CORPORATE INTERNATIONAL DIVERSIFICATION AND QUALITY OF MANAGEMENT FORECASTS*

By MASAHITO KATO, CHAREE KWAK

This study investigates the association between corporate international diversification and the quality of management forecasts, using accuracy of forecasts as a measure of the overall forecast quality. Relying on the intuition that an international business may have greater uncertainty and complexity, we hypothesize that corporate international diversification reduces the accuracy of management forecasts. Using a sample of Japanese firms listed on the first section of the Tokyo Stock Exchange, we find that a greater foreign sales ratio is associated with less accurate management forecasts. The lower accuracy seems to arise from pessimistically biased forecasts. In addition, a manager’s experience of international business contributes to mitigate the effects of corporate international diversification on the accuracy and bias of management forecasts.

1. Introduction

Many firms experience the problem of information asymmetry between managers and investors. Management forecasts contribute toward reducing information asymmetry between managers and investors because these forecasts provide information to investors about the company’s expected future performance (Trueman, 1986; Coller and Yohn, 1997). Empirical research also suggests that management forecasts influence the firm’s stock price or trading volume (Foster, 1973; Conroy et al., 1998). Especially, higher quality management forecasts can be valuable information (Lambert et al., 2007; Goodman et al., 2013).

In this paper, we focus on management forecasts provided by multinational firms. Corporate international diversification, also referred to as multi-nationality, is a worldwide phenomenon. Firms expand their operations overseas seeking new markets for their business and to pursue better performance. However, when operating as an international business, a multinational firm could face additional business risks. This may be accompanied by higher uncertainty in future performance due to risks associated with overseas expansion, namely foreign exchange risk and political risk (Reeb et al., 1998). In addition, international diversification is likely to result in greater agency costs, as geographical distance, differences in culture, and language barriers between the home and host countries make it difficult to manage an international business (Lee and Kwok, 1988; Duru and Reeb, 2002).

As discussed above, corporate international diversification is associated with several costs, which give rise to higher uncertainty and business complexity, while firms expect to benefit from their international business. The higher the uncertainty of the business, the greater will be the difficulty of forecasting future earnings or cash flows. Thus, if international diversification increases business uncertainty, it would deteriorate the quality of management forecasts. To address the research question, this study examines how corporate international diversification influences the

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quality of management forecasts. We use the accuracy of management forecasts as our measure of forecast quality, following previous studies (Hirst et al., 2008; Herrmann et al., 2010; Baik et al., 2011; Goodman et al., 2013).

This study uses a sample of listed Japanese firms. In most countries, firms issue their management forecasts voluntarily. Typically, voluntary management forecasts can cause the problem of self-selection bias, which may distort the results of empirical analysis (Yeo and Ziebart, 1995). In Japan, unlike in other countries, management forecasts are effectively mandated (Kato et al., 2009). Almost all firms listed in Japan issue management forecasts regularly because stock exchanges encourage companies to provide regular sales and earnings forecasts. In addition, Japanese firms release point estimates, while management forecasts in other countries include open-interval or range estimates. Thus, the sample of listed Japanese firms is expected to be more abundant and less biased than that of firms issuing voluntary management forecasts.

Using the sample of Japanese firms that were listed on the first section of the Tokyo Stock Exchange (hereinafter “TSE”) between 2004 and 2015, we investigate the relation between corporate international diversification and the accuracy of management forecasts. Our regression results show that the foreign sales ratio is negatively related to the accuracy of sales, operating income, and net income forecasts, after controlling for other determinants of forecast accuracy. This implies that international diversification deteriorates the quality of forecasting because of the greater uncertainty and complexity in a firm’s operating environment. We also find that a manager’s experience of the international business can mitigate the negative effect of corporate international diversification on forecast accuracy.

Additionally, we investigate whether management forecasts of multinational firms are optimistically or pessimistically biased. In the results obtained from additional analysis, the foreign sales ratio is negatively related to the forecast optimism measures and the downward forecast revision measures, and positively related to the upward forecast revision measures. This indicates that management forecasts of multinational firms are likely to be pessimistic and are revised upward. The pessimistic bias of management forecasts may result in lower accuracy. In addition, a manager’s experience of international business mitigates the effect of corporate international diversification on the forecast bias.

Our paper has some contributions with several dimensions. First, this study complements the outcomes of previous studies regarding the relation between corporate international diversification and the quality of management forecasts (Runyan and Smith, 2007). We use mandated management forecasts and accuracy measured by using point estimates of forecasts, while they used voluntary management forecasts and accuracy measured by coding forecasts based on their forms (point, range, open-interval estimates, and general impression). In addition, our findings provide new empirical evidence of forecast pessimism and the mitigation effect of a manager’s experience related to the association between international business and management forecasts. Second, our study results may be relevant to investors, analysts, and other stakeholders, because management forecasts are important information that forms part of their task. Our study suggests that the quality of management forecasts of multinational firms is likely to be lower than that of domestic firms. Finally, our study has some implications for managers of multinational firms regarding the
effort they should make to grow their ability to manage their international business, which involves greater uncertainty and complexity.

The remainder of this paper is organized as follows. Chapter 2 provides the theoretical background of the study and establishes the hypotheses. In chapter 3, we describe the sample and variables for empirical analysis. Chapter 4 presents the method and results of main analysis, while chapter 5 presents the method and results of additional analysis. Chapter 6 concludes.

2. Hypotheses

In this paper, we consider forecast accuracy as a measure of the quality of management forecasts. Brown (1993) argues that the accuracy of forecasts is affected by the difficulty of the forecasting task, which is related to the uncertainty of the firm's business and availability of its operating information. Thus, the relation between corporate international diversification and the difficulty of the forecasting task would determine how an international business influences the accuracy of management forecasts. However, corporate international diversification is expected to have conflicting effects on the difficulty of forecasting tasks.

Multinational firms may have less difficulty in their forecasting task, when their international business reduces the uncertainty of earnings and cash flows. From the perspective of the portfolio theory, operations in imperfectly correlated multiple markets can reduce earnings volatility because of diversification benefits. Rugman (1976) describes that the diversification of sales in various national economies that are not perfectly correlated increases the stability of earnings. Shapiro (1978) also argues that multinational firms can leverage the diversification benefits that derive from uncorrelated cash flows in multiple countries. The decrease in earnings volatility due to diversification benefits may contribute toward more accurate management forecasts (Porter, 1982).

However, corporate international diversification may increase the volatility of earnings due to the various risks associated with the international business. It involves greater exposure to foreign exchange rate fluctuations, thereby increasing the variance in foreign returns. Multinational firms are also exposed to greater political risk such as the possibility of host government appropriation, fund remittance control, differences in cultural practices, and changes in government regulations (Reeb et al., 1998). The increase in cash flow volatility due to such risks may offset the impact of any reduction in cash flow correlations due to diversification (Reeb et al, 1998; Olibe et al., 2008).

In addition, greater complexity in the information environment of an international business would increase the difficulty of the forecasting task. Geographical distance, cultural differences, language barriers, and differences in legal systems influence the flow of information in multinational firms, thereby increasing the difficulty of forecasting in an international business (Duru and Reeb, 2002). In addition, multinational firms are likely to experience greater complexity and uncertainty in their operations due to the challenge of communicating across borders and the principal-agent relationship between the domestic parent and the foreign subsidiary (Runyan and Smith, 2007). Multinational firms also have greater agency costs compared to domestic firms, as it is difficult to monitor managers in an international market (Lee and Kwok, 1988).
Some studies explore analysts’ earnings forecasts to examine how corporate international diversification influences the accuracy of forecasts. Erwin and Perry (2000) find that a firm’s geographical expansion, as a consequence of a foreign merger and acquisition, diminishes the accuracy of analysts’ forecasts. Duru and Reeb (2002) and Mauri et al. (2013) also suggest that corporate international diversification is associated with less accurate analysts’ earnings forecasts. The results of analysts’ earnings forecasts imply that multinational firms face the difficulty of forecasting future earnings due to increased earnings volatility and the complex information environment of an international business.

Also, there are a few studies on the relation between corporate international diversification and management forecasts. Runyan and Smith (2007) find that the degree of a firm’s multi-nationality is negatively associated with the precision of management forecasts. Herrmann et al. (2010) show that multinational firms are associated with less accurate and more biased management forecasts, following the implementation of Reg FD. These results also support that firms with internationally diversified activities are likely to operate in a more complex environment and have greater uncertainty of earnings forecasts compared to domestic firms.

We investigate the association between corporate international diversification and the accuracy of management forecasts, which is underexplored in the previous studies. If a firm’s international business increases earnings volatility and complexity of the information environment, as suggested by previous studies mentioned above, multinational firms would experience more difficulty in forecasting their future earnings. Thus, we hypothesize the relation between corporate international diversification and the accuracy of management forecasts as follows:

**H1.** Greater corporate international diversification is associated with less accurate management forecasts.

We infer that a manager’s experience of international business can mitigate the decrease in forecast accuracy due to the impact of corporate international diversification. A manager’s experience may affect knowledge and the ability of seeking and processing information (Hambrick and Mason, 1984; Kor, 2003). Such knowledge and abilities contribute toward managing the complexity of the international business effectively (Hsu et al., 2013). Indeed, some previous studies suggest that the experience of a manager or the top management team of multinational firms have a positive effect on the business, such as performance or capabilities (Sambharya, 1996; Daily et al., 2000; Hsu et al., 2013; Driesch et al., 2015). If the manager’s experience can help in coping with the greater uncertainty and complexity of international business, it also would reduce errors in management forecasts. Thus, we advance the following hypothesis:

**H1.** Greater corporate international diversification is associated with less accurate management forecasts.

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1) Runyan and Smith (2007) measure the precision of management forecasts by coding them according to their forms. In the precision measure, point estimates are accounted as 3, range estimates as 2, open-interval forecasts as 1, and general impression forecasts as 0.

2) A rule passed by the Securities and Exchange Commission (SEC) 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.
H2. A manager’s experience of international business can mitigate the negative effect of corporate international diversification on the accuracy of management forecasts.

3. Data and Variables

We collected data for management forecasts and international diversification and other financial information from NEEDS-FinancialQUEST provided by Nikkei Media Marketing, Inc.

3.1 Sample selection

The sample consists of Japanese firms that were listed on the first section of the TSE between 2004 and 2015. Financial firms such as commercial banks, security houses, insurance companies, and credit and lease firms, are excluded from the dataset. We excluded observations of firms without management sales forecasts, ordinary income, and net income in a given year and firms that do not have accounting period of 12 months. We also eliminated firms without information on foreign sales. To minimize the effect of outliers, we winsorized management forecasts variables and all control variables at the 1% level. As a result, the final dataset consists of 18,502 firm-year observations.

Table 1 displays the proportion of firms that disclose their management forecasts every year from 2004 to 2015. The first column shows all the listed firms on the first section of the TSE. The second and third columns show the number of firms with management forecasts for the forthcoming year and their ratio to total firms in the first column, respectively. The fourth and fifth columns present the number of multinational firms that have positive foreign sales and their ratio to firms with management forecasts in the third column, respectively. As seen in Table 1, on average, over 90 percent of firms listed in the first section of the TSE provide management forecasts. The percentage of firms with management forecasts is almost consistent for most of the years except 2009 for which the percentage (88.39%) is lower than that of other years. The decline in percentage may have arisen due to higher risk after the collapse of the Lehman Brothers, because the rule of
the TSE requires firms to not disclose management forecasts when they have greater difficulty in forecasting future earnings. The ratio of firms with foreign sales is over 40 percent, on average.

3.2 Measuring accuracy of management forecasts
Management forecasts for year t are announced in year t-1 in Japan, when actual earnings for year t-1 are announced. We use three types of management forecasts, which include forecasts for sales, ordinary income, and net income, to compute forecast accuracy. The equation for the accuracy of management forecasts can be given as follows:

\[
ACC_{SALES} = \frac{|FORECAST_{SALES} - ACT_{SALES}|}{ASSET} \times 100
\]

\[
ACC_{ORD} = \frac{|FORECAST_{ORD} - ACT_{ORD}|}{ASSET} \times 100
\]

\[
ACC_{NET} = \frac{|FORECAST_{NET} - ACT_{NET}|}{ASSET} \times 100
\]

where \(ACC_X\) is the absolute forecast error of variable \(X\) (= \(SALES\), \(ORD\), and \(NET\)) at time t, \(SALES\) is total sales, \(ORD\) is ordinary income, \(NET\) is net income, \(FORECAST_X\) is the management forecast for period t sales and earnings made at period t-1, \(ACT_X\) is actual sales and earnings for period t, and \(ASSET\) is total assets at the time of forecast (t-1). As indicated by the equation, a larger value for \(ACC_X\) indicates the likelihood that management forecasts are less accurate.

Figure 1 describes the accuracy of management forecasts between multinational and domestic firms. Each graph shows the mean of accuracy variables, namely \(ACC_{SALES}\), \(ACC_{ORD}\), and \(ACC_{NET}\), respectively. As shown in the graphs, across all types of variables, the mean of accuracy variables for multinational firms are greater than domestic firms. This indicates that management forecasts of multinational firms are less accurate compared to domestic firms. This is because accuracy variables measure the degree of forecast error.

3.3 Measurement of international diversification
The degree of international diversification is measured by the ratio of foreign sales to total sales (\(FSTS\)), which is also used in the previous studies (Duru and Reeb, 2002; Runyan and Smith, 2002). The observed differences are statistically significant in both parametric and nonparametric tests.
2007; Herrmann et al., 2010). The ratio of foreign sales is a proxy for the firm’s dependence on its foreign markets for sales revenues. We use information about foreign sales in segment data of NEEDS-FinancialQuest to compute FSTS. The equation is as follows:

\[ FSTS = \frac{\text{Foreign sales}}{\text{Total sales}} \times 100 \]  

\[ (4) \]

4. Analysis

4.1 Regression model and descriptive statistics

We investigate the effects of corporate international diversification on the accuracy of management forecasts to test Hypothesis 1 (H1). We use an OLS model and the estimated regression model is as follows:

\[ ACC = \beta_0 + \beta_1 \times FSTS + \beta_2 \times \ln(\text{Asset}) + \beta_3 \times SalesGrowth + \beta_4 \times MTB + \beta_5 \times DebtRatio \]
\[ + \beta_6 \times LLOSS + \beta_7 \times LOSS + \beta_8 \times Horizon + \beta_9 \times HHI + \sum \delta_y \times YEAR_y \]
\[ + \sum \delta_y \times IND_y + \epsilon_i \]  

\[ (5) \]

where \( ACC \) measures the accuracy of management forecasts, \( FSTS \) is the measure of international diversification. We use FSTS as the explanatory variable. If \( \beta_1 \) has a positive sign, Hypothesis 1 is supported that greater corporate international diversification is associated with less accurate management forecasts.

Based on previous studies (Duru and Reeb, 2002; Runyan and Smith, 2007; Kato et al., 2009; Herrmann et al., 2010; Jong et al., 2010; Ota, 2011), we include some variables to control the other determinants of forecast accuracy. Firm size can have two opposing effects. Larger firms tend to have more complex operations resulting in forecasting difficulty. Otherwise, they would have greater ability to forecast. We measure firm size with a natural logarithm of market capitalization (\( \ln(\text{Asset}) \)). We use sales growth rate (\( SalesGrowth \)) and market-to-book ratio (\( MTB \)), which is calculated by the ratio of total assets to the sum of market capitalization and the book value of debt, as the proxy for a firm’s growth opportunities. Greater growth opportunities are expected to reduce forecast accuracy. The firm’s financial condition and earnings trend may also influence the accuracy of management forecasts. Leverage (\( DebtRatio \)), defined as the ratio of total debt to total assets, and dummy variable for net income loss in the current and forthcoming year (\( LLOSS, LOSS \)) are adopted to measure the firm’s financial condition. Forecast horizon in month (\( Horizon \)) is expected to be negatively associated with forecast accuracy. Market competition, defined as sales-based Herfindahl index (\( HHI \)), may affect the manager’s incentive to disclose more accurate forecasts. Finally, we add dummy variables for year and industry.

To test Hypothesis 2 (H2) with regard to the effect of the manager’s experience on the association between corporate international diversification and forecast accuracy, we also include an interaction term of international diversification measure and experience measure. The estimated
regression model including the interaction term is as follows:

\[
ACC = \beta_0 + \beta_1 \times FSTS + \beta_2 \times FSTS \times Experience + \beta_3 \times \ln(Asset) + \beta_4 \times SalesGrowth \\
+ \beta_5 \times MTB + \beta_6 \times DebtRatio + \beta_7 \times LLOSS + \beta_8 \times LOSS + \beta_9 \times Horizon + \beta_{10} \times HHI \\
+ \sum \delta_y \times YEAR_y + \sum \delta_y \times IND_y + \epsilon_i
\]  

(6)

where \(FSTS \times Experience\) is the interaction term of international diversification measure and a manager’s experience measure. We use the number between the first year of positive foreign sales of the firm and current year as the proxy of a manager’s experience of international business. If \(\beta_2\) has a negative sign, Hypothesis 2 is supported that a manager’s experience of international business can mitigate the negative effect of corporate international diversification on the accuracy of management forecasts.

Panel A in Table 2 presents descriptive statistics for all the variables in our regression model. As seen in the Panel A, the mean of \(ACC_{SALES}, ACC_{ORD},\) and \(ACC_{NET}\) is 5.765, 1.539, and 1.531, respectively. The average foreign sales ratio (\(FSTS\)) of our sample firms is 16.08 percent. International business experience of firms is about four years on average. The median of \(FSTS\) and Experience is zero, which indicates that over 50 percent of the sample firms have no foreign sales and international business experience.

Table 2 (Panel A) Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>10%</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
<th>90%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC_{SALES}</td>
<td>5.765</td>
<td>6.121</td>
<td>0.533</td>
<td>1.513</td>
<td>3.740</td>
<td>7.756</td>
<td>13.86</td>
<td>18502</td>
</tr>
<tr>
<td>ACC_{ORD}</td>
<td>1.539</td>
<td>1.668</td>
<td>0.152</td>
<td>0.406</td>
<td>0.986</td>
<td>2.048</td>
<td>3.671</td>
<td>18502</td>
</tr>
<tr>
<td>ACC_{NET}</td>
<td>1.351</td>
<td>1.814</td>
<td>0.105</td>
<td>0.292</td>
<td>0.735</td>
<td>1.660</td>
<td>3.207</td>
<td>18502</td>
</tr>
<tr>
<td>FSTS</td>
<td>16.08</td>
<td>23.44</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>28.80</td>
<td>54.30</td>
<td>18502</td>
</tr>
<tr>
<td>Experience (Year)</td>
<td>4.126</td>
<td>5.296</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>8.083</td>
<td>13.08</td>
<td>18502</td>
</tr>
<tr>
<td>Asset (Billion yen)</td>
<td>358.5</td>
<td>1364</td>
<td>14.633</td>
<td>31.363</td>
<td>72.945</td>
<td>201.0</td>
<td>634.3</td>
<td>18502</td>
</tr>
<tr>
<td>MTB</td>
<td>1.138</td>
<td>0.782</td>
<td>0.731</td>
<td>0.849</td>
<td>0.981</td>
<td>1.192</td>
<td>1.586</td>
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<td>DebtRatio</td>
<td>49.39</td>
<td>19.75</td>
<td>21.87</td>
<td>34.13</td>
<td>49.92</td>
<td>64.79</td>
<td>75.64</td>
<td>18502</td>
</tr>
<tr>
<td>LLoss</td>
<td>0.110</td>
<td>0.313</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>18502</td>
</tr>
<tr>
<td>Loss</td>
<td>0.096</td>
<td>0.294</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>18502</td>
</tr>
<tr>
<td>Horizon (Month)</td>
<td>11.04</td>
<td>0.921</td>
<td>11.00</td>
<td>11.00</td>
<td>11.00</td>
<td>11.00</td>
<td>12.00</td>
<td>18502</td>
</tr>
<tr>
<td>HHI</td>
<td>0.706</td>
<td>0.269</td>
<td>0.333</td>
<td>0.467</td>
<td>0.727</td>
<td>1.000</td>
<td>1.000</td>
<td>18502</td>
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Table 2 (Panel B) Correlation matrix

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<th></th>
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</thead>
<tbody>
<tr>
<td>[1] ACC_{SALES}</td>
<td>1.00</td>
<td>0.37</td>
<td>0.33</td>
<td>0.07</td>
<td>0.05</td>
<td>-0.16</td>
<td>-0.06</td>
<td>0.02</td>
<td>0.05</td>
<td>0.06</td>
<td>0.15</td>
<td>0.00</td>
<td>0.07</td>
</tr>
<tr>
<td>[2] ACC_{ORD}</td>
<td>0.46</td>
<td>0.70</td>
<td>0.13</td>
<td>0.10</td>
<td>-0.18</td>
<td>-0.03</td>
<td>0.10</td>
<td>-0.13</td>
<td>0.05</td>
<td>0.21</td>
<td>0.02</td>
<td>0.10</td>
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</tr>
<tr>
<td>[3] ACC_{NET}</td>
<td>0.36</td>
<td>0.69</td>
<td>0.13</td>
<td>0.11</td>
<td>-0.16</td>
<td>-0.07</td>
<td>0.09</td>
<td>-0.08</td>
<td>0.11</td>
<td>0.39</td>
<td>-0.01</td>
<td>0.08</td>
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<tr>
<td>[4] FSTS</td>
<td>0.06</td>
<td>0.14</td>
<td>0.12</td>
<td>0.86</td>
<td>0.27</td>
<td>0.06</td>
<td>0.05</td>
<td>-0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.07</td>
<td>-0.12</td>
<td></td>
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<tr>
<td>[5] Experience (Year)</td>
<td>0.02</td>
<td>0.08</td>
<td>0.07</td>
<td>0.73</td>
<td>0.29</td>
<td>0.03</td>
<td>-0.02</td>
<td>-0.04</td>
<td>0.05</td>
<td>0.04</td>
<td>0.07</td>
<td>-0.16</td>
<td></td>
</tr>
<tr>
<td>[6] Asset (Billion yen)</td>
<td>-0.07</td>
<td>-0.05</td>
<td>-0.04</td>
<td>0.13</td>
<td>0.12</td>
<td>-0.04</td>
<td>0.06</td>
<td>0.24</td>
<td>-0.03</td>
<td>-0.03</td>
<td>0.15</td>
<td>-0.31</td>
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<tr>
<td>[7] SalesGrowth</td>
<td>-0.07</td>
<td>-0.07</td>
<td>-0.11</td>
<td>0.02</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.21</td>
<td>-0.01</td>
<td>-0.12</td>
<td>-0.24</td>
<td>0.02</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>[8] MTB</td>
<td>0.04</td>
<td>0.16</td>
<td>0.08</td>
<td>0.00</td>
<td>-0.07</td>
<td>-0.01</td>
<td>0.19</td>
<td>0.08</td>
<td>-0.13</td>
<td>-0.08</td>
<td>0.09</td>
<td>0.02</td>
<td></td>
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<tr>
<td>[9] DebtRatio</td>
<td>0.07</td>
<td>-0.11</td>
<td>0.00</td>
<td>-0.07</td>
<td>-0.05</td>
<td>0.14</td>
<td>0.00</td>
<td>-0.09</td>
<td>0.15</td>
<td>0.13</td>
<td>-0.06</td>
<td>-0.23</td>
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</tr>
<tr>
<td>[10] LLoss</td>
<td>0.05</td>
<td>0.05</td>
<td>0.16</td>
<td>0.05</td>
<td>0.04</td>
<td>-0.06</td>
<td>-0.08</td>
<td>0.16</td>
<td>0.26</td>
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<tr>
<td>[11] Loss</td>
<td>0.18</td>
<td>0.28</td>
<td>0.58</td>
<td>0.04</td>
<td>0.03</td>
<td>0.01</td>
<td>-0.18</td>
<td>-0.06</td>
<td>0.14</td>
<td>0.26</td>
<td>-0.03</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>[12] Horizon (Month)</td>
<td>0.03</td>
<td>0.02</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.05</td>
<td>0.04</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.04</td>
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<td></td>
</tr>
<tr>
<td>[13] HHI</td>
<td>0.07</td>
<td>0.10</td>
<td>0.05</td>
<td>-0.07</td>
<td>-0.16</td>
<td>-0.14</td>
<td>0.03</td>
<td>0.07</td>
<td>-0.22</td>
<td>-0.01</td>
<td>0.00</td>
<td>-0.05</td>
<td></td>
</tr>
</tbody>
</table>
Panel B in Table 2 displays the correlation matrix of the variables. The upper right triangle of the matrix presents the Spearman correlation coefficients and the lower left triangle presents the Pearson correlation coefficients. Management forecast accuracy measures (ACC_SALES, ACC_ORD, and ACC_NET) show positive and relatively high correlations. The correlation between FSTS and forecast accuracy variables (ACC_SALES, ACC_ORD, and ACC_NET) are also positive. This indicates that corporate international diversification is correlated with less accurate management forecasts.

4.2 Empirical results

First, we investigate the association between corporate international diversification and the accuracy of management forecasts.

Table 3 reports the results from estimating Equation (5). We use three types of management forecast accuracy measures, ACC_SALES (model 1), ACC_ORD (model 2), and ACC_NET (model 3). We find that international diversification measure (FSTS) is positively associated with all three management forecast accuracy measures. In model 1, the estimated coefficient of FSTS is 0.031 and statistically significant 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 control variables. The same conclusion is obtained from the models using the other management forecast measures.
accuracy variables (\textit{ACC\_ORD} and \textit{ACC\_NET}). Both estimated coefficients of \textit{FSTS}, in model 2 and 3, are positive (0.010 and 0.009) and statistically significant at the 1% level, respectively.

Based on the estimation results discussed above, it can be inferred that corporate international diversification decreases the accuracy of management forecasts, when other determinants of forecast accuracy are controlled for. The regression results presented in Table 3 show the positive relation between international diversification measures and absolute forecast errors, supporting Hypothesis 1 that greater corporate international diversification is associated with less accurate management forecasts. Therefore, our results show that management forecasts become less accurate if firms expand their international business. Thus, managers of multinational firms would experience greater difficulty with earnings forecasts because the various risks involved in international business increase earnings volatility and complexity of the information environment (Duru and Reeb, 2002; Runyan and Smith, 2007).

Control variables also influence the accuracy of management forecasts, based on previous studies. As seen in the regression results, \textit{ln(Asset)} is negatively associated with the absolute forecast

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.617 ***</td>
<td>4.127 ***</td>
</tr>
<tr>
<td>\textit{FSTS}</td>
<td>0.042 ***</td>
<td>0.013 ***</td>
</tr>
<tr>
<td>\textit{Experience}</td>
<td>-0.003</td>
<td>-0.003</td>
</tr>
<tr>
<td>\textit{FSTS} \times \textit{Experience}</td>
<td>-0.0010 **</td>
<td>-0.0003 **</td>
</tr>
<tr>
<td>\textit{ln(Asset)}</td>
<td>-0.784 ***</td>
<td>-0.190 ***</td>
</tr>
<tr>
<td>\textit{SalesGrowth}</td>
<td>-0.004 *</td>
<td>-0.001 *</td>
</tr>
<tr>
<td>\textit{MTB}</td>
<td>0.370 ***</td>
<td>0.300 ***</td>
</tr>
<tr>
<td>\textit{DebtRatio}</td>
<td>0.032 ***</td>
<td>-0.005 ***</td>
</tr>
<tr>
<td>\textit{LLoss}</td>
<td>-0.275 *</td>
<td>-0.079 **</td>
</tr>
<tr>
<td>\textit{Loss}</td>
<td>2.373 ***</td>
<td>1.401 ***</td>
</tr>
<tr>
<td>\textit{Horizon}</td>
<td>0.456 ***</td>
<td>0.132 ***</td>
</tr>
<tr>
<td>\textit{HHI}</td>
<td>0.207</td>
<td>0.152 ***</td>
</tr>
<tr>
<td>\textit{Year Fixed Effects}</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>\textit{Industry Fixed Effects}</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>\textit{Adjusted R-squared}</td>
<td>0.184</td>
<td>0.221</td>
</tr>
<tr>
<td>\textit{N}</td>
<td>18502</td>
<td>18502</td>
</tr>
</tbody>
</table>

The values within parentheses denote robust standard error. ****, ***, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
error, indicating that larger firms issue more accurate forecasts. On the other hand, the forecast horizon \((\text{Horizon})\) is related to less accurate forecasts since it increases the difficulty of the forecasting task (Duru and Reeb, 2002). Firms with greater growth opportunities \((\text{MTB})\) are also associated with less accurate forecasts. Finally, management forecasts of firms in a poor financial condition \((\text{LOSS})\) are likely to be less accurate.

Next, we investigate the effect of management experience of international business. Table 4 reports the results of estimating the model including the interaction term, Equation (6). Across models 1 and 3, the estimated coefficients of the interaction terms of international diversification measure and management experience measure \((\text{FSTS} \times \text{Experience})\) are negative and statistically significant at the 5% level. This implies that the degree of experience of international business is positively associated with the accuracy of management forecasts of multinational firms.

These results suggest that managers of multinational firms who are more experienced in operating an international business may contribute to more accurate management forecasts, although the international business of firms is likely to deteriorate the accuracy of management forecasts. This supports Hypothesis 2 that manager’s experience of international business can mitigate the negative effect of corporate international diversification on the accuracy of management forecasts. The experience of operating an international business may augment the ability of managers to deal with the greater uncertainty and complexity of an international business (Hsu et al., 2013; Driesch et al., 2015).

5. Additional analysis

5.1 Regression model and descriptive statistics

In this chapter, we examine whether lower accuracy of the management forecasts of multinational firms is due to optimistic forecasts or pessimistic forecasts. To address the question, we use forecast optimism measures calculated as follows:

\[
\text{OPT}_{\text{SALES}} = \frac{\text{FORECAST}_{\text{SALES}} - \text{ACT}_{\text{SALES}}}{\text{ASSET}} \times 100 \quad (7)
\]

\[
\text{OPT}_{\text{ORD}} = \frac{\text{FORECAST}_{\text{ORD}} - \text{ACT}_{\text{ORD}}}{\text{ASSET}} \times 100 \quad (8)
\]

\[
\text{OPT}_{\text{NET}} = \frac{\text{FORECAST}_{\text{NET}} - \text{ACT}_{\text{NET}}}{\text{ASSET}} \times 100 \quad (9)
\]

where \(\text{OPT}_X\) is the signed forecast error of variable \(X\) (= \text{SALES}, \text{ORD}, and \text{NET}) at time \(t\), \text{SALES} is total sales, \text{ORD} is ordinary income, \text{NET} is net income, \text{FORECAST}_X\) is the management forecast for period \(t\) sales and earnings made at period \(t-1\), \text{ACT}_X\) is actual sales and earnings for period \(t\), and \text{ASSET} is total assets at the time of forecast (\(t-1\)). The positive \(\text{OPT}_X\) indicates optimistic forecasts, while the negative \(\text{OPT}_X\) represents pessimistic forecasts. We also use forecast revision measures defined as follows:
UpRevision\_X = \frac{N\_UpRevision\_X}{T\_FORECAST\_X} \times 100 \quad (10)

DownRevision\_X = \frac{N\_DownRevision\_X}{T\_FORECAST\_X} \times 100 \quad (11)

where \text{UpRevision}\_X is the ratio of upward forecast revisions of variable \(X\) (= \textit{SALES}, \textit{ORD}, and \textit{NET}), \text{DownRevision}\_X is the ratio of downward forecast revisions of variable \(X\), \(N\_UpRevision\_X\) is the number of upward forecast revisions of variable \(X\), \(N\_DownRevision\_X\) is the number of downward forecast revisions of variable \(X\), and \text{T\_FORECAST\_X} is the total number of forecast disclosures of variable \(X\) during time \(t-1\) and \(t\). Whether the revision is upward or downward is determined by comparing with the initial management forecast made at time \(t-1\).

For additional analysis, we employ the forecast optimism and revision measures instead of the forecast accuracy measures in Equation (6). The estimated regression models used in additional analysis are as follows:

\[
OPT = \beta_0 + \beta_1 \times \text{FSTS} + \beta_2 \times \text{FSTS} \times \text{Experience} + \beta_3 \times \ln(\text{Asset}) + \beta_4 \times \text{SalesGrowth} \\
+ \beta_5 \times \text{MTB} + \beta_6 \times \text{DebtRatio} + \beta_7 \times \text{LOSS} + \beta_8 \times \text{LOSS} + \beta_9 \times \text{Horizon} + \beta_{10} \times \text{HHI} \\
+ \sum \delta_i \times \text{YEAR}_y + \sum \delta_i \times \text{IND}_y + \epsilon_i
\] (12)

\[
\text{Revision} = \beta_0 + \beta_1 \times \text{FSTS} + \beta_2 \times \text{FSTS} \times \text{Experience} + \beta_3 \times \ln(\text{Asset}) + \beta_4 \times \text{SalesGrowth} \\
+ \beta_5 \times \text{MTB} + \beta_6 \times \text{DebtRatio} + \beta_7 \times \text{LOSS} + \beta_8 \times \text{LOSS} + \beta_9 \times \text{Horizon} \\
+ \beta_{10} \times \text{HHI} + \sum \delta_i \times \text{YEAR}_y + \sum \delta_i \times \text{IND}_y + \epsilon_i
\] (13)

where \(OPT\) is the forecast optimism measure, and \(\text{Revision}\) is the forecast revision measure. Other control variables are consistent with Equation (6).

Table 5 presents descriptive statistics for the additional variables. As shown in the Table, the mean of \(OPT\_SALES\), \(OPT\_ORD\), and \(OPT\_NET\) is 1.069, 0.129, and 0.393, respectively. These positive means of the optimism variables indicate that management forecasts in our sample firms have a tendency to be optimistically biased. The average upward and downward revision ratios of each management forecast are under 20 percent (about 16–20 percent). A large difference between
The mean of upward and downward revision ratios is not observed. In addition, over 50 percent of our sample observations have neither upward nor downward revision.

### Table 6: The association between corporate international diversification and optimism of management forecasts

<table>
<thead>
<tr>
<th>Sales</th>
<th>OPT</th>
<th>UpRevision</th>
<th>DownRevision</th>
<th>Ordinary Income</th>
<th>Model 4</th>
<th>UpRevision</th>
<th>DownRevision</th>
<th>Net Income</th>
<th>Model 7</th>
<th>UpRevision</th>
<th>DownRevision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.782***</td>
<td>-0.312</td>
<td>*0.081</td>
<td>0.598</td>
<td>-9.184*</td>
<td>0.1023**</td>
<td>0.415</td>
<td>-1.780</td>
<td>0.1032**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSTS</td>
<td>-0.033***</td>
<td>0.209***</td>
<td>-0.094***</td>
<td>-0.004**</td>
<td>0.195***</td>
<td>-0.077***</td>
<td>-0.002</td>
<td>0.214***</td>
<td>-0.10***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>0.027</td>
<td>0.028</td>
<td>-0.068</td>
<td>0.003</td>
<td>-0.018</td>
<td>0.066</td>
<td>-0.002</td>
<td>0.007</td>
<td>0.055</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSTS \times Experience</td>
<td>0.002***</td>
<td>-0.012***</td>
<td>0.011***</td>
<td>0.0003*</td>
<td>-0.009***</td>
<td>0.009***</td>
<td>0.004*</td>
<td>-0.011***</td>
<td>0.011***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(Asset)</td>
<td>0.321***</td>
<td>1.015***</td>
<td>0.617***</td>
<td>0.061***</td>
<td>1.447***</td>
<td>0.463***</td>
<td>-0.007</td>
<td>0.180***</td>
<td>-0.16***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SalesGrowth</td>
<td>0.067*</td>
<td>0.208***</td>
<td>-0.185***</td>
<td>0.011*</td>
<td>-0.208***</td>
<td>-0.185***</td>
<td>0.0004*</td>
<td>0.031**</td>
<td>0.027**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTB</td>
<td>0.0418</td>
<td>-1.060***</td>
<td>1.254***</td>
<td>0.179***</td>
<td>-1.163***</td>
<td>0.958***</td>
<td>-0.130***</td>
<td>-1.076***</td>
<td>0.565***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DebtRatio</td>
<td>-0.011***</td>
<td>0.011</td>
<td>-0.022**</td>
<td>-0.001</td>
<td>-0.011</td>
<td>-0.013</td>
<td>0.000</td>
<td>0.019*</td>
<td>-0.021***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLoss</td>
<td>0.081</td>
<td>0.506</td>
<td>2.526***</td>
<td>-0.160***</td>
<td>2.724***</td>
<td>0.688</td>
<td>-0.195***</td>
<td>3.233***</td>
<td>0.533</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizon</td>
<td>0.090</td>
<td>-0.557</td>
<td>-0.272</td>
<td>0.057***</td>
<td>-0.276</td>
<td>-0.280</td>
<td>0.081***</td>
<td>-0.361</td>
<td>-0.646*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHI</td>
<td>-0.507**</td>
<td>-0.644</td>
<td>-1.673***</td>
<td>0.044</td>
<td>-2.124***</td>
<td>0.305</td>
<td>-0.048</td>
<td>-1.314*</td>
<td>0.107</td>
<td></td>
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</tr>
<tr>
<td>Year Fixed Effects</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Fixed Effects</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.205</td>
<td>0.166</td>
<td>0.186</td>
<td>0.218</td>
<td>0.128</td>
<td>0.185</td>
<td>0.404</td>
<td>0.126</td>
<td>0.219</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>18502</td>
<td>18407</td>
<td>18407</td>
<td>18502</td>
<td>18407</td>
<td>18407</td>
<td>18502</td>
<td>18407</td>
<td>18407</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The values within parentheses denote robust standard error. *** *, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.2 Empirical results
Table 6 reports the results from estimating Equations (12) and (13). This includes the results of management forecasts of sales (model 1–3), ordinary income (model 4–6), and net income (model 7–9). We find that international diversification measure (FSTS) is negatively associated with the forecast optimism measures. In model 1, the estimated coefficient of FSTS is −0.033 and statistically significant at the 1% level. In model 4, using the optimism measures based on the forecasts of ordinary income, the estimated coefficient of FSTS is also negative (−0.004) and statistically significant at the 10% level. These results indicate that management forecasts of firms with a higher-level of international business are likely to be pessimistic. Managers of multinational firms are likely to disclose pessimistic forecasts when they are less confident about their forecasts due to the greater uncertainty and complexity of the international business. The pessimistic bias would result in less accurate forecasts.

From Table 6 results, we also observe the relation between international diversification measure and forecast revision measure. FSTS is positively related with UpRevision, while it is negatively related with DownRevision. This implies that if the foreign sales ratio increases, the upward revisions of the forecasts increase, but the downward revisions decline. Combined with the results of the forecast optimism measures, it is considered that managers are likely to provide pessimistic forecasts for the initial forecasts in a given year, and then, revise them upward under the pressure of difficulty in forecasting the earnings of an international business.

Consistent with the results of the previous chapter, the international business experience of managers of multinational firms influences the optimism and revision of their forecasts. In Table 6, the estimated coefficients of the interaction terms (FSTS × Experience) show opposite signs for FSTS. Although management forecasts of multinational firms are likely to be more pessimistic than for domestic firms, managers of firms experienced in international business may contribute to mitigating the pessimistic bias of forecasts.

6. Conclusion

In this study, we investigate the relation between corporate international diversification and the quality of management forecasts using a sample of Japanese firms that were listed on the first section of the TSE between 2004 and 2015. The accuracy of management forecasts, used as the measure of forecast quality, is expected to be determined by the degree of difficulty of forecasting tasks. We hypothesize that corporate international diversification may increase the difficulty of forecasting tasks because of greater uncertainty and the complexities of international business, thereby deteriorating the accuracy of management forecasts.

Consistent with the hypothesis, we find that corporate international diversification is associated with less accurate management forecasts. In our regression results, international diversification measures are positively associated with the absolute forecast error of sales, ordinary income, and net income, after controlling other determinants of forecast accuracy. This implies that forecasting tasks become more difficult, as firms expand their international business. We also find that the increase in forecast error arises from pessimistic forecasts and managers’ experience of international business can mitigate the effects of corporate international diversification on their forecasts.
Our findings suggest that management forecasts of multinational firms are likely to be less accurate and more pessimistically biased. The important implication for investors and analysts, who utilize management forecasts, is that they should be more prudent when evaluating multinational firms based on management forecasts. The findings also imply that corporate international diversification may give rise to greater uncertainty and complexities of business that make it more difficult for managers to forecast future earnings and cash flows. Thus, managers of multinational firms need to make more efforts to effectively cope with the greater uncertainty and complexity of their international business.

REFERENCES


