***	-1.498	***	-3.689	***	-1.900	***	-1.657	***
							(0.324)		(0.173)		(0.133)		(0.330)		(0.176)		(0.135)	
TA							0.489	***	0.651	***	0.448	***	0.632	***	0.711	***	0.494	***
							(0.097)		(0.065)		(0.050)		(0.097)		(0.065)		(0.050)	
LEV							1.261	***	0.848	***	0.692	***	1.467	***	0.907	***	0.740	***
							(0.072)		(0.051)		(0.039)		(0.076)		(0.053)		(0.041)	
R&D							-0.498	***	-0.282	***	-0.232	***	-0.483	***	-0.268	***	-0.221	***
							(0.153)		(0.106)		(0.085)		(0.148)		(0.100)		(0.080)	
AGE							-0.347	***	-0.312	***	-0.317	***	-0.372	***	-0.351	***	-0.346	***
							(0.062)		(0.046)		(0.036)		(0.061)		(0.046)		(0.035)	

DIV				-0.056 ***	0.004	-0.013 *	-0.033 **	0.017 *	-0.003
				(0.017)	(0.009)	(0.007)	(0.017)	(0.009)	(0.007)
FI							2.490 ***	1.073 ***	0.843 ***
							(0.183)	(0.109)	(0.085)
I_HOR							0.187 ***	0.163 ***	0.125 ***
							(0.013)	(0.009)	(0.007)
TO_DIR							0.014 ***	0.004 *	0.004 *
							(0.003)	(0.003)	(0.002)
OUT_DIR							-0.045 ***	-0.023 ***	-0.021 ***
							(0.010)	(0.008)	(0.006)
S_HHI							-2.038 **	-0.736	-0.535
							(0.839)	(0.464)	(0.355)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,936	28,936	28,936	28,936	28,936	28,936	28,936	28,936	28,936
R-Sq	0.039	0.109	0.111	0.235	0.335	0.343	0.246	0.344	0.352

*** p < 0.01; ** p < 0.05; * p < 0.10

5.5. Results

1) The relation between overseas business activities and stock liquidity

To examine the relationship between corporate international diversification and stock liquidity, I estimate the basic model in equation (1). The regression results are shown in Table 5.3. Panel A presents the results using *FSR* as a proxy for corporate international diversification, while Panel B presents the results using *FSTS*. In both Panel A and Panel B, I report the estimated results of the three different measures of stock liquidity as the dependent variable: *RILLIQ*, *QUOTED SPREAD*, and *EFFECTIVE SPREAD*. The table reports the basic model in which an overseas business variable is only a repressor, as well as comprehensive versions with the complete set of control variables. Year dummy variables and industry dummy variables are included in all regressions.

In Panel A, model 1, 2, and 3 show the result of basic models. The regression results show that corporate international diversification has a significantly negative relation with stock illiquidity. For example, in model 1 using *RILLIQ* as the dependent variable for example, the estimated coefficient on *FSR* is -0.575 and statistically significant at the 1% level. It implies that the higher degree of foreign subsidiaries ratio is associated with greater stock liquidity. The same conclusion can be drawn from model 2 and 3 using *QUOTED SPREAD* and *EFFECTIVE SPREAD* as the dependent variables, respectively. The coefficients of *FSR* in model 2 and 3 are negative and statistically significant at the 1% level.

Model 4, 5, and 6 are the results of regressions including a set of control variables. I confirm that the estimated coefficients on *FSR* do not change qualitatively, although these are attenuated in all columns because of the correlation between *FSR* and control variables. In model 4 using *RILLIQ*, the estimated coefficient on *FSR* is -0.470 and statistically significant at the 1% level. The results of the regression using *QUOTED SPREAD* (model 5) or *EFFECTIVE SPREAD* (model 6) are corresponding.

All control variables have significant relations with stock liquidity. Stock liquidity is

higher for firms with larger Tobin Q, cash flow, and R&D expenditure, larger assets, and lower asset tangibility. However, I find that the firm with more subsidiaries and younger and more leveraged firms exhibit a lower liquidity of stocks. Larger firms are related to greater stock liquidity, since the information about them is more available due to greater media and analyst coverage (Stoll and Whaley, 1983). The positive effects of Tobin Q and R&D expenditure may be the reason of more attention of investors about firms with greater growth opportunity. In addition, investors may be able to have more information about older firms as compared to younger firms. These results of control variables are consistent with that of previous studies (e.g., Chung et al., 2010; Kale and Loon, 2011; Prommin et al., 2014).

To secure the isolated impact of overseas business activities, I include other possible determinants of stock market liquidity in a set of the control variables (*FI*, *I_HOR*, *TO_DIR*, *OUT_DIR*, and *S_HHI*). Model 7, 8, and 9 show the regression results. First of all, the coefficients on all of the additional control variables are statistically significant. *FI* are positively associated with stock illiquidity, providing that they are informed investors which give rise to information asymmetry between informed and uninformed investors (Glosten and Milgrom, 1985; Easley and O'Hara, 1987). Consistent with the finding of prior research (Amihud and Mendelson, 1986; Yan and Zhang, 2009), stock liquidity decreases as the investment horizon (*I_HOR*) becomes longer. This also supports that short term investors are associated with higher stock liquidity as they have information advantage. Two measures of corporate governance (*TO_DIR* and *OUT_DIR*) provide conflicting results. The firms with a larger number of directors have less liquid stocks, while a larger number of outside directors contribute greater stock liquidity. The better corporate governance that leads to higher liquidity would be constructed by outside directors, not by directors. The possible explanation is that a large number of directors may increase the complexity of decision making process. In addition, firms with greater market power (*S_HHI*) have a positive relation with stock liquidity due to the stability of their cash flow and returns, as discussed in previous studies (Peress, 2010; Kale and Loon, 2011).

After controlling the other possible determinants of stock liquidity, the negative relation between *FSR* and stock illiquidity remains unchanged. To summarize, I conclude that the number of foreign subsidiaries is a positive effect on stock market liquidity, providing support for the Hypothesis 1a that corporate international diversification is associated with higher stock liquidity.

Panel B shows the results using *FSTS* as an alternative proxy for corporate international diversification. The results are corresponding to even after controlling for the comprehensive control variables in model 5-9. Therefore, internationally oriented firms, those in Panel A. *FSTS* is positively related to all the stock liquidity measures, diversified firms, through both foreign subsidiaries and sales, exhibit higher stock market liquidity.

Table 5.4 The sensitivity of corporate international diversification to stock liquidity and other determinants of liquidity

Variable	Foreign subsidiaries Ratio			Foreign Sales Ratio		
	RILLIQ	QUOTED SPREAD	EFFECTIVE SPREAD	RILLIQ	QUOTED SPREAD	EFFECTIVE SPREAD
CID	-0.234 (0.146)	-0.241 ** (0.098)	-0.158 ** (0.076)	-1.134 *** (0.186)	-0.842 *** (0.135)	-0.598 *** (0.104)
CID_FI	0.893 ** (0.358)	0.592 ** (0.249)	0.404 ** (0.193)	4.641 *** (0.407)	3.882 *** (0.284)	2.960 *** (0.221)
CID_I_HOR	-0.121 *** (0.033)	-0.062 ** (0.025)	-0.05 ** (0.020)	-0.104 ** (0.043)	-0.180 *** (0.031)	-0.160 *** (0.024)
CID_TO_DIR	0.032 *** (0.011)	0.014 * (0.008)	0.009 (0.006)	0.091 *** (0.011)	0.049 *** (0.009)	0.037 *** (0.007)
CID_OUT_DIR	-0.002 (0.031)	-0.027 (0.024)	-0.016 (0.018)	0.076 ** (0.035)	0.105 *** (0.028)	0.085 *** (0.021)
OBA_S_HHI	-4.001 *** (1.146)	-1.994 *** (0.634)	-1.505 *** (0.494)	-5.734 *** (1.487)	-3.720 *** (0.821)	-2.825 *** (0.655)
TO_SUB	0.008 *** (0.000)	0.006 *** (0.000)	0.004 *** (0.000)	0.007 *** (0.000)	0.005 *** (0.000)	0.004 *** (0.000)
TOBIN_Q	-0.272 *** (0.017)	-0.188 *** (0.011)	-0.142 *** (0.008)	-0.272 *** (0.017)	-0.187 *** (0.011)	-0.141 *** (0.008)
SIZE	-0.838 *** (0.020)	-0.69 *** (0.011)	-0.538 *** (0.009)	-0.817 *** (0.020)	-0.669 *** (0.011)	-0.521 *** (0.009)
CF	-3.644 *** (0.330)	-1.888 *** (0.177)	-1.646 *** (0.135)	-3.652 *** (0.332)	-1.835 *** (0.177)	-1.601 *** (0.135)
TA	0.613 *** (0.098)	0.704 *** (0.065)	0.487 *** (0.050)	0.644 *** (0.098)	0.702 *** (0.065)	0.485 *** (0.050)

LEV	1.392 ***	0.854 ***	0.701 ***	1.447 ***	0.894 ***	0.73 ***
	(0.075)	(0.053)	(0.041)	(0.075)	(0.053)	(0.041)
R&D	-0.481 ***	-0.277 ***	-0.229 ***	-0.483 ***	-0.269 ***	-0.222 ***
	(0.136)	(0.090)	(0.073)	(0.157)	(0.104)	(0.084)
AGE	-0.473 ***	-0.417 ***	-0.396 ***	-0.452 ***	-0.421 ***	-0.402 ***
	(0.061)	(0.046)	(0.036)	(0.061)	(0.046)	(0.036)
DIV	-0.031 *	0.02 **	0	-0.038 **	0.012	-0.007
	(0.017)	(0.009)	(0.007)	(0.017)	(0.009)	(0.007)
FI	2.106 ***	0.758 ***	0.617 ***	1.424 ***	0.161	0.139
	(0.241)	(0.139)	(0.108)	(0.213)	(0.126)	(0.098)
I_HOR	0.211 ***	0.175 ***	0.135 ***	0.198 ***	0.182 ***	0.142 ***
	(0.019)	(0.012)	(0.009)	(0.016)	(0.011)	(0.008)
TO_DIR	0.006	0.001	0.002	0.000	-0.002	-0.001
	(0.005)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
OUT_DIR	-0.043 ***	-0.016	-0.017 **	-0.056 ***	-0.042 ***	-0.036 ***
	(0.015)	(0.011)	(0.008)	(0.013)	(0.010)	(0.008)
S_HHI	-0.872	0.140	-0.066	-1.154	0.116	-0.071
	(0.956)	(0.501)	(0.384)	(0.949)	(0.504)	(0.386)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	28936	28936	28936	28936	28936	28936
R-Sq	0.250	0.346	0.354	0.252	0.352	0.360

*** p < 0.01; ** p < 0.05; * p < 0.10

2) The sensitivity of overseas business activities to stock market liquidity

In this section, I examine the possibility that the sensitivity of corporate international diversification to stock liquidity depends on the firm-specific factors. To test the possibility, I include interaction terms between the international diversification measures and some firm-specific factors which are regarded as the determinants of stock liquidity. I employ *FI*, *I_HORIZON*, *TO_DIR*, *OUT_DIR*, and *S_HHI* which are also used as variables of determinants of stock market liquidity in Table 3. To make interaction terms, I multiply each of them with the international diversification measures (*FSR* and *FSTS*). If the sensitivity of corporate international diversification is determined by these firm-specific factors, the coefficient of corporate international diversification may be attenuated largely in the regression. Table 5.4 shows the results of regressions with the interaction terms. Model 1-3 and model 4-6 display the results using *FSR* and *FSTS*, respectively.

For all the regression models, most coefficients on interaction terms are statistically significant. The estimated coefficients on interaction terms between the international diversification measures and *FI* (*CID_FI*) are positive and statistically significant at less the 5% level. This means that the variable is associated with less stock liquidity, implying that foreign investors of firms deploying international operations provoke information asymmetry between informed and uninformed investors. The estimates of interaction terms including *TO_DIR* (*CID_TO_DIR*) and *S_HHI* (*CID_S_HHI*) are consistent with the results of those individual variables. The coefficients on *CID_TO_DIR* are positive and statistically significant, indicating that a large number of directors of multinational firms reduce stock liquidity by increasing the complexity of business process. *CID_S_HHI* are associated with higher stock liquidity, because greater market power has an increasing effect on stock liquidity.

However, the interaction terms between the international diversification measures and *I_HOR* (*CID_I_HOR*) are negatively associated with stock market illiquidity, while the individual variables of *I_HOR* are positively associated with illiquidity. A possible interpretation is that, regarding firms with overseas expansion, the longer

investment horizon is related to better monitoring by investors that contributes to higher stock market liquidity. In addition, the interaction terms with the international diversification measures and *OUTSIDE_ DIRECTORS (CID_OUT_DIR)* are positively associated with stock market illiquidity. A large number of outside directors may obstruct corporate governance for multinational firms by increasing the complexity of decision making process, as a large number of directors do.

The results of regressions including interaction terms are consistent with earlier analyses, and corporate international diversification is positively associated with stock market liquidity. The coefficients on the international diversification measures remain significantly negative, although they are attenuated compared to coefficients in earlier regressions. This means that the corporate international diversification sensitivity is stable, even after controlling for firm-specific factors such as foreign investor, investment horizon, corporate governance, and product market power. As a result, corporate international diversification contributes to higher stock liquidity with another dimension, differentiated from the effects of those firm-specific factors. In addition, the results suggest that the positive relationship between corporate international diversification and stock liquidity is driven by other factors unexplored in this study.

5.6. Conclusion

In this chapter, I explore the relationship between corporate international diversification and stock liquidity. The firm's international diversification has two conflicting effects on the liquidity of stocks. Corporate international diversification can improve information efficiency and market power, thereby increasing stock liquidity, while, firms with greater international diversification may have less stock liquidity, due to their poor governance and adverse selection risk. To test the estimations, I investigate how corporate international diversification affects stock liquidity.

The empirical results suggest that firms with greater international diversification are associated with greater stock liquidity, even after controlling for other

determinants of liquidity. This confirms that when firms become internationally diversified, they obtain an advantage of an improvement in their stock liquidity. This also implies that corporate international diversification is a significant determinant of stock liquidity. In additional analysis, I find that the relationship between international diversification and stock liquidity is influenced by factors like foreign investor, investment horizon, corporate governance, and market power, and this remains significantly positive even after controlling for those factors.

Likewise, corporate international diversification has positive effect on stock liquidity. This implies that internationally diversified firms may enhance their firm value by exploiting the effect of overseas activities on stock liquidity. Considering the results of additional analysis, the positive effect of international diversification seems to be derived from other factors unexamined in this study. For example, if Japanese firms expanding business overseas are required to disclose more detailed information about their operations than domestic firms, this would improve transparency between their insider and outsider investors, thereby increasing stock liquidity. Further research is needed to clarify what factors result in the positive relationship between corporate international diversification and stock liquidity.

6. Conclusion

6.1. Summary

This study examines how international diversification of Japanese firms influences their business outcomes by an empirical analysis. In this analysis, the four types of outcomes are considered: financial performance, firm risk, the accuracy of management earnings forecasts, and stock liquidity.

The relation between international diversification of Japanese firms and financial performance, measured by ROS, ROE, and ROA shows the S-shaped form. This is consistent with the argument of three-stage theory by Contractor et al. (2003). The result of empirical analysis indicates that performance declines at very low and high level of internationalization, against increase at moderate level. The curvilinear relation is more noticable for firms iversified internationally at high level than others.

Firm's international operations are associated with greater firm risk. While most previous research focuses on systematic risk or total risk, this study expands the extent of analysis into idiosyncratic risk which is expected to be mitigated with diversification. The expected effects of international diversification on risk are conflicting: risk-decreasing by diversification benefits and risk-increasing due to additional costs of foreign expansion. This study finds that overseas activities of Japanese firms increase systematic, idiosyncratic, and total risk of the firm.

International business activities decrease the accuracy of management earnings forecasts. Corporate international diversification may influence the predictability of future earnings, if it is associated with the degree of earnings volatility and the complexity of information environment of the firm. In exploring the accuracy of management forecasts to confirm the predictability of future earnings, a sample of listed Japanese firms would be more appropriate to that of American firms, because they provide regular forecasts with point estimates. The regression result suggests that firms with overseas activities have less accurate management forecasts of sales, operating income, and net income.

Overseas expansion of Japanese firms increases the liquidity of their stocks. If

firm's international activities give rise to a change in the informational efficiency about stock price of the firm, they also would affect its stock liquidity. According to the regression result, corporate international diversification has a positive relation with stock liquidity. In addition, this study investigates whether the sensitivity of international diversification to stock liquidity depends on the other determinants of liquidity. Even after controlling for the other determinants, the positive between international diversification and stock liquidity remains unchanged.

6.2. Discussion and Implications

The empirical results of this study suggest that corporate international diversification is not necessarily beneficial to Japanese firms. Even though they can make their business more profitable by increasing overseas activities, it is restricted to the appropriate level of internationalization. In the higher or lower than the optimal level, the firms may experience decrease in profitability. In addition, firms expanding their operations into foreign countries may suffer from an increasing risk. They are also expected to have difficulty in forecasting their future earnings. This study proposes that managers of Japanese multinationals should understand the potential disadvantages of overseas operations.

The curvilinear relation between corporate international diversification and financial performance implies that the profitability of overseas operations varies with the phases of internationalization process. The decrease in performance at the very low and high level of internationalization may be interpreted that the costs of foreign expansion exceed its benefits at those levels of internationalization. It may be due to the substantial costs of initial expansion and over internationalization as previous research suggests (e.g., Contractor et al., 2003; Lu and Beamishi, 2004). However, firm performance improves at the moderate level of overseas expansion where, perhaps, the benefits become greater than the costs. This finding provides a valuable implication to managers of Japanese multinationals that they should consider the optimal level of international activities to make a profit, and to take a long-term view of their overseas expansion.

Considering the result of an increase in firm risk, company's overseas operations seem to be associated with greater uncertainty. The increased risk cause greater costs of capital. In addition, the greater management forecast error of multinationals implies that international activities may amplify the operational uncertainty and complexity, thereby making their future earnings more unpredictable. Thus, this study proposes that managers should employ practical methods to deal with the growing uncertainty and complexity when they expand business internationally. For example, it may be helpful for multinationals to investigate their host countries, and to design a more effective management system which can contribute to managers supervising of their foreign subsidiaries, and communication with their business partners in foreign countries.

This study also provides an implication for investors of Japanese firms that they would be exposed to greater risk by holding stocks of internationally diversified firms. Although some literature suggests that investors are able to diversify their personal portfolios by holding stocks of multinational firms (Hughes et al., 1975; Agmon and Lessard, 1977), it seems to be hard to expect to get diversification benefits by holding stocks of Japanese multinationals. In addition, investors should be cautious about using management earnings forecasts of Japanese multinationals to make a decision of investment, because the forecasts are likely to less accurate than those of domestic firms.

One interest finding is that international diversification increase liquidity of the firm's stocks, while it seems to increase risk. Regard this discrepancy, I suggest two possible explanations. First, greater risk may increase stock returns, because investors would demand a return compensation for higher risk. Some literature argues that idiosyncratic risk is positively associated with expected stock returns (Levy, 1978; Merton, 1987; Malkiel and Xu, 2002; Fu, 2009). If an increase in firm risk enhances stock returns, it may offer the motivation for investors to trade. Another one is that multinational firms may have the better informational efficiency of their stock price than that of domestic firms, although their internal information environment becomes more complex. If Japanese multinationals are providing more

improved disclosure to meet global standards or requirements of investors concerning about greater risk of overseas operations, this may enhance transparency between their insiders and outside investors. whether these explanations are correct should be examined in further research.

6.3. Limitations and Further Research Implications

This study has some limitations. First, the measures of international diversification, which are defined as the ratio of foreign sales, assets, and subsidiaries, may be not able to fully capture the degree of international diversification of firms. Except the measures used in this study, other measures of international diversification, such as the ratio of foreign employees, the number of countries where the firm operates, and the number of geographical segments are used in previous studies. Becasuse these are proxies for the proportion of foreign activities, not for the dispersion of international activities, it is needed to measure the degree of dispersion of international activities. For example, the number of host countries or weighs of each countries based on sales may be more appropriate measures in that sense. Therefore, additional measures of international diversification should be considered in further research.

Second, this study does not consider the effect of region factor of host countries. The feature of host countries (e.g., geographic distance from home country, economic stability) may influence the relation between corporate international diversification and the company's business outcomes. Some previous research suggests that the effect of overseas expansion on performance or risk depends on where the firm expands its operation into. For example, Chen and Tan (2012) discuss that the relation between international diversification of Chinese firms and their performance varies with their host countries, which are the Greater China region, Asia and outside Asia. Kwok and Reeb (2000) argue that the effect of international diversification on firm risk would be determined by whether target market is more developed economies than home country. To confirm whether the relation between international diversification of Japanese firms with their business

outcomes varies with their host countries, further research is required to investigate target markets of Japanese multinationals and influence of target markets in effect of overseas expansion on firm outcomes.

Finally, this study could not explain why corporate international diversification increases stock liquidity. The result that the positive relation between overseas activities and stock liquidity remains unchanged after controlling other determinants of liquidity implies that the existence of other dimension of foreign expansion influencing stock liquidity. Furthers, stock liquidity increases with international activities, although firm risk becomes greater. The reason of the increase in stock liquidity is estimated in two ways: increase in stock returns and transparency between insiders and outside investors. Further research is needed to examine how international diversification of Japanese firms is associated with their stock returns and how the quality of disclosure has been changed after they expand operations internationally, in order to this estimation.

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