

Managerial Ability and Earnings Quality in Japanese Firms: An Empirical Analysis

Jiao Zhang^a
Takayoshi Nakaoka^b

Abstract

This study investigates the link between earnings quality and managerial ability in Japanese firms using seven indicators for evaluating earnings quality. Accounting information is crucial in capital markets, facilitating efficient resource allocation. High-quality earnings information and the factors influencing it are essential. This study examines this relationship among firms listed on the Japanese stock market across 27 industries over 11 years. The positive correlation suggests that higher managerial ability corresponds with higher earnings quality, offering valuable evidence to academics and managers. This is the first empirical analysis of the earnings quality-managerial ability relationship in Japanese firms, thereby enhancing existing research.

Key Words: earnings quality, managerial ability, accruals

Introduction

A fundamental role of accounting information in financial markets is to serve as a basis for capital allocation. Given that earnings serve as a primary input for investors' and analysts' valuation models, poor earnings quality can result in differentially informed investors; this eventually exacerbates the information asymmetry in financial markets (Diamond and Verrecchia 1991; Kim and Verrecchia 1994), leading to higher capital costs (Francis et al. 2004). Research into the factors affecting the quality of accounting and earnings remains an important topic.

Numerous studies have explored factors influencing the formation of accounting information, focusing on either firm-specific or stock market characteristics (Fields, Lys, and Vincent 2001; Klein 2002; Leuz, Nanda, and Wysocki 2003). This study investigates how managers' characteristics influence earnings quality. Demerjian, Lev, and McVay (2012) introduced the managerial ability score to gauge a manager's unique competence based on financial and accounting information, rooted in the concept of "maximum earnings with minimum resources." Previously, studies have relied on proxies, such as returns on assets, equity returns, managerial compensation, and media mentions to assess managerial ability (Carter, Franco, and Tuna 2010; Hayes and Schaefer 1999; Rajgopal, Shevlin, and Zamora 2006). This study employs

a Faculty of Management, Josai University, Saitama, Japan

b Faculty of Commerce, Doshisha University, Kyoto, Japan

the managerial ability score along with industry-adjusted returns on assets and equity returns as measures of managerial ability.

Previous studies have explored the relationship between managerial ability and earnings quality in U.S.-based firms (Baik, Choi, and Farber 2020; Demerjian, Lewis-Western, and McVay 2020; Demerjian et al. 2013). Baik, Choi, and Farber (2020) have offered empirical evidence suggesting that effective managers utilize earnings leveling to enhance the utility of earnings information. Similarly, Demerjian et al. (2013) have found that managerial ability is inversely related to the frequency of financial statement revisions and magnitude of errors in bad debt allowance estimation but positively correlated with earnings persistence and accrual quality.

U.S.-based firms are typically characterized by market orientation, shareholder governance, and liquid CEO markets (Aoki, Patrick, and Sheard 1994; Ball, Kothari, and Robin 2000; Kaplan and Minton 1994). Moreover, their managers are more likely to be exposed to strong external pressure for improving business operation efficiency. Unlike the U.S., Japan has a very different institutional environment characterized by bank -orientation, strong stakeholder-governance, and illiquid CEO markets (Aoki, Patrick, and Sheard 1994). These striking differences cast doubt on the relevance of managerial ability and earnings quality in Japan.

However, the upper echelons theory based on Hambrick and Mason (1984) echoes that the top management team plays a key role in formulating and implementing strategies for balancing short-term performance and long-term adaptability through resource allocation trade-offs and organizational design decisions (Eisenhardt and Zbaracki 1992; Hambrick 1994). Therefore, it is expected that the cognitive biases based in the characteristics of the top management team (e.g., age and career) and their operations (information processing, strategic decision-making, resource allocation, employee guidance, etc.) affect firm performance. Moreover, the relationship between managerial ability and the quality of earnings in Japan is confirmed. This study extends prior research by comprehensively examining indicators measuring earnings quality to ascertain if similar correlations exist in Japanese firms.

Prior research and hypothesis derivation

Previous research indicates that disclosing low-quality earnings information can be detrimental to a firm (Francis et al. 2004; Palmrose and Scholz 2004). Consequently, managers are incentivized to disclose high-quality accounting information to prevent their firms from being disadvantaged.

Conversely, managers engaging in opportunistic behaviors—directing cash flows from the firm to management—may manipulate accounting information to boost compensation. This phenomenon is supported by empirical evidence from various studies (Dichev and Skinner 2002; Shuto 2007). However, opportunistic behavior poses significant risks for managers. For instance, if a firm's financial health and growth prospects are assessed based on accounting earnings manipulated by managers, shareholders may misinterpret the firm's true economic status, leading to delays in recovering investment funds (Kubota, Suda, and Takehara 2010; Xie 2001). Consequently, shareholders might miss out on other promising investment opportunities. Hence, shareholders may impose penalties on managers engaging in earnings manipulation (Ishida and Hachiya 2019). These perspectives suggest that managers are incentivized to disclose high-quality earnings information.

As mentioned before, the upper echelons theory suggests that the characteristics of the top management team affect firm performance. Hambrick and Mason (1984) state that an organization's strategy and performance ultimately reflect the cognitive foundations of the top management. Hambrick (2007) also suggests that the characteristics of the top management

team tend to more strongly explain organizational outcomes. Based on these arguments, it is expected that highly capable managers can improve earnings quality.

Accruals, representing the variance between accounting earnings and cash flows calculated under the accrual principle, encompass managerial projections of future profitability and risks. Errors in managerial projections may influence accrual quality and consequently impede earnings quality (Dechow and Dichev 2002; McNichols 2002). Proficient managers capable of accurately forecasting a firm's future profitability and risks are likely to produce precise earnings information.

H1: Accrual quality and managerial ability are positively correlated.

Earnings persistence refers to a firm's capacity to consistently generate earnings over time (Bergevin 2002). Earnings stemming from core business operations, often termed core business earnings, are characterized by their "repeatability and stability" (Bergevin 2002). The managerial ability score gauges a manager's proficiency in profit generation, primarily using sales as an earnings metric that reflects the ability to generate earnings specifically from core business activities. Managers with high capabilities, capable of achieving substantial sales from given inputs, are presumed to secure more persistent earnings because of the consistent and stable nature of sales. Hence, this study proposes the following hypothesis:

H2: Earnings persistence and managerial ability are positively correlated.

Earnings predictability refers to the ability of net earnings to forecast future earnings and cash flows (Ruch and Taylor 2015). Earnings information encompasses managerial forecasts regarding a firm's future profitability and risks. Previous research suggests that earnings predictability diminishes when prediction errors taint expectations. For instance, Dechow and Dichev (2002) contend that accounting accruals, a constituent of earnings, forecast future cash flows, and accruals containing numerous forecast errors diminish earnings predictability or quality. This study hypothesizes that highly competent managers exhibit superior capabilities in predicting future profitability and risk compared to their less competent counterparts, thereby enabling the formation of highly predictable earnings information.

H3: Earnings predictability and managerial ability are positively correlated.

Earnings smoothness refers to a pattern of earnings adjustment behavior where earnings are moderated downward during periods of strong business performance and increased during periods of poor performance (Ronen and Sadan 1981; Smith, Lipin, and Maj 1994). Accordingly, managers aim to achieve stable and consistent earnings growth characterized by consecutive profit increases. Demerjian, Lewis-Western, and McVay (2020) contend that "smoothing earnings is a difficult task, requiring managers to accurately forecast future profitability and adjust earnings for the current period," testing the hypothesis that highly competent managers are more adept at earnings adjustment than their less capable counterparts. The findings suggest that more proficient managers tend to engage in more aggressive earnings-smoothing. Anticipating a similar relationship between earnings-smoothing and managerial capability in Japanese firms (see Appendix Notes-1), the following hypothesis is proposed:

H4: Earnings smoothing and managerial ability are positively correlated.

The fundamental characteristic of accounting information lies in its utility for investor decision-making (Accounting Standards Board of Japan 2006). Previous research has utilized various measures of decision-making utility to validate this concept, with the relationship between earnings and stock prices being particularly significant. This relationship is expected to

be reinforced by the accuracy of corporate earnings predictions reflected in financial statements. Studies have demonstrated that competent managers possessing keen insights into firm and industry trends can furnish accounting information with high-value relevance (Baik, Farber, and Lee 2011). Consequently, the following hypothesis is posited:

H5: Earnings value relevance and managerial ability are positively correlated.

Timeliness and conservatism are key indicators of transparency. In an efficient stock market, events affecting a firm's financial health are promptly factored into stock prices before official accounting figures are published. Timeliness gauges how swiftly a firm incorporates such market-influenced information into its financial reporting. Competent managers, drawing on their expertise, profitability insights, and risk anticipation, are likely to generate earnings more promptly than their less capable counterparts. Therefore, the following hypothesis is posited:

H6: Earnings timeliness and managerial ability are positively correlated.

Conservatism is the degree to which accounting earnings reflect economic losses as compared to economic earnings (Otokawa and Kitagawa 2007). Essentially, timely recognition of bad news in earnings signifies conservatism. Previous studies indicate that conservative earnings can alleviate information asymmetry between corporate managers and external investors (Kirschenheiter and Melumad 2005; LaFond and Watts 2008). From the perspective of the informational function of accounting information, these findings imply that conservatism enhances earnings quality. Given that competent managers are inclined to disclose high-quality earnings, the following hypothesis can be posited:

H7: Earnings conservatism and managerial ability are correlated.

Research and design

Verification model

To assess the impact of managerial ability on earnings quality, we employ a regression model (1) where earnings quality serves as the dependent variable and managerial ability is the independent variable. Other factors influencing earnings quality are treated as control variables. A significantly positive coefficient (α_1) for the variable representing managerial ability confirms the proposed hypotheses.

$$\begin{aligned}
 \text{Earnings Quality Attribute}_{t,t+9}^k = & \alpha_0 + \alpha_1 \text{Managerial Ability}_t^b + \alpha_2 \text{FirmSize}_t \\
 & + \alpha_3 \text{SalesVolatility}_{t-4,t} + \alpha_4 \text{CashFlowVolatility}_{t-4,t} \\
 & + \alpha_5 \text{OperCycle}_{t-4,t} + \alpha_6 \text{LossH}_{t-4,t} \\
 & + \alpha_7 \text{SalesGrowth}_t + \alpha_8 \text{AbnormalReturn}_t \\
 & + \alpha_9 \text{InsiderOwn}_t + \alpha_{10} \text{ForeignOwn}_t \\
 & + \alpha_{11} \text{FinancialOwn}_t + \text{Year} + \text{Industry} + \varepsilon_t
 \end{aligned} \tag{1}$$

$$k \in \left\{ \begin{array}{l} \text{Accrual Quality, Persistence, Predictability, Smoothness,} \\ \text{Value Relevance, Timeliness, Conservatism} \end{array} \right\}$$

$$b \in \{ \text{MAScore, AdjustedROA, AdjustedReturn} \}$$

Variable definitions

The following subsections describe the variables related to earnings quality and managerial ability as well as the control variables.

Earnings quality

Accrual quality

Dechow and Dichev (2002) contend that, to capture managerial prediction errors affecting accrual quality, short-term accruals (*TCA*) should be calculated as operating cash flows (*CFO*). *TCA* is measured as (Δ current assets minus Δ cash deposits) - (Δ current liabilities - Δ funding items) (see Appendix Notes-1). *CFO* is calculated as net income - extraordinary income + extraordinary losses – accruals (see Appendix Notes-2). Each variable is based on the average total assets at the beginning and end of the period.

$$\frac{TCA_{i,t}}{Assets_{i,t}} = \alpha_0 + \alpha_1 \frac{CFO_{i,t-1}}{Assets_{i,t}} + \alpha_2 \frac{CFO_{i,t}}{Assets_{i,t}} + \alpha_3 \frac{CFO_{i,t+1}}{Assets_{i,t}} + \varepsilon_{i,t} \quad (2)$$

Equation (2) is estimated using rolling regression analysis with a window size of 10 periods from period t to period $t+9$, with the standard deviation of the error terms obtained for each firm $\sigma(\varepsilon_{i,t})$ defined as *Accrual Quality* in period t (Demerjian et al. 2013; Francis et al. 2004; Otokawa and Kitagawa 2007). To align with other measurements of earnings quality, the estimated standard deviation of the error terms $\varepsilon_{i,t}\sigma(\varepsilon_{i,t})$ is multiplied by -1.

Persistence

Generally, earnings persistence is measured using the regression coefficient of previous earnings obtained by regressing net income on previous earnings (Ali and Zarowin 1992; Francis et al. 2004; Lev 1983; Otokawa and Kitagawa 2007). The closer this regression coefficient is to 1, the higher the persistence. A rolling regression with a window size of 10 periods from period t to period $t+9$ is performed, estimating the first-order autoregressive (AR(1)) model (3). The earnings ($E_{i,t}$) used here indicate the ordinary income after tax, after deducting extraordinary income from net income and adding extraordinary losses; they are based on the average total number of shares issued during a given period. The coefficient α_1 estimated from Equation (3) indicates that the larger the coefficient, the higher the persistence.

$$E_{i,t} = \alpha_0 + \alpha_1 E_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Predictability

The freedom-adjusted coefficient of determination ($adj.R^2_{i,t}$) estimated from Equation (3) is considered a measure of predictability (Bradshaw, Lee, and Peterson 2016; Francis et al. 2004; Otokawa and Kitagawa 2007). The higher this value, the higher the predictability.

Smoothness

Several previous studies have measured the degree of earnings smoothness by contrasting earnings with cash flow volatility (Baik, Choi, and Farber 2020; Francis et al. 2004; Otokawa and Kitagawa 2007). The ratio of the standard deviation of ordinary income after tax ($E_{i,t}$) to the standard deviation of operating cash flow ($CFO_{i,t}$) over 10 periods is regarded as a measure of

smoothness. Therefore, smoothness can be defined as $\sigma(E_{i,t}) / \sigma(CFO_{i,t})$. Similar to accruals quality, the smoothness measure is multiplied by -1 to align with other earnings quality indicators.

Value Relevance

The value relevance of earnings concerns the relationship between shareholder value—market capitalization of stock prices—and earnings such that the higher the relevance, the higher the earnings quality. Equation (4) is used to estimate the value relevance of earnings (Bushman et al. 2004; Collins, Maydew, and Weiss 1997; Francis et al. 2004; Otokawa and Kitagawa 2007). $RET_{i,t}$ represents equity returns (see Appendix Notes-3) over the seven months from the end of the current fiscal year to one month later, $E_{i,t}$ the ordinary income after tax, $\Delta E_{i,t}$ the changes in ordinary income after tax compared to the previous fiscal year, and $MV_{i,t-1}$ the market capitalization of shares at the beginning of the period. Equation (4) is estimated using rolling regression analysis with a window size of 10 periods from period t to period $t+9$, with the obtained $adj.R^2_{i,t}$ regarded as the degree of *Value Relevance*.

$$RET_{i,t} = \alpha_0 + \alpha_1 \frac{E_{i,t}}{MV_{i,t-1}} + \alpha_2 \frac{\Delta E_{i,t}}{MV_{i,t-1}} + \varepsilon_{i,t} \quad (4)$$

Timeliness

Based on the aforementioned definition of timeliness described, the measurement is derived from Equation (5). $NEG_{i,t}$ is a dummy variable set to 1 if $RET_{i,t} < 0$, and 0 otherwise. The remaining variables are as defined before. Equation (5) is estimated using rolling regression analysis with a window size of 10 periods from period t to period $t+9$, with the obtained $adj.R^2_{i,t}$ representing the degree of *Timeliness*. The higher the value, the higher the timeliness.

$$\frac{E_{i,t}}{MV_{i,t-1}} = \alpha_0 + \alpha_1 NEG_{i,t} + \beta_1 RET_{i,t} + \beta_2 NEG_{i,t} \times RET_{i,t} + \varepsilon_{i,t} \quad (5)$$

Conservatism

Several previous studies have used measures derived from the coefficients estimated in Equation (5) (Basu 1997; Francis et al. 2004; Otokawa and Kitagawa 2007). The coefficient $\beta_1 + \beta_2 \beta_1$ estimated from Equation (5) is defined as *Conservatism*. This indicator compares the coefficient of economic losses with that of economic earnings (Otokawa and Kitagawa 2007). The higher this value, the higher the conservatism.

Managerial Ability

MAScore

Demerjian, Lev, and McVay (2012) have proposed a method for calculating managerial ability scores by focusing on how efficiently managers use firms' resources. The calculation method consists of the following two steps:

First, calculate a *Firm Efficiency* score by comparing *Sales* output with the required inputs. Inputs include *Cost of Goods Sold (CoGS)*, *Selling and Administrative Expenses (SG&A)*, *Tangible Fixed Assets (Net PP & E, PPE)*, *Net Operating Leases (OpsLease)* (see Appendix Notes-4), *Net Research and Development (R&D)* (see Appendix Notes-5), *Goodwill (Pur-*

chased Goodwill, Goodwill) and *Other Intangible Assets (OtherIntan)*.

When calculating *Firm Efficiency*, Demerjian, Lev, and McVay (2012) have used the data envelopment analysis (DEA) method to find the optimal solution of the efficiency score for each firm in each industry using Equation (6).

$$\max_{\theta} \theta = \frac{Sales}{v_1 CoGS + v_2 SG\&A + v_3 PPE + v_4 OpsLease + v_5 R\&D + v_6 Goodwill + v_7 OtherIntan} \quad (6)$$

In the second step, Demerjian, Lev, and McVay (2012) have conducted a statistical procedure to distinguish firm characteristics and managerial ability within the efficiency score calculated using DEA. Firm characteristics affecting the efficiency score include *Firm Size* ($\ln(Total Assets)$), *Market Share*, *Free Cash Flow*, *Firm Age* ($\ln(Age)$) (see Appendix Notes-6), *Business Segment Concentration*, and *Foreign Currency*. Equation (7), in which these firm characteristics are independent variables and the efficiency score is the dependent variable, makes estimations for each industry using Tobit regression analysis. Refer to Table A1 of the Appendix for the definitions of the variables used in Equation (7).

$$\begin{aligned} Firm\ Efficiency = & \alpha_0 + \alpha_1 \ln(Total\ Assets)_i + \alpha_2 Market\ Share_i + \alpha_3 Free\ Cash\ Flow_i \\ & + \alpha_4 \ln(Age)_i + \alpha_5 Business\ Segment\ Concentration_i \\ & + \alpha_6 Foreign\ Currency_i + Year_i + \varepsilon_i \end{aligned} \quad (7)$$

The residual (ε_i) estimated in Equation (7) is the *MAScore*. Therefore, the aspects of the efficiency score that are not explained by firm characteristics can be explained by managerial ability.

Industry-adjusted returns on assets and industry-adjusted equity returns

Chang, Ishida, and Kochiyama (2018) validated the *MAScore* as an effective measure of managerial ability in Japan. However, its superiority over alternative measures remains uncertain. Before the introduction of *MAScore*, several studies cited industry-adjusted return on assets and equity returns as proxy variables for management ability (Carter, Franco, and Tuna 2010; Hayes and Schaefer 1999; Rajgopal, Shevlin, and Zamora 2006). Thus, this study adopts industry-adjusted returns on assets and equity returns as proxy variables for managerial ability.

Control variables

Dechow and Dichev (2002) and Demerjian et al. (2013) have introduced control variables to account for various factors influencing earnings quality. First, Dechow and Dichev (2002) observed that larger firms tend to disclose higher-quality earnings. Consequently, the natural logarithm of total assets (*FirmSize*) is used as a control variable for firm size. Second, greater volatility in sales or cash flows indicates an unstable business environment, potentially leading to lower earnings quality (Dechow and Dichev 2002). To address this, sales volatility (*SalesVolatility*) and cash flow volatility (*CashFlowVolatility*) are included as control variables. Moreover, longer operating cycles can increase uncertainty and diminish earnings quality (Dechow and Dichev 2002). Thus, the operating cycle (*OperCycle*) is calculated as the sum of inventory turnover and accounts receivable turnover periods. Additionally, firms with net losses tend to disclose lower-quality earnings (Demerjian et al. 2013), which is why a variable indicating net losses over the past five years (*LossH*) is incorporated as a control. Year-on-year changes in sales growth and excess equity returns also impact earnings quality (Demerjian et al. 2013).

Therefore, sales growth rate (*SalesGrowth*) and excess equity returns (*AbnormalReturn*) are included as control variables. Considering corporate governance, prior studies have suggested that higher executive shareholding ratios are associated with higher earnings quality (Wang 2006; Warfield, Wild, and Wild 1995). Thus, the executive shareholding ratio (*InsiderOwn*), shareholding ratio of foreign corporations (*ForeignOwn*), and shareholding ratio of financial institutions (*FinancialOwn*) are included. Additionally, year and industry dummies are controlled for. Detailed definitions of these variables are provided in Table A2 of the Appendix.

Sample acquisition

The analysis utilizes financial data from firms listed on the Japanese stock market spanning from FY1999 to 2018. The data are sourced from NEEDS-Financial QUEST. We begin from FY1999 because the R&D expenditure data became available in Japan starting from that year. The sample excluded firms reporting for less than 12 months, those not adhering to Japanese GAAP for financial statements, and firms within the financial industry, including banking, securities, commodity futures trading, insurance, and other financial sectors among the 34 industries classified on the Tokyo Stock Exchange. Consistent with Demerjian, Lev, and McVay (2012) and Chang, Ishida, and Kochiyama (2018), industries such as mining and air transport, with fewer than 100 observations per industry, are excluded from the analysis. This is because estimating efficiency scores using DEA becomes challenging when the number of observations is insufficient.

The variable *R&D*, necessary for estimating the efficiency score, follows Lev and Sougiannis (1996) and Chang, Ishida, and Kochiyama (2018); it is calculated from FY2003 onwards. This calculation considers R&D expenditures over the past five periods, including the current fiscal year, for capitalization purposes. Considering that R&D data from the beginning of the fiscal year are essential for estimating the efficiency score, the score cannot be obtained until FY2004 or later. Additionally, following the methodology of Francis et al. (2004), a rolling regression analysis with a window size of 10 periods from $t-9$ to t is conducted when creating each variable for estimating earnings quality in period t . However, to ensure a sufficient number of observations, each variable representing earnings quality in period t is calculated based on the financial information for period t to period $t+9$ in the interim financial summary. Therefore, we obtain each variable related to earnings quality until FY2014. The sampling process and variable creation requirements result in a sample of firms from 27 industries over 11 years.

Descriptive statistics

Tables A1 and A3 of the Appendix present the descriptive statistics of the efficiency scores obtained using Equation (6) and the variables used in Equation (7), respectively.

Descriptive statistics for variables related to earnings quality closely resemble those reported by Otokawa and Kitagawa (2007). However, they tend to be slightly lower overall, particularly for *Persistence* and *Conservatism*. Previous studies have noted a decline in the persistence of accounting earnings over time, attributed to accounting reforms introduced in 2000 (Dichev and Tang 2008; Suda 2008). Unlike Otokawa and Kitagawa (2007), who covered the period from 1988 to 2005, this study spans the period following accounting system reforms, potentially explaining the lower persistence values observed in Table I. Furthermore, events such as the 2008 financial crisis and the 2011 Great East Japan Earthquake may have contributed to the decreased persistence of accounting earnings. Regarding *Conservatism*, the mean value (-0.280) shown in Table I is much lower than the average values in Otokawa and Kitagawa (2007) (0.404). Moreover, the minimum (-865.094) and maximum (883.999) values

Table I Descriptive statistics

	Mean	Standard deviation	Min	P25	Median	P75	Max	Observations
<i>Accrual Quality</i>	-0.025	0.024	-0.165	-0.030	-0.017	-0.011	-0.003	32,321
<i>Persistence</i>	0.098	0.556	-1.243	-0.248	0.126	0.441	4.962	32,915
<i>Predictability</i>	0.138	0.272	-0.125	-0.086	0.038	0.291	0.936	32,915
<i>Smoothness</i>	-0.527	0.394	-2.632	-0.678	-0.428	-0.255	-0.051	36,633
<i>ValueRelevance</i>	0.106	0.280	-0.281	-0.130	0.055	0.299	0.847	32,755
<i>Timeliness</i>	0.079	0.328	-0.472	-0.185	0.040	0.312	0.873	32,776
<i>Conservatism</i>	-0.280	65.225	-865.094	-1.070	0.080	1.339	883.999	32,690
<i>MAScore</i>	-0.007	0.084	-0.270	-0.054	-0.006	0.039	0.292	31,836
<i>AdjustedROA</i>	-0.034	0.212	-3.502	-0.023	0.001	0.016	1.846	36,597
<i>AdjustedReturn</i>	0.078	0.435	-0.991	-0.153	0.024	0.230	3.559	36,647
<i>FirmSize</i>	10.394	1.567	6.739	9.318	10.252	11.325	14.891	36,660
<i>SalesVolatility</i>	0.068	0.065	0.004	0.027	0.048	0.084	0.446	36,660
<i>CashFlowVolatility</i>	0.033	0.031	0.003	0.014	0.023	0.040	0.216	36,660
<i>OperCycle</i>	5.351	0.747	2.749	4.979	5.513	5.848	6.918	36,660
<i>LossH</i>	0.207	0.252	0.000	0.000	0.200	0.400	1.000	36,660
<i>SalesGrowth</i>	-0.005	0.278	-1.439	-0.102	-0.004	0.092	1.463	36,660
<i>AbnormalReturn</i>	0.005	0.357	-1.376	-0.182	-0.028	0.143	2.548	36,660
<i>InsiderOwn</i>	0.072	0.115	0.000	0.002	0.014	0.094	0.589	36,660
<i>ForeignOwn</i>	0.077	0.104	0.000	0.003	0.030	0.113	0.543	36,660
<i>FinancialOwn</i>	0.164	0.129	0.000	0.058	0.142	0.250	0.548	36,660

are significantly different from those in Otokawa and Kitagawa (2007) (see Appendix Notes-7). However, the first quartile, median, and third quartile values are similar to those reported by Otokawa and Kitagawa (2007).

Moreover, Table I indicates that the mean value of *MAScore* (-0.007) is smaller than that reported by Demerjian, Lev, and McVay (2012) (-0.004) and larger than that reported by Chang, Ishida, and Kochiyama (2018) (-0.009). The standard deviation of *MAScore* (0.084) is lower than that of Demerjian, Lev, and McVay (2012) (0.149) and slightly higher than that of Chang, Ishida, and Kochiyama (2018) (0.082). This variation may be attributed to differences in sample sizes used to calculate the efficiency scores. Nonetheless, *MAScore* values closely align with those reported by Chang, Ishida, and Kochiyama (2018), who studied Japanese firms.

Analysis results

Results of the tests for differences

Before conducting multivariate analysis, the relationship between earnings quality and managerial ability is explored by testing for differences. Table A4 of the Appendix summarizes the testing results for means or medians of all variables related to earnings quality in two groups, divided based on the medians of *MAScore*, *AdjustedROA*, or *AdjustedReturn* by year. The results suggest a relationship between certain earnings quality indicators and managerial ability.

Results of the correlation analysis

Multicollinearity between the independent variables is investigated. In Panel A of Table A5 in

the Appendix, correlation coefficients between earnings quality variables are generally low, indicating that each indicator captures earnings from different perspectives. In Panel B, correlation coefficients between independent variables are mostly low. However, *AdjustedReturn* and *AbnormalReturn* show the highest correlation coefficient at 0.804. *AbnormalReturn* is excluded from the control variables to mitigate multicollinearity, with *AdjustedReturn* retained as a measure of managerial ability.

Results of the regression analysis

Equation (1) is estimated while controlling for factors influencing earnings quality. The results of this estimation are summarized in Table II.

First, in the analysis related to *MAScore*, significant results are observed for four of the seven indicators. Specifically, *MAScore* exhibits a significantly positive coefficient at the 5% level for *Accrual Quality* and *Value Relevance*, and at the 1% level for *Persistence* and *Smoothness*. These findings suggest that higher managerial ability is associated with improved accruals quality, value relevance, persistence, and smoothness.

Second, focusing on the analysis using *AdjustedROA* to represent managerial ability, for the results obtained for *Accrual Quality* and *Smoothness* are significant. This implies that higher managerial ability corresponds with enhanced accruals quality and smoothness.

Third, in the analysis using *AdjustedReturn* as a measure of managerial ability, the results are significant for the following five out of seven indicators: *Accrual Quality*, *Persistence*, *Smoothness*, *Value Relevance*, and *Timeliness*. All coefficients for *MAScore* are significantly positive at the 1% level, indicating that higher managerial ability is associated with improved accruals quality, persistence, smoothness, value relevance, and timeliness.

Overall, the coefficients of the variables measuring managerial ability are positive among the statistically significant results. Notably, *Accrual Quality* and *Smoothness* exhibit robust verification results. These findings support H1, H3, H4, and H5, suggesting that higher managerial ability leads to better reported earnings quality.

Regarding the control variables, their signs vary depending on the dependent variable. For example, *FirmSize* exhibits positive coefficients when *Accrual Quality* is the dependent variable but negative coefficients when *Predictability* is considered. This indicates that larger firms tend to have higher accruals quality but lower predictability. Conversely, consistent signs are observed for *LossH*, *AbnormalReturn*, *InsiderOwn*, and *FinancialOwn*, aligning with previous studies.

Conclusion

Accounting earnings play a crucial role in capital market price formation and are subject to extensive research aimed at understanding the determinants of their quality. While previous studies have focused on firm-specific and market-related factors influencing earnings quality, there is growing recognition of the impact of managerial decisions on financial information (Bertrand and Schoar 2003; DeJong and Ling 2010; Francis et al. 2008; Ge, Matsumoto, and Zhang 2011; Malmendier and Tate 2009). This study found a positive correlation between earnings quality and managerial ability.

Previous studies have explored the relationship between managerial ability and earnings quality in U.S. firms (Baik, Choi, and Farber 2020; Demerjian, Lewis-Western, and McVay 2020; Demerjian et al. 2013). U.S.-based firms are different from Japanese firms because the latter are characterized by bank orientation, strong stakeholder governance, and illiquid CEO markets (Aoki, Patrick, and Sheard 1994). Unlike in the U.S., managers of Japanese firms are

Table II Results of the regression analysis

Variable	Accrual Quality	Persistence	Predictability	Smoothness	ValueRelevance	Timeliness	Conservation
<i>MA Score</i>	0.005** [2.30]	0.310*** [6.82]	-0.027 [-1.32]	0.458*** [16.36]	0.049** [2.41]	0.016 [0.64]	4.765 [1.05]
<i>Adjusted ROA</i>	0.002*** [4.11]	-0.004 [-0.25]	0.003 [0.46]	0.051*** [5.01]	-0.006 [-0.85]	-0.008 [-0.97]	1.263 [0.64]
<i>Adjusted Return</i>	0.002*** [4.18]	0.025*** [2.96]	-0.003 [-0.76]	0.032*** [5.79]	0.029*** [6.48]	0.030*** [5.91]	-0.232 [-0.34]
<i>Firm Size</i>	0.001*** [9.06]	0.001*** [10.10]	-0.007*** [-3.87]	0.020*** [10.80]	0.004** [2.57]	0.001 [0.54]	0.029 [0.07]
<i>Sales Volatility</i>	-0.032*** [-9.66]	-0.031*** [-10.14]	-0.066*** [-2.20]	-0.175*** [-4.04]	0.046 [1.58]	0.075* [1.93]	-2.378 [-0.45]
<i>Cash Flow Volatility</i>	-0.189*** [-21.67]	-0.189*** [-23.33]	0.038 [0.86]	0.973*** [10.24]	0.042 [0.57]	0.056 [0.63]	0.084** [2.31]
<i>Oper Cycle</i>	-0.002*** [-6.77]	-0.002*** [-6.47]	-0.003 [-1.62]	0.010** [2.48]	-0.007** [-2.42]	0.002 [0.15]	2.452 [0.20]
<i>Loss H</i>	-0.011*** [-17.37]	-0.012*** [-20.04]	-0.019** [-2.44]	-0.251*** [-25.34]	-0.022*** [-3.25]	-0.01 [-1.24]	-0.682 [-1.02]
<i>Sales Growth</i>	0.001* [1.67]	-0.008 [-0.71]	0.006 [1.25]	0.045*** [5.32]	0.006 [0.89]	0.01 [1.30]	0.696 [0.54]
<i>Abnormal Return</i>	0.002*** [3.82]	0.031*** [1.87]	-0.005 [-0.95]	0.037*** [4.96]	0.024*** [4.24]	0.016** [2.41]	-0.188 [-0.19]
<i>Insider Own</i>	0.014*** [10.15]	0.015*** [11.87]	-0.014 [-0.92]	0.052*** [2.66]	-0.002 [-0.13]	0.021 [1.11]	-3.573 [-1.28]
<i>Foreign Own</i>	-0.028*** [-16.00]	-0.031*** [-17.84]	0.038* [1.88]	-0.405*** [-15.62]	0.090*** [4.39]	0.063*** [2.63]	1.187 [0.27]
<i>Financial Own</i>	0.022*** [17.80]	0.024*** [19.95]	0.062*** [3.49]	0.092*** [4.01]	0.024 [1.33]	-0.024 [-1.14]	0.938 [0.20]
<i>Constant</i>	-0.019*** [-8.68]	-0.478*** [-4.96]	0.391*** [8.34]	-0.619*** [-17.02]	0.071* [1.83]	0.033 [0.80]	6.851 [1.03]
Observations	28,073	32,310	24,195	27,930	27,957	32,766	28,391
Adjusted R-squared	0.242	0.243	0.058	0.057	0.057	0.008	0.002
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES

(Note) When calculating the t -values in []: Standard errors corrected for heteroscedasticity were used to calculate the t -values in *. **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

not exposed to strong external pressures to improve business operation efficiency. However, the findings of this study suggest a relationship between certain earnings quality indicators and managerial ability in Japanese firms. These findings are consistent with the upper echelons theory, suggesting managers affect firm performance.

Firms must provide accounting information that aids investor decision-making when accessing funds from the capital market for economic activities (Accounting Standards Board of Japan 2006). Meeting investors' demands and disclosing superior-quality accounting information can boost competitiveness in fundraising. This study's findings indicate that capable managers are inclined to disclose high-quality earnings. Thus, appointing competent managers could be an effective strategy for facilitating the disclosure of accounting information beneficial for decision-making.

Our study has three primary limitations. First, we could not replicate the methodology used by Demerjian, Lev, and McVay (2012) to create variables measuring the *MAScore*. For instance, Demerjian, Lev, and McVay (2012) utilized the discounted present value of accrued lease payments for the previous five years, as disclosed in financial statement notes. This is not available for Japanese firms. Instead, we adopted the operating lease asset calculation method from Kusano, Sakuma, and Tsunogaya (2015), specific to Japanese firms and industries, making direct comparisons difficult. Second, because of the absence of comprehensive commercial databases in Japan, alternative measures of managerial ability, such as news and media publications or CEOs' cash compensation, were not considered. Third, our study relied on proxies for managerial ability and earnings quality. While we attempted to control for correlated variables, the possibility of correlated omitted variables remains. Future research could explore the association between market reactions, such as stock price fluctuations and earnings information provided by managers with varying levels of managerial ability.

Funding Details

This work was supported by the Japan Society for the Promotion of Science (Grant No. 20K13644).

Appendix

Table A1. Descriptive statistics

	Mean	Standard deviation	Min	P25	Median	P75	Max	Observations
<i>Firm Efficiency</i>	0.825	0.164	0.118	0.760	0.869	0.948	1.000	35,474
<i>Ln(Total Assets)</i>	10.291	1.642	4.595	9.177	10.155	11.277	16.651	35,474
<i>Market Share</i>	0.007	0.026	0.000	0.000	0.001	0.004	0.636	35,474
<i>Free Cash Flow</i>	0.646	0.478	0.000	0.000	1.000	1.000	1.000	35,474
<i>Ln(Age)</i>	4.002	0.473	2.290	3.727	4.137	4.308	4.938	35,474
<i>Business Segment Concentration</i>	0.753	0.262	0.091	0.510	0.843	1.000	1.000	35,474
<i>Foreign Currency</i>	0.480	0.500	0.000	0.000	0.000	1.000	1.000	35,474

(Note) *Firm Efficiency* = Firm efficiency in period t ; *Ln(Total Assets)* = Natural logarithm of total assets at the end of period t ; *Market Share* = Share of sales in the industry during period t ; *Free Cash Flow* = a dummy variable that takes 1 if the free cash flow in period t is not negative, otherwise 0; *Ln(Age)* = Natural logarithm of firm age in period t . *Business Segment Concentration* = Sum of squares of the ratio of each business segment's sales to total sales in period t . If there is only one business segment, it takes 1; *Foreign Currency* = A dummy variable that takes 1 if the currency exchange adjustment account at the end of period t is not 0; otherwise, it takes 0.

Table A2. Variable definitions

Variable	Definition
Measures of earnings quality	
<i>Accrual Quality</i>	Accrual quality in the period t . (2) The standard deviation of the error terms $\sigma(\varepsilon_{it})$ of the period t estimated from Equation (2) multiplied by -1. Estimation is performed by rolling regression with a window period of 10 periods from period t to period $t+9$.
<i>Persistence</i>	Persistence of period t . The coefficient $\alpha_{1i,t}$ of period t estimated from equation (3). Estimation is performed using rolling regression with a window period of 10 periods from the period t to period $t+9$.
<i>Predictability</i>	Predictability of period t . The freedom-adjusted coefficient of determination ($adj.R^2_{i,t}$) from equation (3). Estimation is performed using rolling regression with a window period of 10 periods from period t to period $t+9$.
<i>Smoothness</i>	Smoothness of period t . The ratio of the standard deviation of after-tax ordinary income to the standard deviation of operating cash flow for the 10 periods from period t to period $t+9$, multiplied by -1.
<i>ValueRelevance</i>	Value relevance of period t . The $adj.R^2_{i,t}$ from equation (4). Estimation is performed using rolling regression with a window period of 10 periods from period t to period $t+9$.
<i>Timeliness</i>	Timeliness of the period t . The $adj.R^2_{i,t}$ from equation (5). Estimation is performed using rolling regression with a window period of 10 periods from period t to period $t+9$.
<i>Conservatism</i>	Conservatism in period t . The sum of the period t coefficients $\beta_{1i,t}$ and $\beta_{2i,t}$ estimated from the equation (5) divided by the coefficient $\beta_{1i,t}$. Estimation is performed using rolling regression with a window period of 10 periods from period t to period $t+9$.
Measures of managerial ability	
<i>MA Score</i>	Managerial ability in the period t . Managerial ability is the residuals estimated from equation (7).
<i>AdjustedROA</i>	Industry-adjusted returns on assets for period t . The industry-adjusted returns on assets are calculated by subtracting the weighted average of total assets from the returns on assets at the beginning of the year and in the same industry.
<i>AdjustedReturn</i>	Industry-adjusted equity returns in period t . Industry-adjusted equity returns are calculated by subtracting the weighted average of the market capitalization from the annual equity returns at the beginning of the year and in the same industry.
Control variables	
<i>FirmSize</i>	Natural logarithm of total assets at the end of period t .
<i>SalesVolatility</i>	Standard deviation of sales over five periods from the period $t-4$ to the period t . Sales are based on the average of total assets at the beginning of the period and total assets at the end of the period.
<i>CashFlowVolatility</i>	Standard deviation of cash flow over five periods from period $t-4$ to period t . Cash flow is based on the average of total assets at the beginning of the period and total assets at the end of the period.
<i>OperCycle</i>	The average value of operating cycles over five periods from period $t-4$ to period t . The operating cycle is the natural logarithm of the sum of the inventory turnover period and the accounts receivable turnover period.
<i>LossH</i>	The number of times a net loss was recorded from period $t-4$ to period t , divided by 5.
<i>SalesGrowth</i>	The sales growth rate in period t minus the sales growth rate in period $t-1$.
<i>AbnormalReturn</i>	Excess returns on stocks in period t . Excess stock returns are the annual stock returns minus the TOPIX annual stock returns.
<i>InsiderOwn</i>	Executive shareholding ratio in period t .
<i>ForeignOwn</i>	Foreign corporation and other shareholding ratio in period t .
<i>FinancialOwn</i>	Financial institution shareholding ratio in period t .

Table A3. Descriptive statistics on efficiency scores

Industry	Mean	Standard deviation	P25	Median	P75	Observations
Construction	0.889	0.061	0.845	0.877	0.932	2,013
Food	0.912	0.065	0.870	0.913	0.971	1,466
Textiles	0.903	0.090	0.845	0.916	0.988	690
Pulp and paper	0.975	0.031	0.957	0.987	1.000	279
Chemical	0.884	0.081	0.825	0.886	0.952	2,323
Medicine	0.806	0.140	0.723	0.808	0.911	475
Petroleum and coal products	0.974	0.030	0.954	0.984	1.000	128
Rubber products	0.962	0.038	0.929	0.968	1.000	205
Glass and stone products	0.879	0.085	0.816	0.877	0.952	696
Iron and steel	0.890	0.086	0.826	0.889	0.978	588
Non-ferrous metals	0.928	0.075	0.891	0.944	0.987	401
Metal products	0.889	0.095	0.840	0.901	0.967	968
Machinery	0.825	0.101	0.766	0.823	0.887	2,479
Electrical appliances	0.767	0.118	0.688	0.765	0.842	2,828
Transportation equipment	0.938	0.049	0.904	0.944	0.980	1,129
Precision machinery	0.873	0.109	0.806	0.884	0.975	524
Other products	0.907	0.078	0.854	0.915	0.978	1,132
Electricity and gas	0.972	0.050	0.959	0.993	1.000	161
Fisheries, agriculture, and forestry	0.963	0.048	0.936	0.988	1.000	119
Land transport	0.970	0.026	0.952	0.973	0.994	735
Shipping	0.859	0.112	0.763	0.860	0.974	198
Warehousing and transportation	0.969	0.028	0.950	0.969	0.999	442
Information and communications	0.690	0.150	0.592	0.696	0.787	3,392
Wholesale trade	0.926	0.057	0.892	0.935	0.969	3,431
Retail	0.890	0.068	0.845	0.892	0.938	3,770
Real estate	0.804	0.151	0.715	0.813	0.924	1,307
Service	0.520	0.169	0.389	0.493	0.606	3,595
Total sample	0.825	0.164	0.760	0.869	0.948	35,474

Table A4. Results of the tests of differences

	<i>Low MAScore</i>			<i>High MAScore</i>			Diff Mean	Diff Median
	Observations	Mean	Median	Observations	Mean	Median		
<i>Accrual Quality</i>	13,927	-0.025	-0.017	14,146	-0.024	-0.017	0.001***	0.000
<i>Persistence</i>	14,196	0.088	0.112	14,402	0.108	0.139	0.020***	0.027***
<i>Predictability</i>	14,196	0.138	0.039	14,402	0.138	0.038	0.000	-0.001
<i>Smoothness</i>	15,826	-0.567	-0.466	15,986	-0.494	-0.401	0.073***	0.065***
<i>ValueRelevance</i>	14,132	0.096	0.044	14,322	0.107	0.057	0.011***	0.013***
<i>Timeliness</i>	14,140	0.074	0.035	14,329	0.075	0.036	0.001	0.001
<i>Conservatism</i>	14,099	-0.929	0.068	14,292	-0.223	0.088	0.706	0.020
	<i>Low AdjustedROA</i>			<i>High AdjustedROA</i>			Diff Mean	Diff Median
	Observations	Mean	Median	Observations	Mean	Median		
<i>Accrual Quality</i>	15,904	-0.026	-0.018	16,367	-0.024	-0.017	0.002***	0.001***
<i>Persistence</i>	16,211	0.106	0.125	16,652	0.090	0.126	-0.016***	0.001
<i>Predictability</i>	16,211	0.124	0.025	16,652	0.152	0.053	0.028***	0.028***
<i>Smoothness</i>	18,215	-0.552	-0.446	18,355	-0.502	-0.413	0.050***	0.033***
<i>ValueRelevance</i>	16,130	0.099	0.047	16,573	0.112	0.064	0.013***	0.017***
<i>Timeliness</i>	16,142	0.077	0.039	16,582	0.080	0.041	0.003	0.002
<i>Conservatism</i>	16,094	-0.211	0.089	16,544	-0.341	0.075	0.130	-0.014
	<i>Low AdjustedReturn</i>			<i>High AdjustedReturn</i>			Diff Mean	Diff Median
	Observations	Mean	Median	Observations	Mean	Median		
<i>Accrual Quality</i>	15,925	-0.026	-0.018	16,385	-0.023	-0.017	0.003***	0.001***
<i>Persistence</i>	16,227	0.105	0.132	16,677	0.091	0.120	-0.014**	-0.012*
<i>Predictability</i>	16,227	0.136	0.038	16,677	0.140	0.041	0.004	0.003
<i>Smoothness</i>	18,229	-0.547	-0.446	18,391	-0.506	-0.411	0.041***	0.035***
<i>ValueRelevance</i>	16,135	0.100	0.047	16,610	0.111	0.062	0.011***	0.015***
<i>Timeliness</i>	16,145	0.074	0.035	16,621	0.083	0.045	0.009**	0.010*
<i>Conservatism</i>	16,095	-0.639	0.072	16,585	0.066	0.088	0.705	0.016

(Note) *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A5. Results of the correlation analysis

Panel A													
	<i>Accrual Quality</i>	<i>Persistence</i>	<i>Predictability</i>	<i>Smoothness</i>	<i>Value Relevance</i>	<i>Timeliness</i>	<i>Conservatism</i>						
<i>Accrual Quality</i>		-0.013*	0.013*	0.209*	0.019*	0.004	-0.003						
<i>Persistence</i>	-0.012		0.038*	-0.031*	0.005	0.046*	-0.015*						
<i>Predictability</i>	0.022*	0.168*		-0.026*	-0.008	-0.013*	-0.006						
<i>Smoothness</i>	0.256*	-0.066*	-0.031*		-0.015*	0.007	-0.001						
<i>ValueRelevance</i>	0.010	0.018*	0.003	-0.016*		0.465*	0.006						
<i>Timeliness</i>	0.015*	0.055*	-0.004	0.004	0.440*		0.009						
<i>Conservatism</i>	0.007	-0.008	0.000	0.005	0.095*	0.024*							
Panel B													
	<i>MAScore</i>	<i>Adjusted ROA</i>	<i>Adjusted Return</i>	<i>FirmSize</i>	<i>Sales Volatility</i>	<i>CashFlow Volatility</i>	<i>OperCycle</i>	<i>LossH</i>	<i>Sales Growth</i>	<i>Abnormal Return</i>	<i>Insider Own</i>	<i>Foreign Own</i>	<i>Financial Own</i>
<i>MAScore</i>		0.048*	0.057*	0.003	0.077*	0.037*	-0.089*	-0.166*	0.018*	0.064*	0.001	0.042*	0.035*
<i>AdjustedROA</i>	0.185*		0.012*	0.063*	-0.017*	-0.038*	-0.008	-0.081*	0.005	0.047*	0.003	0.032*	0.042*
<i>AdjustedReturn</i>	0.063*	0.087*		0.073*	-0.052*	-0.061*	0.057*	0.005	0.159*	0.804*	-0.051*	0.036*	0.104*
<i>FirmSize</i>	0.041*	0.041*	0.097*		-0.267*	-0.314*	0.080*	-0.220*	0.003	0.048*	-0.324*	0.557*	0.646*
<i>SalesVolatility</i>	0.083*	0.038*	-0.075*	-0.268*		0.539*	-0.124*	0.162*	-0.019*	-0.033*	0.082*	-0.102*	-0.289*
<i>CashFlowVolatility</i>	0.047*	0.025*	-0.087*	-0.337*	0.552*		0.070*	0.179*	-0.024*	-0.042*	0.096*	-0.108*	-0.325*
<i>OperCycle</i>	-0.103*	-0.041*	0.047*	0.083*	-0.130*	0.052*		0.088*	0.007	0.045*	-0.131*	0.092*	0.156*
<i>LossH</i>	-0.175*	-0.312*	-0.022*	-0.190*	0.177*	0.181*	0.117*		0.021*	-0.007	-0.016*	-0.154*	-0.158*
<i>SalesGrowth</i>	0.005	0.034*	0.188*	0.010	-0.033*	-0.022*	0.007	0.017*		0.121*	-0.005	-0.002	0.010*
<i>AbnormalReturn</i>	0.076*	0.147*	0.636*	0.074*	-0.042*	-0.061*	0.027*	-0.037*	0.133*		-0.018*	0.031*	0.084*
<i>InsiderOwn</i>	-0.014*	0.043*	0.004	-0.362*	0.006	0.036*	-0.048*	-0.047*	-0.002	0.026*		-0.143*	-0.281*
<i>ForeignOwn</i>	0.063*	0.103*	0.078*	0.631*	-0.153*	-0.183*	0.125*	-0.187*	-0.004	0.074*	-0.128*		0.406*
<i>FinancialOwn</i>	0.043*	0.040*	0.131*	0.662*	-0.310*	-0.361*	0.165*	-0.137*	0.011*	0.114*	-0.155*	0.537*	

(Note) The lower triangular matrix shows Spearman's correlation coefficient, and the upper triangular matrix shows Pearson's correlation coefficient. * Indicates statistical significance at the 5% level.

Notes

1. In accordance with Suda and Shuto (2004), Δ financing items are defined as follows. Δ Financing items = Δ short-term borrowings + Δ commercial papers + Δ long-term borrowings to be repaid within one year + Δ corporate bonds and convertible bonds to be repaid within one year. However, Δ indicates change during the period.
2. In accordance with Suda and Shuto (2004), accruals are defined as follows. Accruals = (Δ current assets - Δ cash deposits) - (Δ current liabilities - Δ cash adjustment items) - (Δ allowance for bad debts + Δ provisions for retirement benefits + Δ provisions for executive retirement benefits + Δ other long-term provisions + depreciation and amortization).
3. In previous studies, $RET_{i,t}$ has been defined as equity returns over 5 months from the end of the current period to one month later. However, in this study, variables related to earnings quality are created using interim data. Therefore, $RET_{i,t}$ is defined as equity returns over the 7 months from the end of the current period to one month later.
4. For operating lease assets, Demerjian et al. (2012) utilized the discounted present value of accrued lease payments for the previous five years, as disclosed in the notes to the financial statements. However, as information on accrued lease payments for operating lease assets is not available for Japanese firms, this study adopts the operating lease asset calculation method reported by Kusano et al. (2015), who examine Japanese firms, following the approach taken by Chang et al. (2018).
5. Following Chang et al. (2018), research and development assets ($R\&D$) are defined as $R\&D$ expenditures ($R\&D_Exp$) over the past five years capitalized according to a fixed amount of depreciation with useful life defined as five years. That is, $R\&D = \sum_{t=4}^0 (1+0.2*t) \times R\&D_Exp$.
6. Demerjian et al. (2012) defined the number of years elapsed since listing as the company's age ($\ln(Age)$). However, according to Chang et al. (2018), who assessed the applicability and validity of this method for measuring managerial capacity in Japanese firms, even companies with a long history of business establishment may be considered startups and may not effectively represent the company's life cycle. Therefore, in this study, the company's age is calculated from the actual year of establishment, following Chang et al. (2018).

7. In contrast to Otokawa and Kitagawa (2007), this study employs a year-by-year analysis of outliers. Adopting this approach yields minimum and maximum values (-68.660 and 38.223, respectively) that closely resemble those reported in Otokawa and Kitagawa (2007).

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